

Technology and Industrial Arts

Textile Technology

**Junior High
Grade 9**

Teacher Guide

Standards-Based



**'FREE ISSUE
NOT FOR SALE'**

Department of Education

Technology and Industrial Arts

Textile Technology

Teacher Guide

Grade 9

Standards- Based Curriculum



Department of Education

Issued free to schools by the Department of Education

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Acronyms

AAL	Assessment as Learning
AFL	Assessment for Learning
ARS	Audience Response System.
AOL	Assessment of Learning
BoS	Board of Studies
CDD	Curriculum Development Division
CP	Curriculum Panel
DA	Diagnostic Assessment
IHD	Integral Human Development
GoPNG	Government of Papua New Guinea
KSVA	Knowledge Skills Values and Attitudes
MTDG	Medium Term Development Goals
NDoE	National Department of Education
OBC	Outcomes-Based Curriculum
OBE	Outcomes-Based Education
PNG	Papua New Guinea
SAC	Subject Advisory Committee
SBC	Standards-Based Assessment
SBC	Standards-Based Curriculum
SBE	Standards-Based Education
SCG	Subject Curriculum Group
STEAM	Science, Technology, Engineering, Arts and Mathematics
SRS	Student Response System
TIA	Technology and Industrial Arts
UOW	Unit of Work

SECRETARY'S MESSAGE

The ultimate aim of Standards-Based Education in Papua New Guinea (PNG) is to prepare students for careers, higher education, and citizenship. This means that education should focus on developing and equipping students with essential knowledge, skills, values, and attitudes that they can use in all aspects of their lives. Education must also aim to motivate and prepare students to pursue Science, Technology, Engineering, Arts, and Mathematics (STEAM) courses in higher education institutions and pursue careers in STEAM related fields.

The Technology and Industrial Arts subject has 5 strands, which have their own teacher guides developed. This Textiles Technology teacher guide is one of the four developed for grades 9 to 12. Textiles Technology is a significant curriculum course written to develop skills-based proficiencies and competencies in students to be confident, efficient and effective creators and users of textile through better understanding of the content and incorporating the concepts with other technologies, that will provide career opportunities for students to pursue in the 21st century.

Textiles Technology embraces the historical and cultural diversity of creating various types of fibres and fabrics, textiles and clothing, absorbing key important aspects of safety, blending these into the modern designing and constructions of garments and fashions and other textile products to meet the needs of today's living.

It is equally important for students to understand textile technology on a larger scale, the perspectives of textile products manufacturing industries, and their impacts on the environment as well as the population globally. Students will make decisive and collaborative decisions to further pursue textile technology more to their advantage and interest.

Technology and Industrial Arts as a subject of which Textile Technology is a strand, is envisioned to benefit students in enabling them to utilise textile technology knowledge, skills, values and attitudes, and systems and processes to solve problems using the design process in a methodical and precise manner to innovate and invent design solutions. The integration of STEAM in the teaching and learning of Textile Technology will instill in students the abilities and capabilities to be highly proficient and competent end users and possibly creators of technology as STEAM is an integral component of the core curriculum.

Teachers are encouraged to read this teacher guide carefully to become familiar with the content so that they can be confident to use the new concepts and strategies as well as teach the content well. They can also adjust to suit the needs of the students.

I commend and approve this Grade 9 and 10 Technology and Industrial Arts: Communication Technology Teacher Guide to be used in all high schools throughout Papua New Guinea.



DR. UKE W KOMBRA, PhD

Secretary for Education

INTRODUCTION

The strand Communication Technology in the Technology and Industrial Arts subject aims to help students become competent and confident users of communication and technology who can make efficient, effective and creative use of basic application software in their everyday activities. It further encourages them to individually and collaboratively apply systems thinking to monitor, analyse, predict and shape the interactions within and between information systems and the impact of these systems on individuals, societies, economies and environments. It embraces the development in technology and emerging technologies using software and applications, safely, ethically and with greater responsibility.

The study of Textile Technology will enhance the students' knowledge to recognize intellectual property, apply creativity and critical thinking skills, collaboration of design process skills, safety practices, and further identify the impacts of textile technology in society. It also aims to provide lifelong skills and opportunities for students to live a productive life as well as a career or pursuing further learning. In the 21st century, it is important to recognise that textile technology has become part of the educational process for all age levels and should be viewed and taught as a tool for problem solving and decision- making.

Students should be encouraged to analyse, synthesise and evaluate situations at home, and school, thereby, apply textile technology knowledge, skills, values and attitudes to efficiently and effectively prepare for the rapid changes and influences that will and may affect textile technology today and beyond.

Students' employability will be enhanced through the study and application of STEAM principles. STEAM is an integral component of the core curriculum. It is envisioned that the study of STEAM will motivate students to take up academic programs and careers in STEAM related fields. STEAM has been embedded in the Technology and Industrial Arts: Communication Technology curriculum.

Teachers of Textile Technology strands will plan and program the food and textile strands for 13 weeks on a rotational basis with the other 3 strands as they are taught concurrently, hence the total coverage of learning Technology and Industrial Arts as a subject. The learning integration is more relevant including the STEAM approach to teach the essential knowledge, skills, values and attitudes, and processes.

This Technology and Industrial Arts-Textile Technology teacher guide must be used in close consultation with the Technology and Industrial Arts grades 9 and 10 syllabuses. It is to be timetabled for 200 minutes (5 periods) per week in junior high school.

STRUCTURE OF THE TEACHER GUIDE

The Textile Technology Strand Teacher Guide comprises of two main sections that provide essential information that all teachers should know and do to effectively implement the Textile Technology curriculum.

1. General Information of the Subject/Strand

The general information section of the Teacher Guide informs teachers on the Textile Technology Strand under the following headings below;

- Introduction of the Strand Teacher Guide
- Structure of the Strand Teacher Guide
- Purpose of the Strand Teacher Guide
- How to use the Strand Teacher Guide

2. Teaching and Learning Section

The teaching and learning section of the Teacher Guide informs and guides teachers to apply the teaching and learning theories, principles, pedagogies and practices in planning, programing, teaching and assessing students. They are outlined in the headings bulleted below;

- Syllabus and Teacher Guide Alignment
- Learning and Performance Standards
- Core Curriculum
- Science Technology Engineering Arts Mathematics (STEAM)
- Curriculum Integration
- Essential Knowledge, Skills, Values and Attitudes
- Teaching and Learning Strategies
- Strands, Units and Topics
- Sample SBC Lesson Plans

3. Assessment Section

The assessment section of the Textile Technology Teacher Guide informs and guides teachers to plan and program assessment activities, formulate assessment rubrics and apply assessment strategies to assess studies. This section also guides teachers to monitor and report students' progress of learning and performances of the attainment of standards.

4. Glossary, References and Appendices Sections

These sections guide teachers to refer to terms and definitions of the strand/ subject content, references outlined to guide the development of this teacher guide. The appendices section provides essential information to guide teachers on the content and the delivery of this strand/subject.

5. Glossary, References and Appendices Sections

These sections guide teachers to refer to; terms and definitions of the strand/ subject content, references outlined to guide the development of this teacher guide and essential and supplementary information provided to guide teachers on the content and the delivery of this strand/subject.

PURPOSE OF THE TEACHER GUIDE

This teacher guide describes what teachers should know and do to effectively plan, program, teach and assess grade 9 and Textile Technology content to enable all students to attain the required learning and proficiency standards.

Ample information with thorough guidelines is provided for the teacher to use to achieve the essential Knowledge, Skills, Attitudes and Values (KSAV) embedded in the set national content standards and grade level benchmarks.

The overarching purpose of this teacher guide is to assist teachers to;

- understand the significance of aligning all the elements of standards- based curriculum (SBC) as the basis of achieving the expected level of education quality;
- effectively align all the components of SBC when planning, programming, teaching, and assessing students learning and levels of proficiency;
- effectively translate and align the Technology and Industrial Arts Syllabi and Textile Technology Strand teacher guides to plan, program, teach and assess different Textile Technology Strand Teacher Guide units and topics, and the essential knowledge, skills, attitudes and values (KSAVs) described in the grade – level benchmarks;
- understand the Textile Technology Strand national content standards, grade-level benchmarks, and evidence outcomes;
- effectively make sense of the content (KSAVs) described in the Textile Technology Strand national content standards and the essential components of the content described in the grade – level benchmarks;
- effectively guide students to progressively learn and demonstrate proficiency on a range of Textile Technology Strand skills, processes, concepts, ideas, principles, practices, values and attitudes;
- confidently interpret, translate and use Textile Technology Strand content standards and benchmarks to determine the learning objectives and performance standards, plan and program appropriately to enable all students to achieve these standards;
- embed the core curriculum in the Textile Technology Strand lesson planning, programming, instruction, and assessment to permit all students to learn and master the core knowledge, skills, values and attitudes required of all students;
- provide opportunities for all students understand how STEAM has and continues to shape the social, political, economic, cultural, and environment contexts and the consequences, and use STEAM
- principles, skills, processes, ideas and concepts to inquire into and solve problems relating to both the natural and physical worlds (human –made) as well as problems created by STEAM;

- integrate cognitive skills (critical, creative, reasoning, decision-making, and problem solving skills), high level thinking skills (analysis, synthesis and evaluation skills), values (personal, social, work, health, peace, relationship, sustain values), and attitudes in lesson planning, programming, instruction and assessment;
- meaningfully connect what students learn in Textile Technology Strand with what is learnt in other subjects to add values and enhance students learning so they can integrate what they learn and develop in-depth vertical and horizontal understanding of subject content;
- formulate effective SBC lesson plans using learning objectives identified for each of the topics;
- employ SBC assessment approaches to develop performance assessments to assess students' proficiency on a content standard or a component of the content standard described in the grade –level benchmark;
- effectively score and evaluate students' performance in relation to a core set of learning standards or criteria, and make sense of the data to ascertain status of progress towards meeting grade-level and nationally expected proficiency standards,
- use evidence from the assessment of students' performance to develop effective evidence – based intervention strategies to help students making inadequate or slow progress towards meeting the grade-level and national expectations to improve their learning performances.

HOW TO USE THE TEACHER GUIDE

The Grade 9 Textiles Technology Strand Teacher Guide is an expansion of the content in the Technology and Industrial Art Syllabus. The Syllabus contains the content standards, benchmarks and evidence outcomes which are expanded into teaching and learning activities in the Teacher Guide. The Teacher Guide provides essential information about what the teacher needs to know and do to effectively plan, teach and assess students' learning and proficiency on learning and performance standards.

It should be read in conjunction with the syllabus in order to understand what is expected of teachers and students to achieve the envisaged quality of education outcomes.

Teachers must read and understand each of the sections of the Teacher Guide to help them understand the SBC concepts and ideas. A thorough understanding of these components will help teachers meet the teacher expectations for implementing the SBC curriculum, and therefore the effective implementation of Grade 9 Textiles Technology Strand in Technology and Industrial Arts Curriculum.

The scope of learning is translated and programmed according to the four terms. The suggested teaching and learning strategies and the key important instructions provided for teachers can be used to design and manage teaching and learning activities for the students in the classroom.

Assessment methods, assessment samples, reporting and recording strategies contained in this guide will assist teachers to plan assessment in Strands for the school year. Based on this understanding, teachers should be able to effectively use the teacher guide to do the following:

The strand teacher guide can be used for developing both classroom learning and professional development activities. The document is a useful resource for developing school and community based in-service programs. Teachers must thoroughly read the contents of the documents in order to develop an understanding and do the following;

Determine Learning Objectives and Lesson Topics

- The teaching and learning Standards are derived from the Content Standards and Benchmarks in the Syllabus. The Learning Objectives are extracted from the grade-level benchmarks and are used for teaching topics. And lesson objectives are derived from learning objectives and are used for teaching Lessons.

Identify and Teach Grade Appropriate Content

- Grade appropriate content has been identified and scoped and sequenced using appropriate content organisation principles. The content is sequenced using the spiralling sequence principles. The strand, topics and lesson concepts in the Teacher Guide can be spiralled and taught by Strand, by Topics or by lessons using the Benchmarks. Using the Benchmarks, Content Mapping in Programing will enable the teacher to see the content from what the students have already learned in line with current to be taught and link to the next learning content.

Integrate the core curriculum in lesson planning, instruction and assessment

- This sequencing of content will enable students to progressively learn the essential knowledge, skills, values and attitudes as they progress further into their schooling.

Integrate cognitive, high level and 21st century skills in lesson planning, instruction and assessment

- Lesson titles in the teacher guide were drawn out from the benchmarks. From the lesson titles outlined in the planning and programming section, the values, the attitude, the skills and the knowledge is identified and the inclusion of 21st century skills, creativity, critical thinking collaboration and communication in and where necessary.

Integrate Technology and Industrial Arts: Textiles Technology Values and Attitudes in lesson planning, instruction and assessment

- When planning a lesson, it is important that, the values, attitudes, skills and knowledge of the lesson are shown in the teaching and learning activities as displayed in the sample lessons.

Identify and use grade and content appropriate, innovative, differentiated and creative teaching and learning methodologies

- At least one value, one attitude, one skill and one knowledge must be captured in a topic.

Integrate Science, Technology, Engineering, Arts and Mathematics (STEAM) principles and skills in lesson planning, instruction and assessment

- STEAM principles and skills must be effectively taught and learned by students. Teachers should use the teacher guide to help them make informed decisions when selecting the types of teaching and learning methodologies to use in their teaching of the subject content, including STEAM principles and skills.

Plan and address the principles of “Inclusive Teaching and Learning”

Teachers are obliged to create an inclusive learning environment to include students with special needs to promote learning for all. These special needs may include students who are gifted or disadvantaged physically, socially, emotionally and intellectually. Students may display combinations of any of these needs and therefore, the teaching and learning activities must have students with special needs to participate to their fullest abilities. The different types of needs in students include;

- Physical disabilities
- Intellectual disabilities
- Hearing impairment
- Sight-vision impairment
- Speech impairment
- Behavioral and emotional disorders

It is important that the learning activities for TIA:Textile Technology are inclusive and foster the learning needs of all students.

Syllabus and Teacher Guide Alignment

The Grade 9 Textiles Technology Strand Teacher Guide is closely aligned and complementary to the Technology and Industrial Art Syllabus.

They are the essential focus points for teaching and learning the essential knowledge, skills, values and attitudes.

Syllabus and Teacher Guide Alignment	
Syllabus	Teacher Guide
<p>Outlines the ultimate aim and goals, and what to teach and why teach it</p> <ul style="list-style-type: none"> • Overarching and SBC principles • Content overview • Core curriculum • Essential knowledge, skills, values and attitudes • Strands and units • Evidence outcomes • Content standards and grade-level benchmarks • Overview of assessment, evaluation, and reporting 	<p>Describes how to plan, teach, and assess students' performance</p> <ul style="list-style-type: none"> • Determine topics for lesson planning, instruction and assessment • Formulate learning objectives • Plan SBC lesson plans • Select teaching and learning strategies • Implement SBC assessment and evaluation • Implement SBC reporting and monitoring

The syllabus outlines the ultimate aim and goals of SBE and SBC, what is to be taught and why it should be learned by students, the underlying principles and the articulation of the learning and proficiency standards that all students are expected to attain. On the other hand, the teacher guide expands on what is outlined in the syllabus by describing the approaches or the how of planning, teaching, learning, and assessing the content so that the intended learning outcomes are achieved.

This teacher guide should be used in conjunction with the syllabus. Teachers should use these documents when planning, teaching and assessing Grade 9 Textile Technology Strand content.

Teachers will extract information from the syllabus (e.g., content standards and grade-level benchmarks) for lesson planning, instruction and is for measuring students' attainment of a content standard as well as progress to the next grade of schooling.

Learning and Performance Standards Alignment

Content Standards, Benchmarks and Evidence Outcomes are linked to Learning Objectives, Lesson Objectives and Performance Standards in the Teacher Guide. (see table). There is a close linear relationship between these standards. Students' performance on a significant aspect of a benchmark (KSVA) is measured against a set of performance standards or criteria to determine their level of proficiency using performance assessment. Using the evidence from the performance assessment, individual student's proficiency on the aspect of the benchmark assessed and

progression towards meeting the benchmark and hence the content standard are then determined.

Standards Alignment	
Standards in Syllabus	Standards in Teacher Guide
<ul style="list-style-type: none"> SBC Aims and Goals Content Standard Benchmarks Evidence Outcomes 	<ul style="list-style-type: none"> Learning Objectives Lesson Objectives Essential Knowledge, Skills, Values and Attitude Performance Standard

Standard Alignment

Standard Alignment shows the link between different standards in the Syllabus and Teacher Guide. It begins with SBC Aims and Goals which are National Standards in which the Syllabus Standards are derived from. The Content Standards or Subject Standards are expanded into Benchmarks which are Achievable Benchmarks for particular Grade Levels and are translated into the Teacher Guide as Teaching and Learning Standards and Assessment Standards. And they become the components of the Unit of Work. (UOW)

The UOW consists of the Achievable Standards for a particular Grade Level and is translated into Teaching and Learning Activities and Assessment Tasks.

It is essential that teachers know and can do standards alignment when planning, teaching, and assessing students' performance so that they can effectively guide their students towards meeting the grade-level benchmarks (grade expectations) and subsequently the content standards (national expectations).

Below is a diagram to show the relationship between Standards in the Syllabus and the Teacher Guide.

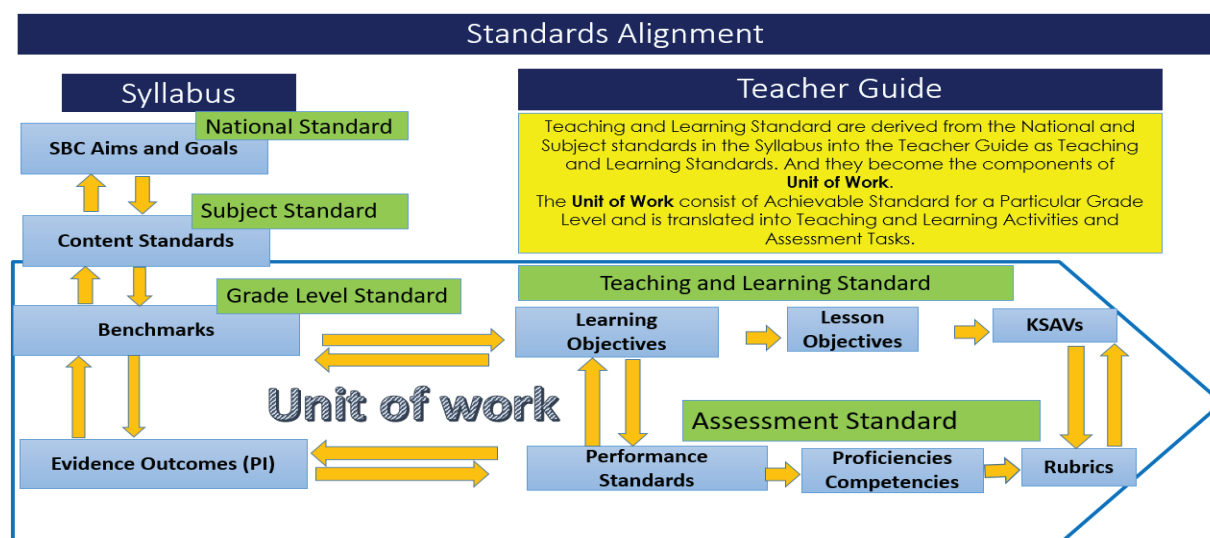


Figure 1 Standards Alignment that shows the alignment of standards in the syllabus and teacher guide.

LEARNING AND PERFORMANCE STANDARDS

Standards define the expected level of education quality that all students should achieve at a particular point in their schooling.

Content standards, benchmarks, and learning objectives are called learning standards while performance and proficiency standards (evidence outcomes) can be categorised as performance standards. These standards are used to measure students' performance, proficiency, progression and achievement of the desired level of education quality. Teachers are expected to understand and use these standards for programming, lesson planning, instruction and assessment.

Student's progression and achievement of education standard(s) are measured using performance standards or criteria to determine their demonstration or performance on significant aspects of the standards and therefore their levels of proficiency and competency. When they are judged to have attained a proficiency on a content standard or benchmark or components of these standards, they are then deemed to have met the standard(s) that is, achieve the intended level of education quality.

Content Standards

Content standards are evidence-based, rigorous and comparable regionally and globally. They have been formulated to target critical social, economic, political, cultural, environment, and employable skills gaps identified from a situational analysis. They were developed using examples and experiences from other countries and best practice, and contextualised to PNG contexts.

Content standards describe what (**content - knowledge, skills, values, and attitudes**) all students are expected to know and do (**how well students must learn and apply what is set out in the content standards**) at each grade-level before proceeding to the next grade. These standards are set at the national level and thus cannot be edited or changed.

Content Standards:

- are evidenced-based,
- are rigorous and comparable to regional and global standards,
- are set at the national level,
- state or describe the expected levels of quality or achievement,
- are clear, measurable and attainable,
- are linked to and aligned with the ultimate aim and goals of SBE and SBC and overarching and SBC principles,
- delineate what matters, provide clear expectations of what students should progressively learn and achieve in school, and guide lesson planning, instruction, assessment,
- comprise knowledge, skills, values, and attitudes that are the basis for quality education,
- provide teachers a clear basis for planning, teaching, and assessing lessons,
- provide provinces, districts, and schools with a clear focus on how to develop and organise their instruction and assessment programs as well as the content that they will include in their curriculum.

Benchmarks

Benchmarks are derived from the content standards and benchmarked at the grade-level. Benchmarks are specific statements of what students should know (i.e., essential knowledge, skills, values or attitudes) at a specific grade-level or school level. They provide the basis for measuring students' attainment of a content standard as well as progress to the next grade of schooling.

Grade-level benchmarks:

- are evidenced-based;
- are rigorous and comparable to regional and global standards;
- are set at the grade level;
- are linked to the national content standards;
- are clear, measurable, observable and attainable;
- articulate grade level expectations of what students are able to demonstrate to indicate that they are making progress towards attaining the national content standards;
- provide teachers a clear basis for planning, teaching, and assessing lessons;
- state clearly what students can do with what they have learned at the end of each school-level;
- enable students' progress towards the attainment of national content standards to be measured, and
- enable PNG students' performance to be compared with students in other countries.

Learning Objectives

Learning or instructional Objectives are precise statements of educational intent. They are formulated using a significant aspect or a topic derived from the benchmark, and is aligned with the educational goals, content standards, benchmarks, and performance standards. Learning objectives are stated in outcomes language that describes the products or behaviours that will be provided by students. They are stated in terms of measurable and observable student behaviour. For example, students will be able to identify all the main towns of PNG using a map.

Performance Standards

Performance Standards are concrete statements of how well students must learn what is set out in the content standards, often called the “**be able to do**” of “what students should know and be able to do.” Performance standards are the indicators of quality that specify how competent a students' demonstration or performance must be. They are explicit definitions of what students **must do to demonstrate proficiency or competency at a specific level on the content standards**. Performance standards:

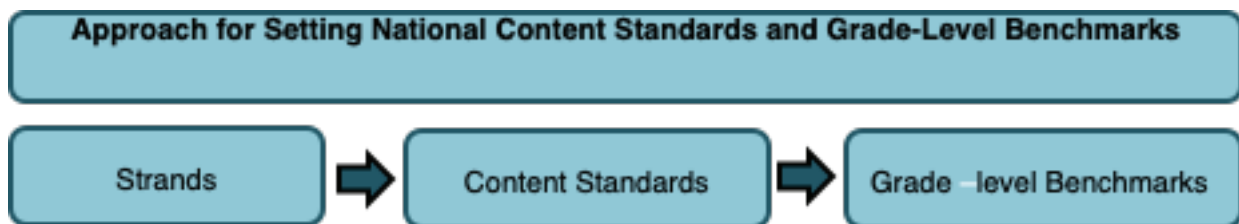
- measure students' performance and proficiency (**using performance indicators**) in the use of a specific knowledge, skill, value, or attitude in real life or related situations.
- provide the basis (**performance indicators**) for evaluating, reporting and monitoring students' level of proficiency in use of a specific knowledge, skills, value, or attitude.

- are used to plan for individual instruction to help students not yet meeting expectations (**desired level of mastery and proficiency**) to make adequate progress towards the full attainment of benchmarks and content standards.
- are used as the basis for measuring students' progress towards meeting grade-level benchmarks and content standards .

Proficiency Standards

Proficiency standards describe what all students in a particular grade or school level **can do** at the end of a strand, or unit. These standards are sometimes called evidence outcomes because they indicate if students can actually apply or use what they have learnt in real life or similar situations. They are also categorised as benchmarks because that is what all students are expected to do before exiting a grade or are deemed ready for the next grade.

As per presented above, should teachers wish to develop additional benchmarks to cater for their students learning needs. You are encouraged to follow the process below to develop them.

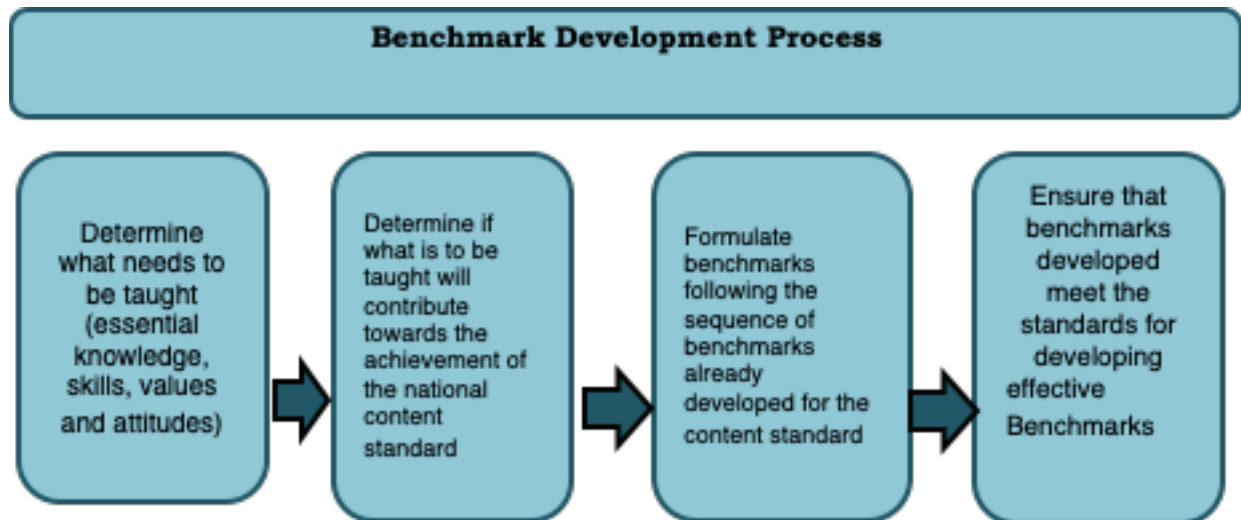


Development of Additional Benchmarks

Teachers should develop additional benchmarks to meet the learning needs of their students. They should engage their students to learn about local, provincial, national and global issues that have not been catered for in the grade-level benchmarks but are important and can enhance students' understanding and application of the content. However, it is important to note that these benchmarks will not be nationally examined as they are not comparable.

Only the benchmarks developed at the national level will be tested. This does not mean that teachers should not develop additional benchmarks. An innovative, reflect, creative and reflexive teacher will continuously reflect on his/her classroom practice and use evidence to provide challenging, relevant, and enjoyable learning opportunities for his/her students to build on the national expectations for students.

Teachers should follow the following process when developing additional grade-level benchmarks



CORE CURRICULUM

Core curriculum refers to a core set of common learnings (knowledge, skills, values, and attitudes) that are integrated into the content standards and grade-level benchmarks for all subjects. The core curriculum includes:

- Cognitive skills (critical and creative thinking);
- Reasoning, problem-solving and decision-making skills;
- High level thinking skills (analysis, evaluation and synthesis);
- 21st century skills;
- STEAM principles and skills;
- Seven Principles for Teaching Procedural and Technical Skills (Plan ahead, Demonstration, Observation of learner in action, Provide specific feedback, Encourage self-evaluation, Allow learner practice, Prepare to modify approach)
- Working Diagrams (sketching and technical drawing)
- Reading, writing and communication skills, and
- Essential values and attitudes.

Textile Technology teachers are expected to include the core learning's in their lesson planning, teaching and assessment of students in all their lessons. In addition to these are the

essential core curriculums; fabrics and fibres and clothing and textiles. Teachers may include other core curriculum concepts in relation to the subject to cater for students learning needs.

A practical example of integrating core curriculum in Teaching and Learning

Teachers can identify a set of core curriculum to teach in one lesson for example; in Textile Technology students may be posed with an opportunity to find solutions on how technology can be used to utilise one of the core concepts of in their area. The core concepts include; marketing, sales, design and manufacturing, technology, services, operations in textile industries.

Students will be required to use what they learnt in Technology and Industrial Arts about textile technology in people's livelihood in terms of marketing as a quicker and cheaper way of advertising and selling textile products.

They can use STEAM principles and skills in finding cause and solutions, use high level thinking skills to analyse and evaluate the effects and how to improve marketing, use decision making and critical thinking skills to find the solutions for marketing a textile product. They can also use textile technology to design a product for an e-marketing model and be able to confidently and boldly communicate their findings and present intelligent and convincing arguments, which we can conclude that learning of the core curriculum is evident.

If students can be able to demonstrate mastery, proficiency and competency of core curriculum in such a manner, then the learning of core curriculum has been achieved.

SCIENCE, TECHNOLOGY, ENGINEERING, ARTS, MATHEMATICS

STEAM education is an integrated, multidisciplinary approach to learning that uses Science, Technology, Engineering, Arts and Mathematics as the basis for inquiring about how STEAM has and continues to change and impact the social, political, economic, cultural and environments contexts and identifying and solving authentic (real life) natural and physical environment problems by nitrating STEAM- based principles, processes, skills, values and attitudes to prepare them for careers, higher education and citizenship.

Textiles Technology utilises both the goals of STEAM rather than just the goal of problem- solving. This is to ensure that all students are provided opportunities to learn, I integrate and demonstrate proficiency on all essential STEAM principles, processes, skills, values and attitudes to prepare them for careers, higher education and citizenship.

Objectives:

Students will be able to:

- Examine and use evidence to draw conclusions about how STEAM has and continues to change the social, political, economic, cultural and environmental contexts.
- Investigate and draw conclusions on the impact of STEAM solutions to problems on the social, political, economic, cultural and environments contexts.
- Identify and solve problems using STEAM principles, skills, concepts, ideas and process.
- Identify, analyse and select the best solution to address a problem.
- Build prototypes or model of solutions to problems.
- Replicate a problem solution by building models and explaining how the problem was or could be solved.
- Test and reflect on the best solution chosen to solve a problem.
- Collaborate with others on a problem and provide a report on the process of problem solving used to solve the problem.
- Use skills and processes learnt from lessons to work on and complete STEAM related projects.
- Demonstrate STEAM principles, skills, processes, concepts and ideas through simulation and modelling.
- Explain the significance of values and attitudes in problem solving.

STEAM Problem -Solving Methods and Approaches

Problem –solving involves the use of problem- solving methods and processes to identify and define a problem, gather information to understand its causes, draw conclusions, and use the evidence to design and implement solutions to address it. Even though, there are many different problems -solving methods and approaches; they share some of the steps of problem-solving, for example:

Identifying the problem;

- Understanding the problem by collecting data;
- Analyse and interpret the data;

- Draw conclusions;
- Use data to consider possible solutions;
- Select the best solution;
- Test the effectiveness of the solution by trialling and evaluating it, and
- Review and improve the solution.

STEAM problem-solving processes go from simple and technical to advanced and knowledge-based processes. However, regardless of the type of process used students should be provided opportunities to learn the essential principles and processes of problem solving and more significantly, to design and create a product that addressed a real problem and meets a human need.

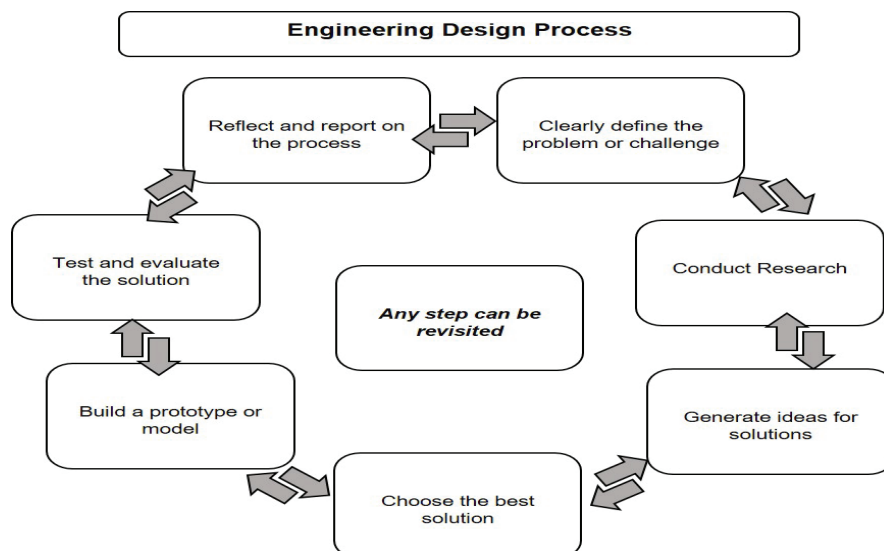
Engineering Design Process

Technological fields use engineering design process to choose the best solution to solve the problem.

It is an open-ended problem solving process that involves the full planning and development of products or services to meet identified needs. It involves the following sequence of steps:

- Analyse the context and background, and clearly define the problem;
- Conduct research to determine design criteria, financial or other constraints, and availability of materials;
- Generate ideas for potential solutions, using processes such as brainstorming and sketching;
- Choose the best solution;
- Build a prototype or model
- Test and evaluate the solution;
- Repeat steps as necessary to modify the design or correct faults;
- Reflect and report on the process.

The sequential engineering design process steps described above is illustrated in the diagram below.



Students should be guided through every step of the process so that they can explain it and its importance, and use the steps and the whole process proficiently to identify, investigate and solve problems.

They should be provided with opportunities to practice and reflect on each step until they demonstrate the expected level of proficiency before moving on to the next one.

The sequence of steps is given as a guide below:

- Step 1: Idea Generation
- Step 2: Research
- Step 3: Planning (Design Brief)
- Step 4: Prototyping
- Step 5: Production
- Step 6: Costing
- Step 7: Marketing

Step 1: IDEA GENERATION

- Ideation, iteration, and brain storming new product ideas

Students should be guided and provided opportunities to identify human made, natural and physical environment problems using their five senses and describe what the problem is and its likely causes.

Example: Irregularity of keeping records of stocks of goods and materials

Step 2: RESEARCH

- Questionnaires Feedback from a substantial and unbiased audience for product validation.

After the problem is identified and described, several questions will be derived from a main issue question. The questionnaire will be formulated and then will be answered in the survey. This questionnaire will guide the researcher in conducting research and investigation for the appropriate solution to the problem.

The questions will be targeted towards the usefulness of the product and the interests to purchase the finished product.

Example: Main Question 'How can records of stocks be kept efficiently and managed effectively?'

Step 3: PLANNING (DESIGN BRIEF)

- Bring the product to life through sketching, illustrations and working diagrams
Creating working sketches, illustrations and working diagrams helps the researcher to better understand his or her research problem, refine the research question and decide on investigation approach before the investigation is conducted.

Example: Description of an Authentic Situation

The researcher may look into the current practices of stock taking in schools, or other subject areas for tips or conduct online search on how to improve the records of stocks on relevant websites. The researchers may even analyse information and past practices or similar but better regarding the stock taking records keeping.

Step 4: PROTOTYPING

- Create a finished prototype product to use as a sample for production. The researcher will make or develop a prototype of the solution and test how it would be used to solve the problem.

Example: Prototype

The illustration of sketches in the planning stage can be created in the MS Excel and its functions can be identified as the basic solution for Stocking Records.

Step 5: PRODUCTION

- Gather materials and production

This step is the gathering of materials and producing of the product from the best prototype. This involves the identification of lists of materials, procedural steps with their respective tools or equipment to be used to produce the intended product.

It is obviously known during the production that certain procedural steps are needed to be done in certain order before the others because later steps depend on them being prioritised. In addition, concepts of other subjects needed for producing the product may be gathered, integrated and utilised in the production of the product.

Example: Producing the product

Step 6: COSTING

- Total cost of product sold (COGS) to determine retail price and gross margin
This stage is known as product pricing which involves the calculation of the costs of materials used, labour costs mark up and selling prices. The selling price may be influenced by responses to the questions in the survey due to the interest of the buyers which will determine the cost of the product.

The cost for producing the item are;

1. Material Unit cost K _____
2. Labour Cost (no of hours spent x your Rate) 10 hrs x K _____ = K _____
3. Selling/Marketing cost K _____

A simple formula to calculate a good mark-up percentage for the project:
MARKUP PERCENTAGE = (SELLING PRICE – UNIT COST) / UNIT COST X 100%

Simply take the sales price minus the unit cost and divide the number by the unit cost. Then multiply by 100 to determine the mark-up percentage.

For example: if the project costs K50.00 to make and the selling price is K75.00 then the mark-up percentage would be 50%. (K75.00 - K50.00 = 0.50 x 100 = 50%).

Example: Pricing the product.

Step 7: MARKETING

- Launch product into market

This stage involves the marketing of the finished product. The potential buyers of the

product are the targeted audience that were used in the research.

The finished product can be promoted using flyers, put out on public places and market page can be created on social media networks.

STEAM- Based Lesson Planning

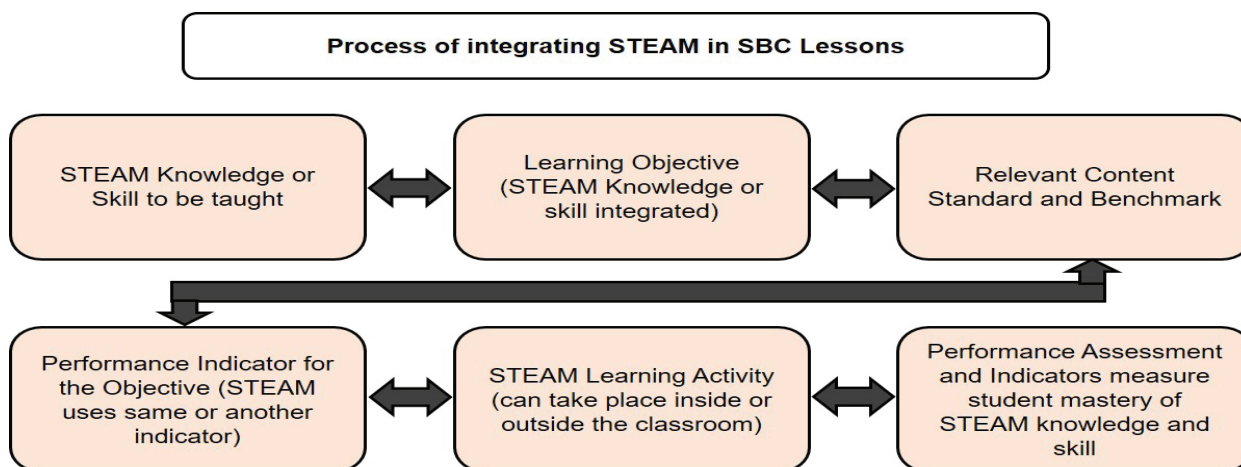
Effective STEAM lesson planning is the key to the achievement of the expected outcomes. STEAM Skills can be planned and taught using separate STEAM- based lesson plans or integrated into the standards- based lesson plans. To effectively do this, teachers should know how to write effective standards and STEAM-based lesson plans.

Developing STEAM-based Lesson Plans

An example of a standards- based lesson is provided below. Teachers should use this to guide them to integrate STEAM content and teaching, learning and assessment strategies into their standards- based lesson plans.

Integration of STEAM problem-solving skills into standards-based lesson plans

Process for Integrating STEAM Principles and Problem-Solving Skills into Standards-Based Lessons



Teachers should follow the steps given below when integrating STEAM problem-solving principles and skills into their standards-based lesson plans.

Teachers should follow the steps given below when integrating STEAM problem-solving principles and skills into their standards-based lesson plans.

Step 1: Identify the STEAM knowledge or skill to be taught (From the table of KSAVs for each content standard and bench mark). **This could be already being captured in the learning objective stated in the standards-based lesson plan.**

Step 2: Develop and include a performance standard or indicator for measuring student mastery of the STEAM knowledge or skill (e.g. level of acceptable competency or proficiency) **if this is different from the one already stated in the lesson plan**

Step 3: Develop student learning activity (An activity that will provide students the opportunity to apply STEAM knowledge or skill specified by the learning objective and appropriate statement of standards). Activity can take place inside or outside the classroom and during or after school hours.

Step 4: Develop and use performance descriptors (standards or indicators) to analyse student STEAM related behaviours or products (results or outcomes), which provide evidence that the student has acquired and mastered the knowledge or skill of the learning objective specified by the indicator(s) of the standard(s).

STEAM- Based Assessment

STEAM-based assessment is closely linked to standards-based assessment where assessment is used to assess student's level of proficiency or competency of a specific knowledge, skill, value or attitude taught using a set of performance standards (indicators or descriptors). The link also includes the main components such as the purpose, the assessment principles and assessment strategies and tools.

In STEAM-based assessment, assessment is designed for what the students should know and be able to do. In STEAM learning students are assessed in a variety of ways including portfolios, project/problem-based assessment, backward designs, authenticity assessment, or other students centered approaches. When planning and designing the assessment, teachers should consider the authenticity of the assessment by designing an assessment that relates to a real world task or discipline specific attributes (such as simulation, role play, placement assessment, live projects, debates) should make the activity meaningful to the student, and therefore be motivating as well as developing employability skills and discipline specific attributes.

Effective STEAM-Based Assessment strategies

The following six sections describe six assessment tools and strategies shown to impact teaching and learning as well as help teachers foster a 21st century learning environment in their classrooms.

1. Rubrics
2. Performance-based assessment (PBAs)
3. Portfolios
4. Student self-assessment
5. Peer-assessment
6. Students response system (SRS)

Although the list does not include all innovative assessment strategies, it includes what we think are the most common strategies, and ones that may be particularly relevant to the educational context of developing countries in this 21st century. Many of the assessment strategies currently use fit under one or more of the categories discussed. Furthermore, it is important to note that strategies also connect in a variety of ways.

1. Rubrics

Rubrics are both a tool to measure students' knowledge and ability as well as an assessment strategy. A rubric allows teachers to measure certain skills and abilities not measurable by standardised testing systems that assess direct knowledge at a fixed moment in time. Rubrics are also frequently used as part of other assessment strategies (portfolios, performances, projects, peer-review and self-assessment), they will be discussing in those sections as well.

2. Performance- Based Assessments

Performance- Based Assessments (PBA), also known as authentic assessment are generally used as a summative evaluation strategy to capture not only what students know about a topic, but if they have the skills to apply that knowledge in a; real-world' situation by asking them to create an end product. PBA pushes students to synthesise their knowledge and apply their skills to a potentially unfamiliar set of circumstances that is likely to occur beyond the confines of a controlled classroom setting. The implementation of performance-based assessment strategies can also impact other instructional strategies in the classroom.

3. Portfolio Assessment

Portfolios are a collection of student work gathered over time that is primary used as a summary evaluation method. The most salient characteristic of the portfolio assessment is that rather than being a snap shot of a student's knowledge at one point in time (like a single standardised test) it highlights student effort, development, and achievement over a period of time; portfolios measure a student's ability to apply knowledge rather than simply regurgitate. They are considered both student-centered and authentic assessment of learning.

4. Self-Assessment

Its main purpose is for students to identify their own strengths and weakness and to work to make improvements to meet specific criteria. Self-assessment occurs when students judge their own work to improve performance as they identify discrepancies between current and desired performance. In this way, self-assessment aligns well with standards-based education because it provides clear targets and specific criteria against which students or teachers can measure learning.

Self-assessment is used to promote self-regulation to help students reflect on their progress and to inform revisions and improvements on a project or paper in order for self-assessment to be truly effective, four conditions must be in place, the self-assessment criteria, criteria is negotiated between the teachers and students, students are taught how to apply the criteria, students receive feedback on their self-assessments and teachers help students use assessment data to develop an action plan.

5. Peer Assessment

Peer assessment, much like self-assessment, is a formative assessment strategy that gives students a key role in evaluating learning. Peer assessment approaches can vary greatly but, essentially it is a process for learners to consider and give feedback to other learners about the quality or value of their work. Peer assessments can be used for a variety of products like papers, presentations, projects and or other skills behaviors. Peers assessment is understood as more than only a grading procedure and is also envisioned as teaching strategy, since engaging in the process develops both the assessor and the assessee's skills and knowledge.

The primary goal for using peer assessment is to provide feedback to the learners. This strategy may be particularly relevant in the classrooms with many students per teacher since student time will be more plentiful than teacher time, although any single student's feedback may not be rich or in-depth as teachers feedback, the research suggests that peer assessment can improve learning.

6. Students Response system

Students response system (SRS), also known as classroom response (CRS), audience response system (ARS) is general term that refers to a variety of technology-based formative assessment tools that can be used to gather student-level data instantly in the classroom. Through the combination of hardware, (voice recorders, PC, internet connection, projector and screen) and software.

Teachers can ask students a wide range of questions (both closed and open ended), where students can respond quickly and anonymously, and the teacher can display the data immediately and graphically. The use of technology also includes a use of video which examines how a range of strategies can be used to assess students understanding. The value of SRS comes from the teachers analysing information quickly and then devising real-time instructional solutions to maximise students learning. This includes a suggested approach to help teachers and trainers assess learning.

ESSENTIAL KNOWLEDGE, SKILLS and ATTITUDES

Students' level of proficiency and progression towards the attainment of content standards for Technology and Industrial Arts subject will depend on their mastery and application of essential knowledge, skills, values, and attitudes in real life or related learning experiences and situations across the secondary curriculum.

Examples of the different types of knowledge, skills, values and attitudes, including processes, that all students are expected to learn and master as they progress through the grades are provided in;

- Technology and Industrial Arts syllabuses for grades 9&10 page 24-27 and
- Technology and Industrial Arts syllabuses for grades 11&12 pages 23-26.

These knowledge, skills, values and attitudes have been integrated into the content standards, benchmarks and performance standards developed for Technology and Industrial Arts subject

Teachers are expected to plan and teach these in their lessons, and assess students' performance and proficiency, and progression towards the attainment of content standards.

Textile and Industrial Arts

Technology and Industrial Arts provides and instils in students the confidence to use a range of specific knowledge, skills, values and attitudes in various technologies. These are scoped and embedded within the strands curriculum content in the subject, with the intension to create related career pathways. Each strand content encourages students to be proactive, competent, creative, responsible and reflective learners, enabling them to pursue career opportunities in respective fields of technology studied in this subject.

Provided herein are recognised knowledge for the subject which are applicable across the strands.

Types of common knowledge for Technology and Industrial Arts

These are specific content knowledge for the subject. They include;	
<ul style="list-style-type: none"> • Creativity • Branding • Communication skills • Technical expertise • Industry expertise • Critical thinking- • Information Technology skills • Innovation • Collaboration 	<ul style="list-style-type: none"> • Building and Engineering Knowledge. • Physical Strength and Stamina. • Mathematical formulas in technology • Technology and Industrial Language Coordination. • Technology Skills. • Problem Solving Skills. • Prototype

Technology and Industrial Arts is a skills oriented subject, therefore embraces all the commonly recognised skills which can be used across the strands scoped in the content. Listed here for teachers convenience are commonly recognised skills across the strands.

Types of Skills for Technology and Industrial Arts

These are specific content Skills for the Textile Technology strand., They include;	
<ul style="list-style-type: none"> • Creativity • Critical thinking • Technical knowledge • Commercial awareness of textile industry • Research and data handling capacity • Critical analysis and interpretation of materials • Management skills • Organisational Skills. • Problem solving skills • Mathematical skills • Language Literacy skills • Leadership • Innovative skills • trans formational skills 	<ul style="list-style-type: none"> • Textile construction Skills • Focus Communication skills (approachability, circumstantial awareness, diligence, efficiency, thoroughness) • <u>Multitasking skills</u> • Attention to detail skills (multitasking , approachability, • Technical Skills for fashion designing • Decision making skills • <u>Textile technology soft skills</u> • <u>logical thinking</u> • <u>collaboration</u> • <u>teamwork</u> • Textile <u>Design engineering</u> • <u>consumer Service</u> • Modelling

Types of Values

Personal engagement and civic engagement strategies help young people to acquire and apply skills and dispositions that will prepare them to become competent and responsible citizens.

1. Personal Values (importance, worth, usefulness, etc.)

Core values	Sustaining values
<ul style="list-style-type: none"> • Sanctity of life • Truth • Aesthetics • Honesty • Human • Dignity • Rationality • Creativity • Courage • Liberty • Affectivity • Individuality 	<ul style="list-style-type: none"> • Self-esteem • Self-reflection • Self-discipline • Self-cultivation • Principal morality • Self-determination • Openness • Independence • Simplicity • Integrity • Enterprise • Sensitivity • Modesty • Perseverance

2. Social Values

Core Values	Sustaining Values
<ul style="list-style-type: none"> • Equality • Kindness • Benevolence • Love • Freedom • Common good • Mutuality • Justice • Trust • Interdependence • Sustainability • Betterment of human kind • Empowerment 	<ul style="list-style-type: none"> • Plurality • Due process of law • Democracy • Freedom and liberty • Common will • Patriotism • Tolerance • Gender equity and social inclusion • Equal opportunities • Culture and civilization • Heritage • Human rights and responsibilities • Rationality • Sense of belonging • Solidarity • Peace and harmony • Safe and peaceful communities

3. Types of Attitudes

Attitudes - Ways of thinking and behaving, points of view	
<ul style="list-style-type: none"> • Optimistic • Participatory • Critical • Creative • Appreciative • Empathetic • Caring and concern • Positive • Confident • Cooperative 	<ul style="list-style-type: none"> • Responsible • Adaptable to change • Open-minded • Diligent • With a desire to learn • With respect for self, life, equality and excellence, evidence, fair play, rule of law, different ways of life, beliefs and opinions, and the environment.

Textile Technology Strand

The textile technology strand encourages students to “think out of the box”. This simply means to think openly and freely beyond the learning situation to bring about fresh creative ideas into the classroom lessons. This gives opportunity to the students to apply creativity and critical thinking to participate. Teachers must ensure that even students with rudimentary creativity skills end up improvising them.

Types of knowledge for Textile Technology

These are specific content knowledge for the subject. They include;	
<ul style="list-style-type: none"> • technical knowledge of fabric manufacturing, • yarn preparation, • textile dyeing and bleaching, • textile construction methods, • all the basics of fibre, warp, weft, weave etc. 	<ul style="list-style-type: none"> • Manufacturing of textiles. • Procurement of raw materials. • Yarn preparation. • Analysis of materials. • Printing and dyeing. • Painting techniques. • Traditional dyeing techniques like tie and dye, batik, (kalam-kari,) screen printing, (stencil-ling), transfer printing, and block printing. • Application of colour theory. • Knowledge of luminosity and colour spectrum. • Fabric cutting, sewing, weaving techniques. • Analysis and interpretation of materials.

Processes in Technology & Industrial Arts

Technology and Industrial Arts expounds on the classroom practices using processes for effective and evidence based lesson deliveries. The commended/suggested processes are for teachers to use as the starting points planning skills or practice based lessons in any of the strands as presented in the subject syllabus.

Types of Processes- Inquiry processes for Technology & Industrial Arts subject

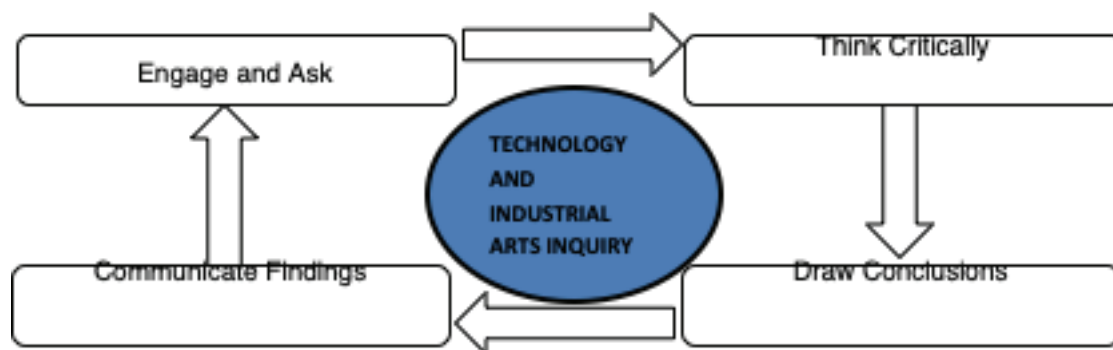
Technology & Industrial Arts Inquiry processes include: (Accept for the TG)

- Gathering information
- Analysing information
- Evaluating information
- Making judgements
- Taking actions
- Instructional technology
- Integration process
- Project planning process
- Organisation of learning experiences

Technology & Industrial Arts Inquiry Processes

<p>Engage and Ask</p>	<p>How will I engage my students in the topic and prompt them to ask questions?</p> <ul style="list-style-type: none"> • Determine the enduring understandings about the topic being studied. • Engage your students with the topic by grabbing their interest with a hook connected to the enduring understandings. • Allow students to generate questions based upon the topic and hook. • Determine what questions will be essential to achieving the enduring understandings. (Student generated or teacher determined) • With students, determine what other information is needed in order to fully answer the questions.
<p>Think Critically</p>	<p>How will students access and analyse information about this topic?</p> <ul style="list-style-type: none"> • Have students think about where they can find answers to the questions posed about the topic. • Gather and organise multiple primary and secondary sources. • Ensure that sources used expose students to different perspectives and viewpoints about the topic. • Students should use sources to collect, analyse, and interpret data. • Ensure students are analysing sources for credibility, bias, and perspective in order to identify gaps in the research.
<p>Draw Conclusion</p>	<p>How will students synthesise ideas to answer the questions posed based on sources used?</p> <ul style="list-style-type: none"> • Students should engage in civic discussion to answer the questions posed while respecting diverse opinions. • Engage students in evaluating possible courses of action and their consequences. • Students should make and justify an informed decision or choice and/or design an action plan supported by evidence from sources. • Have students evaluate the consequences of a decision or choice. • Allow students to make revisions based on feedback and further study.
<p>Communicate Findings</p>	<p>How will students demonstrate what they have learned and take action on that learning?</p> <ul style="list-style-type: none"> • Determine how students will apply what they have learned and share their findings with others. • Explore appropriate audiences for students to present conclusions. • Determine if there is an opportunity for students to take action and influence others to make more informed decisions. • Have students develop strategies to persuade others, including policy makers when applicable. • Prepare students to defend their analysis against alternative.

Below is how the **Technology & Industrial Arts Inquiry Process** will be taught in the classroom. Be specific as you make notes of the activities or prompts you will use to ensure students will have the opportunity to practice these skills as a requirement in the Grade 9 content standards.



Technology & Industrial Arts Enquiry

1. Developing Questions and Planning Inquiries

- a. *Constructing Essential Questions*
 - Address essential questions that reflect an enduring issue in the field
- b. *Constructing Supporting Questions*
 - Explain how supporting questions contribute to an enquiry.
- c. *Determining Helpful Sources*
 - Develop new supporting and essential questions through investigations, collaboration and using diverse sources.

2. Evaluating Sources and Using Evidence

- a. *Gathering and Evaluating Sources*
 - Gather and evaluate information from multiple sources while considering the origin, credibility, point of view, authority, structure, context and corroborative value of the sources.
- b. *Developing Claims and Using Evidence*
 - Identify evidence that draws information from multiple sources to revise or strengthen claims.
- Communicating Conclusions and Taking Informed Action
- c. *Communicating Conclusions*
 - Construct and evaluate explanations and arguments using multiple sources and relevant, verified information.
- d. *Critiquing Conclusions*
 - Articulate explanations and arguments to a targeted audience in diverse setting.
- e. *Taking Informed Action*
 - Use interdisciplinary lenses to analyse the causes and effects of and identify solutions to local, regional or global concerns.
 - Use deliberative processes and apply democratic strategies and procedures to address local, regional or concerns and take action in or out of school.

5. Literacy Skills

A strong emphasis must be placed on various types of literacy, from financial to technological, from media to mathematical, from content to cultural. Literacy may be defined as the ability of an individual to use information to function in society, to achieve goals and to develop her or his knowledge and potential. Teachers emphasize certain aspects of literacy over others, depending on the nature of the content and skills they want students to learn.

The following literacy skills are intended to be exemplary rather than definitive	
<ul style="list-style-type: none"> • Listens, read, write, and speak with comprehension and clarity • Define and apply discipline-based conceptual vocabulary • Describe people, places, and events, and the connections between and among them • Arrange events in chronological sequence • Differentiate fact from opinion • Determine an author's purpose • Determine and analyse similarities and differences • Analyze cause and effect relationships • Explore complex patterns, interactions and relationships • Differentiate between and among various options 	<ul style="list-style-type: none"> • Listens, read, write, and speak with comprehension and clarity • Define and apply discipline-based conceptual vocabulary • Describe people, places, and events, and the connections between and among them • Arrange events in chronological sequence • Differentiate fact from opinion • Determine an author's purpose • Determine and analyse similarities and differences • Analyse cause and effect relationships • Develop an ability to use and apply abstract principals • Explore and/or observe, identify, and analyse how individuals and/or societies relate to one another

6. High Level Thinking Skills

These skills include analysis, synthesis, and evaluation skills.

- i. **Analysis Skills** – Analysis skills involve examining in detail and breaking information into parts by identifying motives or causes, underlying assumptions, hidden messages; making inferences and finding evidence to support generalisations, claims, and conclusions.

Key Words				
Analyse	Differences	Find	List	Similar to
Appraise	Discover	Focus	Motivate	Simplify
Arrange	Discriminate	Function	Omit	Take part in
Assumption	Discussion	Group	Order	Test for
Breakdown	Distinction	Highlight	Organize	Theme
Categorize	Distinguish	In-depth	Point out	
Cause & effect	Dissect	Inference	Research	
Choose	Divide	Inspect	See	

Textile Technology

Classify	Establish	Isolate	Select	
Comparing	Examine	Investigate	Separate	

ii. Synthesis Skills – Synthesis skills involve changing or creating something new, compiling information together in a different way by combining elements in a new pattern proposing alternative solutions.

iii. Evaluation Skills – Evaluation skills involve justifying and presenting and defending opinions by making judgments about information, validity of ideas or quality of work based on set criteria.

TEACHING AND LEARNING STRATEGIES

Technology & Industrial Arts emphasises and embraces the use of cognitive, reasoning, decision-making, problem solving and higher level thinking skills to teach to enhance students' understanding of inter-disciplinary concepts and issues in relation to environment, geography, history, politics and economic within PNG and globally.

It aims to provide a meaningful pedagogical framework for teaching and learning essential and in demand knowledge, skills, values, and attitudes that are required for the preparation of students for careers, higher education and citizenship in the 21st century.

Students must be prepared to gather and understand information, analyse issues critically, learn independently or collaboratively, organise and communicate information, draw and justify conclusions, create new knowledge, and act ethically.

Teaching and learning is a two-way interactive interaction between teacher and a student, a student to a student/students and occurs in any learning environment in or outdoors depending on the nature of teaching strategies learning activities and performance assessments teachers plan to use in the delivering of the lesson.

Technology and Industrial Arts teaching and learning takes on a **blended perception and practices** of its content delivering with envisioning intentions to reinforce evidence based learning. It embraces these in the classrooms whereby each technology strand's content in the form of content standards, benchmarks and performance standards direct or determine the planning of the types of learning situations and activities, assessments throughout the school year.

These standards, including the specific knowledge skills and attitudes ,how they are planned for students learning and performance attainment purposes in the respective grade levels are through highly commended teaching, learning and assessing strategies. For example; using blended learning strategies. This is where/ when the traditionally recognised strategies(teacher centred) is blended with using e-teaching/learning strategies (online using smart phones) to learn about properties of fabrics, in a Textile Technology strand lesson.

Teaching strategies

Find listed for your convenience are identified teaching strategies commended for TIA subject lesson deliveries lessons However teachers can blend these in with the existing or current teaching practices using technology.

- use of multimedia for content research
- utilisation of social media for fact finding on particular technology ...
- using variety of resources for meaningful teaching
- making most of games in electronic devices for learning..
- use technology to empower students and reach out.

Learning Strategies

These are suggested learning strategies that can be used across the learning of all the five content strands in TIA subject.

1. Using multiple types of instructional materials for learning
2. Incorporate technology for reinforcement and motivation for learning
3. Try new learning techniques for
4. Keep your traditional methods
5. Vary your assessments
6. Mix up group work styles
7. Try a digital curriculum

Classroom assessment strategies

Find for your convenience suggested assessment strategies to assess technology curriculum content.

- Clarifying learning intentions and criteria for success.
- Engineer effective classroom-based questioning and discussions on performance tasks that provoke or draw out evidence of learning.
- Constantly provide feedback that move learners forward.
- Present or address students as instructional resources for each other,
- Computer assisted video-based test
- All Teachers teaching TIA from grades 9-12 are encouraged to also add to this list for the good of their students learning.

TIA Classroom

This classroom will be a learning environment prepared especially for the teaching and learning of TIA subject. As we are moving through the 21st century technology era TIA classrooms must reflect a shadow image to encourage the teaching and learning of all the strands in the subject content.

It is suggested that teachers and students could work together to ensure that this technology classroom tips could be accommodated. These are

- Regularly keep updates on new advancements in technology
- Ongoing Effective Evaluation on an Ongoing Basis
- Make Technology a Treat & Not an Expectation
- Monitor closely usage of electronic devices
- Set ground rules for all
- Share knowledge on how to get technical support
- Communicate with Parents
- Familiarise yourself with the Technology First id
- Use of Technology by Students

These teaching and learning strategies will help teachers to;

- familiarise themselves with different methods of teaching in the classroom;
- develop an understanding of the role of a teacher for application of various methods in the classroom.

Successful teachers always keep in view that teaching must “be dynamic, challenging and in accordance with the learner’s comprehension. He/she does not depend on any single method for making his/her teaching interesting, inspirational and effective”.

(Please find a list of the different teaching and learning strategies in the Appendix.)

These strategies;

- make learning more engaging,
- make learning more effective,
- make learning fun,
- encourage higher motivational level,
- improve attention spans,
- develop higher order thinking and reflective skills,
- improve communication skills,
- develop the spirit of teamwork /collaboration,
- develop leadership skills and qualities,
- encourage discovery learning.

Therefore, teachers are encouraged to utilise the suggested strategies as well as others.

CURRICULUM INTEGRATION

What is Curriculum Integration?

An integrated curriculum is described as one that connects different areas of study by cutting across subject-matter lines and emphasising unifying concepts. Integration focuses on making connections and linkages in content for students, allowing them to see the importance of all subjects in the curriculum. When students are able to see and understand the linkages between different subject matter, they engage in relevant, meaningful activities that can be connected to real life.

Curriculum integration is a holistic approach to learning thus curriculum integration in SBC will equip students with the essential 21st Century knowledge, skills, values and attitudes. Teachers must develop intriguing curriculum by going beyond the traditional teaching of content based or fragmented teaching to the teacher who is knowledge based and who should be perceived as a 21st Century innovative educator.

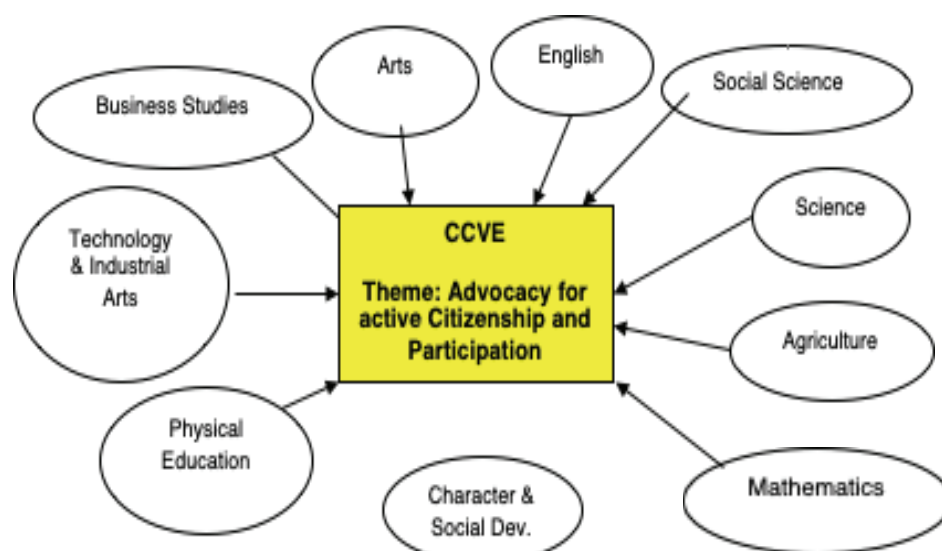
There are three approaches that SBC will engage to foster conducive learning for all children whereby they all can demonstrate proficiency at any point of exit. Adapting these approaches will have an immense impact on the lives of these children as they will not only see themselves as catalysts of change for a competitive PNG but also, comparable to the world standards as global citizens.

Engaging these three approaches in our curriculum will surely sharpen the knowledge and ability of each child, allowing them to see themselves as assets through their achievements and as agents of change contributing meaningfully to their country.

Integrated learning will bear a generation of knowledge-based populace who can solve problems and make proper decisions based on evidence. Thus, PNG can achieve its goals like the Medium Term Development Goals (MTDG) and aims such as the Vision 2050 for a happy, healthy and wealthy society whereby, all its citizens should have access and fair distribution to income, shelter, health, education and general good and services improving the general standard of living for PNG in the long run.

(i) Multidisciplinary Approach

In this approach, learning involves a theme or concept that will be taught right across all subject area of study by students. For instance, if the theme is “Advocacy for active Citizenship and Participation”, all subject areas create lessons or project-based learning and assessment as per their subjects around this theme. The content of the theme ““Advocacy for active Citizenship and Participation” will be taught right across all the different subjects through the different Benchmarks as shown in the diagram and table below.



Sample Curriculum Integration Outline of Linkages

THEME: “ADVOCACY FOR ACTIVE CITIZENSHIP AND PARTICIPATION”		
SUBJECT: CHRISTIAN AND CITIZENSHIP VALUES EDUCATION		
GRADE: 12		
STRAND 3: CHRISTIAN CITIZENSHIP AND SOCIETY		
UNIT 1: Christian Civics Systems		
TOPIC: Christian civic organizations use technology to advocate for good health, better education and for protection of the natural environment and its sustainability.		
Subject	Benchmark	Concept of focus to learn and assessed for the Theme
CCVE	12.3.1.4 Inquire and discuss how Christian civic Organizations use technology to advocate for good health, better education and for protection of the natural environment and its sustainability.	How Civic Organizations use technology to advocate for protection of the natural environment and its sustainability
Agriculture	12.3.1.4.3 Suggest ways for improving problems that affect conservation in Papua New Guinea	Improving Conservation problems in PNG as Citizens
Arts	12.3.3.2 Conduct research and create artworks to advocate for social change. 12.1.2.2 Use a range of techniques and technological tools in a variety of applications relating to music to communicate a theme.	Use data from research to create artwork to advocate for active Citizenship Use Music Technological Tools to communicate active Citizenship
Business Studies	12.4.2.9. Establish the e-business by creating a website or using a mobile application (apps) using the Apple operating system (App Store) or Google Android operating system (Google Play).	Create a website or a mobile application to as a platform to advocate for active Citizenship[p

Textile Technology

Character and Social Development		
English	<p>12.2.6.2: Take advantage of technology's capacity to link to other information and to display information flexibly and dynamically.</p> <p>12.5.4.2: Give a clearly articulated, well-structured presentation on a complex topic.</p>	<p>How to display Citizenship information flexibly and dynamically with use of technology.</p> <p>Do a clearly articulated, well-structured presentation on active Citizenship</p>
Mathematics	<p>12.4.4.3 Use appropriate technology to aid concept development as a tool for problem solving. (General Maths)</p> <p>12.1.1.5 Apply quadratic equations to solve real-world situations and complex number problems. (Advance Math)</p>	<p>Application of quadratic equations to solve real-world situations as part of active citizenship</p> <p>Use appropriate technology as a tool for problem solving when they engage as active citizens in real life situations</p>
Physical Education	12.2.2.2 Distinguish and illustrate sporting greats of PNG in respect to their contribution in the country	How they can actively participate as sporting greats to model active citizenship participation
Science	12.2.1.6 Investigate human population growth by comparing recent and future population growth in developed and developing countries (Biology)	Use of data from investigations to compare human population growth and use the information to participate in informed decision making
Social Science	<p>12.1.4.6. Critique various national and global strategies, agenda, and actions for addressing climate change. (Geography)</p> <p>12.2.4.2. Examine the different ways the United Nations promote change and maintain stability in different regions of the world. (Political Science)</p> <p>12.3.3.1 Identify and appraise the different ways people from different cultures, religions, and ethnic and ideological backgrounds relate to each other (History)</p>	<p>Use of strategies to actively participate in addressing climate change</p> <p>Understanding of how UN maintains stability to be able to actively advocate for understanding of world peace</p> <p>Learn how common grounds of understanding and relationships minimizes differences in cultures, religions, and ethnic and ideological backgrounds and advocate for tolerance</p>
TIA	12.5.2.4; Describe the characteristics of client site scripting and creating interactive menus (Computer Tech)	The use of site scripting to create interactive menus for advocacy on issues of national and global interest as part of active citizenship participation

Note: Assessment Project Planning for the theme

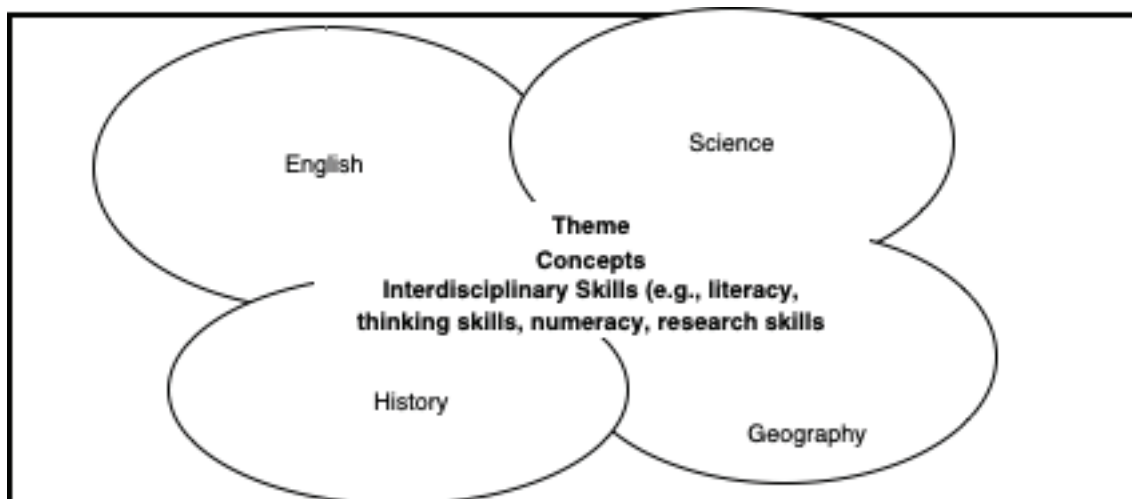
Planning for assessment will be a collaborative effort of all the subject teachers who wish their students to be part of the project with the CCVE subject Teacher as the overall coordinator of the Project and leading the Team.

See the process of this assessment in the Assessment Section.

(ii) Interdisciplinary Approach

This approach addresses learning similarly to the multidisciplinary approach of integrated learning whereby learning takes place within the subject area. It is termed interdisciplinary as the core curriculum of learning is interwoven into each subject under study by the students. For instance; in CCVE, under the strand “Governance and Leadership” students will learn the different types of leadership and common governance principles cut across the different leadership styles they will learn. Apart from learning these, students learning in CCVE are expected to use the application of writing, speaking and communication presentation skills in writing text types in their essay, such as argumentative essay, informative, explanatory, descriptive, expository and narrative essay, oral presentations and speech delivery in debates, advocacies and awareness campaigns. They must be able to capture the mechanics of English skills such as grammar, punctuation etc... Though these skills are studied under English, they are considered as core skills that cut across all subjects under study.

Therefore, essential knowledge, skills, values and attitudes comprising the core curriculum are interwoven and provide an essential and holistic framework for preparing all students for careers, higher education and citizenship in this learning.



(iii) Intra-disciplinary approach

This approach involves teachers integrating sub-disciplines within a subject area. For instance, within the subject CCVE, the four different strands will all be captured studying a particular content for CCVE. For example, under the Civic Systems and Principles, students will learn about civic different identities of different contexts and their participation likewise in the other 3 strands. Thus, children are well aware of their responsibility in active civic participation.

(iv) Trans-disciplinary Approach

In this approach learning goes beyond the subject area of study. Learning is organised around students' questions and concerns. That is, where there is a need for change to improve lives, students develop their own curriculum to effect these needs. The Trans-disciplinary approach addresses real-life situations thus gives the opportunity to students to attain real life skills. This learning approach is more to do with Project-Based Learning also referred to as problem-based learning or place-based learning.

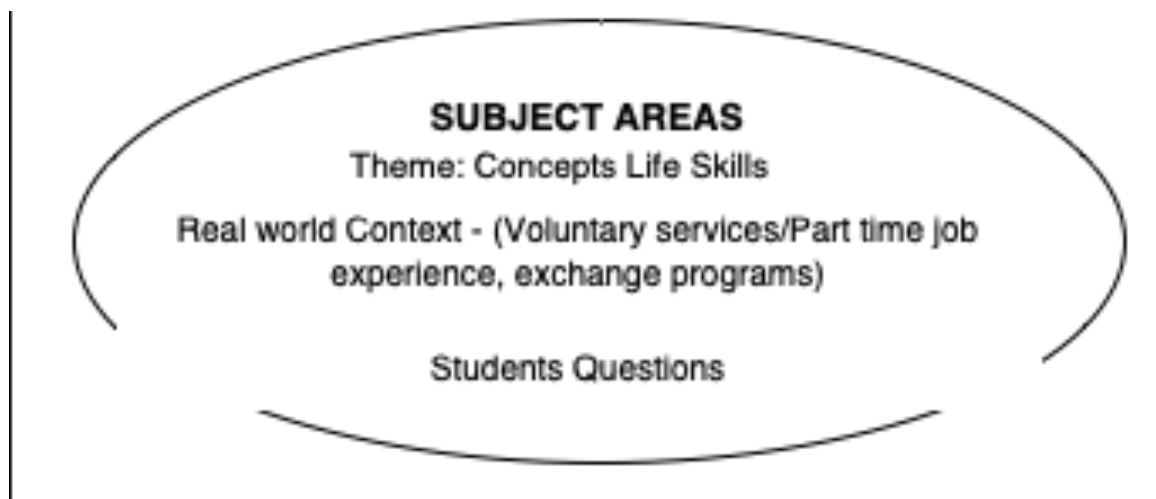
The three steps to planning project-based curriculum (Chard 1998).

1. Teachers and students select a topic of study based on student interests, curriculum standards, and local resources.
2. The teacher finds out what the students already know and helps them generate questions to explore. The teachers will also provide resources for students and opportunities to work in the field.
3. Students share their work with others in a culminating activity. Students display the results of their exploration and review and evaluate the project.

For instance; students may come up with slogans for school programs such as 'Our culture— clean city for a healthier PNG'. The main aim could be to curb betel nut chewing in public areas especially around bus stops and local markets. Here, students draw up their own instructions and criteria for assessment which is they have to clean the nearest bus stop or local market once a week throughout the year. They also design and create posters to educate the general public as their program continues. They can also involve the town council and media to assist them especially to carry out awareness.

Studies (Susan M. Drake and Rebecca C. Burns) have proven that Project based-programs achievements have led to the following:

- Students go far beyond the minimum effort.
- Make connections among different subject areas to answer open-ended questions.
- Retain what they have learnt.
- Apply learning to real-life problems.
- Have fewer discipline problems.
- Lower absenteeism (Curtis, 2002).



These integrated learning approaches will demand teachers to be more proactive in order to improve students learning and achievements. In order for SBC to serve its purpose fully, these three approaches must be engaged for better learning for the children of Papua New Guinea now and in the future.

Strands, Units and Topics

This section of the teacher guide contains the Technology & Industrial Arts content to be taught in grade 9 to 12. It consists of;

- a brief explanation of how the topics, learning objectives and lesson topics are derived,
- an overview of the content distributed according to the four terms in an academic year.
- the unit of work per strand **Technology & Industrial Arts** is organised around five main strands – Textile Technology, Food Technology, Construction Technology, Communication Technology and Computer Technology.

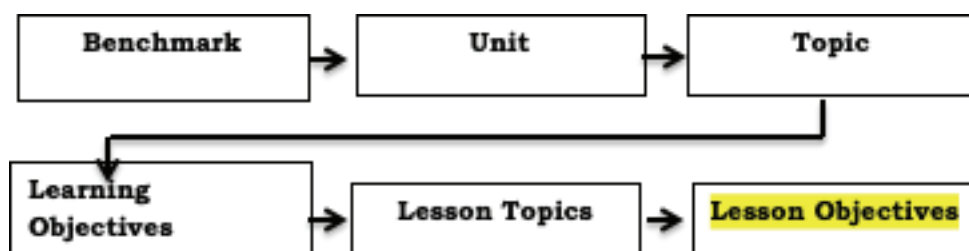
These strands embed the content that students are expected to learn and master at each grade and school level. National content standards are benchmarked at each grade level, which allows for essential KSAV's to be reinforced and expanded throughout the grades. Benchmarks show grade level expectations of what students are able to demonstrate that they are making progress towards attaining the content standard.

These grade-level benchmarks were then unpacked to identify the topics, learning objectives and the lesson topics. Below is a description of how topics were derived from the grade-level benchmarks.

Identifying topics from benchmarks

In order to identify the topic from the benchmark, we need to unpack the benchmark. When we unpack a benchmark, we are identifying what students will know and be able to do when they have mastered the benchmark.

1. Write out the benchmark that you want to unpack.
2. Write the verbs (skills/actions) – Higher order thinking skills
3. Underline or highlight the big idea (content) in the benchmark. The big idea (content) is the topic derived from the benchmark.
4. Write essential questions that would be engaging for students
5. Develop sub-topics from the big idea (topic)
6. Write learning objectives according to the sub-topics
7. Write lesson topics from the learning objectives



Teaching and Learning Concepts and Contents

The table below provides the teachers with what will be taught under each of the five strands in a year. Teachers will use this to develop their own yearly programs by organising these into terms. A sample is provided for teachers to use.

Subject Content - Technology & Industrial Arts

The strand Textile Technology is the first strand in the subject Technology and Industrial Arts (TIA). The overviews given in this guide will provide teachers with a general view of both the subject and the strand if the syllabus is not available.

Subject Overview

Strand	Unit	Content Standard
1.Textile Technology	1.Fibres and Fabrics	1.1 Investigate the evolution, characteristics, designs and trends of fabrics and fabric designs, their construction, production, representation, regulation and marketing. Integrate and apply principles and techniques in presenting fashion ideas and illustrations in pattern making and garment construction for a variety of needs and occasions. Integrate
	2.Textile and Clothing	1.2 Integrate and apply principles and techniques in presenting fashion ideas and illustrations in pattern making and garment construction for a variety of needs and occasions.
2.Food Technology	1.Food and Nutrition	2.1 Examine and analyse the characteristics and properties of different types of food and the social, economic, political cultural and technological influences on their production and compliance with ethical principles and standards
	2.Food Science	2.2 Investigate and analyse the cultural, physical, chemical, nutritional, biological and sensory characteristics of food and how they influence the development and production of food

Textile Technology

3. Construction Technology	1. Building Technology	3.1 Investigate the history and theory of buildings and analyse the components and system of buildings occupational health and safety procedures the properties of building materials and the processes in which those materials and equipment and are used according to industry standards.
	2. Electrical Technology	3.2 Analyse and apply the technological processes, concepts, principles, and practices related to Electrical Technology and its social contribution, with regard to economic growth, entrepreneurship, sustainability and as a tool for change, improving the quality of life responsive to individual, community and industrial needs
	3. Plumbing Technology	3.3 Investigate and analyse fundamental concepts of plumbing theories, Occupational health and safety regulations and standards, trade drawing , demonstrations and applications of tools and materials specifications instillation of plumbing fittings and accessories of drain, waste and vent(DWV)system, and water distribution system.
	4. Welding Technology	3.4 Investigate and analyse safety procedures print reading measurement and layout, identify properties of metals the welding techniques, cutting processes according to welding codes, inspections, testing principles and apply foundations of fabrications.
	5. Engineering Technology	3.5 Investigate and analyse historical and societal influences in Engineering by understanding the engineering principles, practices, the design processes, the management, problem solving and communication skills appropriate to any engineering field.
4. Communication Technology	1. Data Communication and Network	4.1 Investigate and analyse communication technology utilising multimedia and the practices and the systems in designing, installing configuring and managing networks.
	2. Computer Security and safety	4.2 Investigate and analyse ergonomics social and ethical issues, and the development of a monitoring and control system for both hardware , software, and information security in society
5. Computer Technology	1. Computer Architecture	5.1 Explore and analyse computer fundamentals the skills to manage and maintain diagnose, trouble shoot, and solve issues that encompass computer, systems networking interfacing and programing as well as electronics and robotics and be aware of related environment and social issues
	Computer Software	5.2 Investigate and analyse computer systems and application, software, programing, agrithm, web design and databases, and develop and apply the skills and knowledge in the various software

Strand Overview - Textile Technology

Grade Nine- Content Overview

Grade	Nine		
Unit	Benchmark	Topic	Lesson Titles
1 Fibres and Fabrics	9.1.1.1 Compare and contrast social, economic, cultural and technological changes to textiles, fashion and clothing	<ul style="list-style-type: none"> Impact of changes on textiles, fashion and clothing 	<ol style="list-style-type: none"> Exploring Textiles? Origins of textiles, fashion and clothing Factors affecting changes in textile, fashions and clothing
	9.1.1.2 Distinguish the properties and characteristics of fibres and fabrics.	<ul style="list-style-type: none"> Introduction to fibres and fabrics 	<ol style="list-style-type: none"> What are fibres and fabrics? Characteristics and properties of fibres and fabrics From fibres to fabrics.
	9.1.1.3 Explore the elements of design, and the design and construction of fashion ideas.	<ul style="list-style-type: none"> Designing and Construction 	<ol style="list-style-type: none"> Elements of design and design types. Sources of fashion ideas. Basic construction processes.
	9.1.1.4 Describe the functions of tools and equipment and their safe usage	<ul style="list-style-type: none"> Functions and safe usage of tools and equipment 	<ol style="list-style-type: none"> Textile Construction methods tools and their functions. Safety when using textile tools and equipment. Care and maintenance of textile products.
	9.1.1.5 Explore the range of textile construction techniques	<ul style="list-style-type: none"> Techniques in textile construction 	<ol style="list-style-type: none"> Textile construction methods Colouring and decorating methods Fabric finishes
	9.1.1.6 Apply appropriate safety practices in fashion design and construction.	<ul style="list-style-type: none"> Safety practices in fashion designing and construction 	<ol style="list-style-type: none"> Differentiating between textile designing and construction processes Safety practices in textile.

* UNIT 1: Fibres and Fabrics

Content Standard 1.1 Investigate the evolution, characteristics, designs and trends of fabrics and fabric design, their construction, production, representation, regulation and marketing

Benchmark 9.1.1.1 Compare and contrast social, economic, cultural technological changes to textiles, fashion and clothing

Topic 1: Impact of changes on textiles, fashion and clothing

Essential Questions:

- Where did textiles originate from?
- What are cultural technological changes to textiles?
- How does social and economic issues affect, textile products (fashion and clothing) today?

Essential Knowledge, Skills and Values/Attitudes

Knowledge	technological changes, textile, fashion and clothing
Skills	compare and contrast
Context	changes in social, cultural, economic and technological settings.
Attitudes/Values	appreciate different changes in fashions. encourage <u>new</u> fashion interests

Technology and Industrial Arts Application: Textiles Technology: Fibres and Fabrics

Learning Objectives:

By the end of this topic, the students will be able to;

1. Explore various textile types and identify their uses
2. Discuss origins of textiles, fashion and clothing
3. Identify common factors affecting changes in textile, fashions and clothing

Content Background: Impact of changes on textiles, fashion and clothing

Explore and identify various textiles

Today the globe and in the locality many people are researching, exploring and identifying the various types of textiles used. The need for textiles is great and these have changed with time and technology experienced today. This simply is saying that textile goods are manufactured in the for global or international markets for a variety of purposes, needs, uses or manually produced for the local markets. Textile products are not only fashioned outfits, garments and clothing. They include, shoes, handbags, belts, purses, lather bags, chairs, and many more.

Most textiles products are multipurpose products even needed in the industries such as the miners gears and safety wear. All these are made from fibres and fabrics that are developed from various sources. Textile is a flexible material which combines natural or artificial fibres such as yarn and thread/. Yarn is produced by spinning raw fibres of wool, cotton, flax or other materials to produce long strands. Textiles are formed by weaving, knitting, crocheting knotting, tating, felting or braiding.

Origins of textiles, fashion and clothing

Textiles originated from South America-Peru in the 8000-3000 BCE, then in Europe in the early middle ages (prehistory) Near East, Africa, India ,China and North Africa, The oldest Fabric from which textile goods were made even to date is Huafa-Indigo blue fabric cotton textile in the world. The latest discovery was in 1917, in India

Textile weave produced in the form of woven baskets, using woven fabrics. This confirms that weaving proceeded before spinning. Ella Bhatt and Indian was the latest discoverer of textiles a century ago with co-founder, Motaben Anasuya-Sarabhai.

As time lapsed and with improved and developed technology textile industry has progressed rapidly and spread to various countries around the world, Textiles, clothing and fashions have changed with times, conditions of environment, fashions and styles, clothing for a range of purposes to meet the demand and needs of the changing traditional, contemporary and modern societies.

Factors affecting changes in textile, fashions and clothing

Textiles, fashions and clothing have changed from the pre-historical past to today. There are many factors affecting changes in textile, fashions and clothing. Some common causes of changes in textiles, fashions and clothing are technology and industrial revolutions.

Technology development in the past centuries had a great impact on the progress and development of clothing and fashions. For example there was so much motivation in Europe surrounding medieval clothing and how it had a great impact on the intellectuals and their interests in the 21st century.

Industrial revolution was also another factor in changing the way fabric was produced.

There machines motored by water wheels and steamed engines to changing from home based production to huge or mass productions to meet needs of line organization

However production of clothes continued manually until in the 19 century sewing machines appeared and clothing productions were streamlined, even textiles were mad in the markets in the industrial revolution were now made in factories.

Today textiles are produced in factories including clothes, as well as designing of and fashions people wear for various occasions and events.

Teaching and Learning Strategies

Teachers are encouraged to introduce students to simulations to better understand the concepts taught. Therefore students will learn effectively and master the knowledge prescribed in each topic. Whilst introducing the topic, guided discovery and research will enable students to get a picture of fibres and fabrics.

The knowledge prescribed must be taught. It is not only about teaching what students should know but also to interpret that knowledge for students in a way that makes it relevant to them, and enables them to begin to acquire skills of analysis and problem solving, which will support teaching and learning. Students must be given opportunities to apply their knowledge, to be creative and to solve problems.

Lesson 1: Exploring Textiles

Teaching Strategies:

Delivery of these lessons will be in the inquiry approach to teaching. Teacher guided questions to establish in the students a starting point and guide them into achieving the objectives in the identified lesson topics.

Learning Strategies:

Students are given the opportunity to explore and conduct simple research and decide on the best method to either individually or in pairs or small groups of 3 to work on the assigned activities for each lesson title.

Activity 1:

Research and present a 500-700 word report on the topic, 'What is Textile Technology and why it is important?'

Activity 2:

Identify textile language used in the report and describe learning situations for its applications.

Activity 3:

Discuss 2 positive things learnt from the reports on what is textile technology?

Resources:

Research notes and student or teacher reference materials from the school.

Lesson 2: Origins of textiles, fashion and clothing

Teaching Strategies

Delivery of these lessons will be in the inquiry approach to teaching. Teacher guided questions to establish in the students a starting point and guide them into achieving the objectives in the identified lesson topics.

Learning Strategies

Students are given the opportunity to explore and conduct simple research and decide on the best method to either individually or in pairs or small groups of 3 to work on the assigned activities for each lesson title.

Activity 1;

Using a blank world map the students will plot the countries with long historical developments of Textile Technology.

Activity 2;

Using the map exercise, discuss the what, where, why and how textile technology originated in that particular country.

Activity 3;

Discuss the key things the particular country in Act 1 and 2 encountered in the history of the development of textile technology to this day.

Resources

Research notes, student or teacher reference materials from the school.

Lesson 3: Factors affecting changes in textile, fashions and clothing

Teaching Strategies:

Delivery of these lessons will be in the inquiry approach to teaching . Teacher guided questions to establish in the students a starting point and guide them into achieving the objectives in the identified lesson topics.

Learning Strategies:

Students are given the opportunity to explore and conduct simple research and decide on the best method to either individually or in pairs or small groups of 3 to work on the assigned activities for each lesson title.

Activity 1:

In small groups of 4 students does a brain storm of the topic ‘Factors affecting textile technology today’?

Activity 2:

Arrange the brain stormed in formation on a KWL Chart.

1. What I know about TT	2.What I want to know about TT	3. What I learnt about TT	Comments

Activity 3.

Chose a point from the column 1,2 or 3 from the KWL Chart and describe a solution for improvement if you think it is a negative view or a way forward if you think it is a positive view.

Resources

Research notes and student or teacher reference materials from the school.

UNIT 1: Fibres and Fabrics

Content Standard 1.1 Investigate the evolution, characteristics, designs and trends of fabrics and fabric design, their construction, production, representation, regulation and marketing

Benchmark 9.1.1.2 Distinguish the properties and characteristics of fibres and fabrics.

Topic 2: Introduction to fibres and fabrics

Essential Questions:

- What are fibres and fabrics?
- How are they different from each other
- How do they relate to textiles

Essential Knowledge, Skills and Values/Attitudes

Knowledge	Properties and characteristics of fibres and fabrics
Skills	Distinguish, differentiate ,investigate
Context	Properties and characteristics
Attitudes/Values	Making judgements Appreciating, acceptance

Technology and Industrial Arts Application: Textiles Technology: Fibres and Fabrics

Learning Objectives

By the end of this topic, the students will be able to;

1. Explain their understanding of fibres and fabrics?
2. Describe characteristics and properties of fibres and fabrics
3. Describe a process used to change fibres into fabrics

Content Background –

Topic: Introduction to Fibres and Fabrics

Early people discovered fabric when they realised that they needed to cover their bodies from the cold climate. They used the skin, fur and hair of the animal for warmth, however continued use made the skin harder but sometime later early men found ways to treat the animal skin and keep its softness. In the recent past the of animal bones were used as needles and nerves as threads. Today people can grow their own fibres and use them to make fabrics and clothes out of them. Textile is a very flexible material combining of natural and artificial or man-made fibres basically known as yarn threads.

Yarn is produced by spinning raw fibres of wool, flex, cotton, hemp or other materials to produce long strands of fibre. Textiles are formed by weaving, knitting, crocheting, knotting and etc

2.1 Natural Fibre



Fibres and fabrics

Fibre and fabric are very commonly known in the textile industry. They play a very important role in the making of clothing and fashions. In any textile product the fibre is the smallest unit that makes a textile product. A fibre is a long strand of molecules that are interwoven to form a linear–string like structure known as fibres.

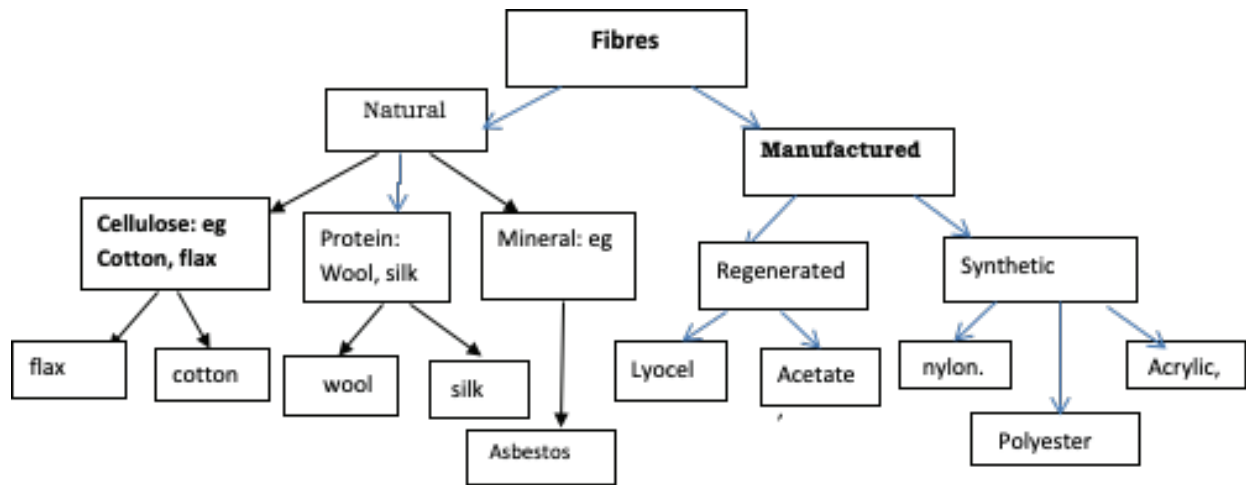
Fibres are found naturally in both plants and animals. Cotton, hair, fair silk and wool are natural fibres. These fibres are springy and flexible, and are easily spun into yarn and then made into fabrics. The fibre substances are either natural or manmade and are considerably longer. It is estimated that about 50 percent of the fibres produced are natural. They come in short and long lengths. A short fibre is called staple fibre, and the long fibre is called filament fibre. Other types of fibres are silk and synthetic.

There are differences between fibres and fabrics. The difference is that fibre is the material used in making fabric. That is, cotton fabric is only made from cotton fibre. Fibre is the kind of yarn the fabric is made from. A yarn might be cotton, or silk, or polyester, or rayon, etc.

Animals, plants and mineral sources directly provide natural fibres which are also referred to as raw material. These fibres are converted into nonwoven fabrics. Fabric is made of fibres which are gathered from sources, spun into filaments and then they are woven or knit into fabrics. Textile fibres are categorized into two types, natural and manufactured according to the sources they are gathered from.

* The diagram below shows the classification of fibres.

2.2; Diagram - Two main Types of fibres.



Characteristics of and properties of fibres and fabrics

It is important to know the characteristics and properties of fibers and fabrics, to enable you to identify the right type of fibre needed to make textile products such clothes, handbags etc.

Characteristics of fibre are concerned with the feel, look and act of a fibre.

That means cotton fibres won't feel, look and act the same as nylon fibre, likewise a cotton and nylon dress won't be the same. Other characteristics are that:

- fibres can be stretched repeatedly to 500% of its original size, and regain its original size.
- fiber is stronger than rubber and is more long lasting and it is light.

The functions of fibres and fabrics have not changed after many decades.

The functions are that:

- natural fibres are still used to make clothing and containers and
- to soften, insulate and beautify spaces.

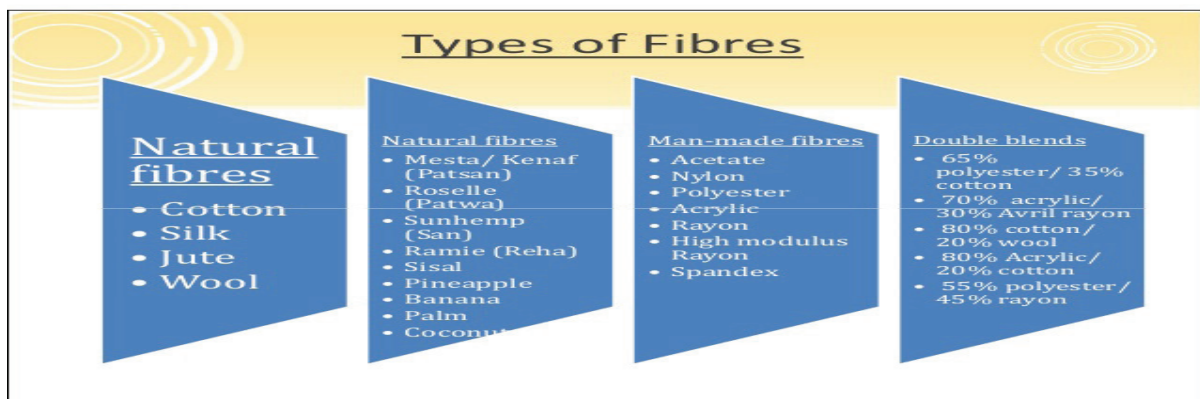
2.3 Fibres used to beautify places.



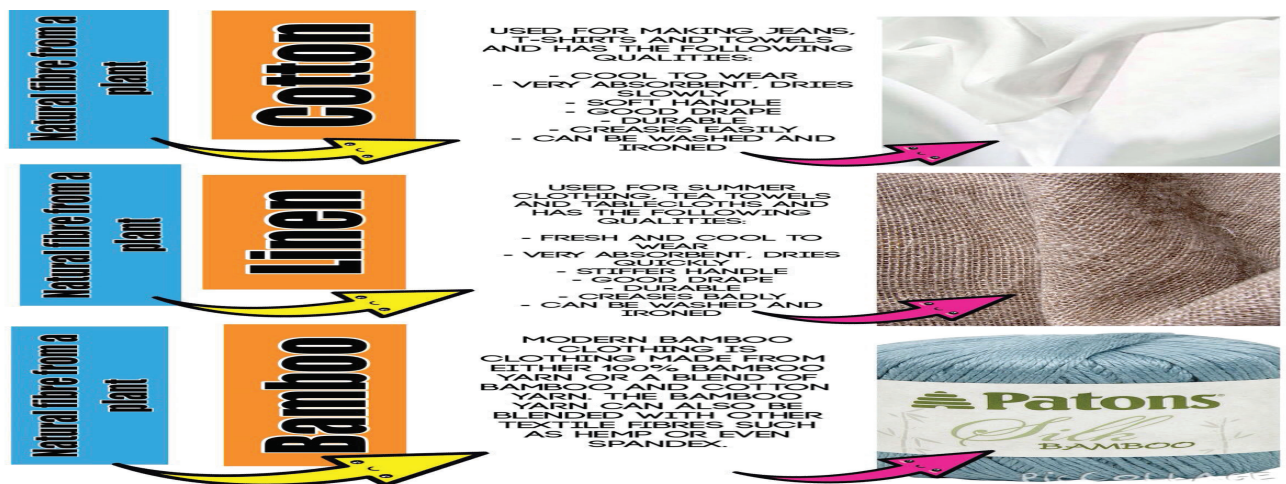
Different types of fibres have their special properties, therefore are used for different purposes. The properties of fibre are determined by three key factors. These are:

- external structure –refers to the form or build of a fibre, which includes the shape, size, cross-section and the microscopic appearance.
- internal structure- is concerned with the molecular arrangement of a fibre- its length and how the monomers and polymers are arranged within the fibre.
- chemical composition-refers to the amount of chemical compounds that make up a fibre- eg wool fibre has protein in them so are referred to as a natural protein fibre.

2.4 Types of Fibres



2.5 Fibres to (yarn) to fabrics



Fibers have different properties which may include fibres being weak, strong, short, long, absorbing water and others do not. Therefore a yarn will have the same properties of the fibre it is made from. Short fibre yarns are hairy and long fibre yarns are smooth. They can be flammable, weak, absorbent or non-absorbent according to the type of fiber it was made from. Fibers are blended to enhance and maximize properties of fibres, thus a fibre blend

From Fibres to (yarn) to fabrics

All fibres go through process to be changed from a fibre to a yarn and then to a fabric. This process is called the 'Spinning' process. It involves pull or drawing out fibres from the source to make a yarn. For example, a cotton ball. The fibres are drawn (pulled out) from the cotton ball and twisted. They stick together; making the fibre stronger to form a yarn. The thickness of yarn depends on different amounts of fibres drawn at any one time. This process is known as the spinning process. A simple spin has 3 steps:

1. Hold a cotton ball in one hand.
2. With the index finger and the thumb of your free hand, remove some fibre from the cotton ball.
3. As you pull, twist them between your index finger and the thumb.

Fabrics come in different types, sizes, shapes and colours. They are made from **natural or** artificial fibre threads (yarn) which are woven or knitted together. Individuals and tailoring companies and many others use fabric to make clothes for all purposes such as curtains, dresses, trousers and many more.

The two main types of fabric are natural and synthetic (man-made). Natural fabrics are silk, cotton wool, linen from coats, cotton-plant seed pods, fibers from silkworms, and flax (from plant stalk). Rayon, polyester, spandex, acrylic and nylon are synthetic fabrics. Synthetic fibres can often be produced very cheaply and in large amounts compared to natural fibres, but for clothing natural fibres are used more than synthetic fibres.

Teaching and Learning Strategies

Teachers are encouraged to introduce students to simulations to better understand the concepts taught. Therefore students will learn effectively and master the knowledge prescribed in each topic. Whilst introducing the topic, guided discovery and research will enable students to get a picture of fibres and fabrics.

The knowledge prescribed must be taught. It is not only about teaching what students should know but also to interpret that knowledge for students in a way that makes it relevant to them, and enables them to begin to acquire skills of analysis and problem solving, which will support teaching and learning. Students must be given opportunities to apply their knowledge, to be creative and to solve problems.

Lesson 1: What are Fibres and fabrics?

Teaching Strategies

Delivery of these lessons will be in the inquiry approach to teaching. Teacher guided questions to establish in the students a starting point and guide them into achieving the objectives in the identified lesson topics.

Learning Strategies

Students are given the opportunity to explore and conduct simple research and decide on the best method to work individually, in pairs or small groups on assigned activities for each lesson.

Activity 1

In small groups of 4, each member select one of the natural or manufactured fibres prepare a story board of the type of fibre and share findings with group members. Make a Fibre folder for each student in the class for future lessons.

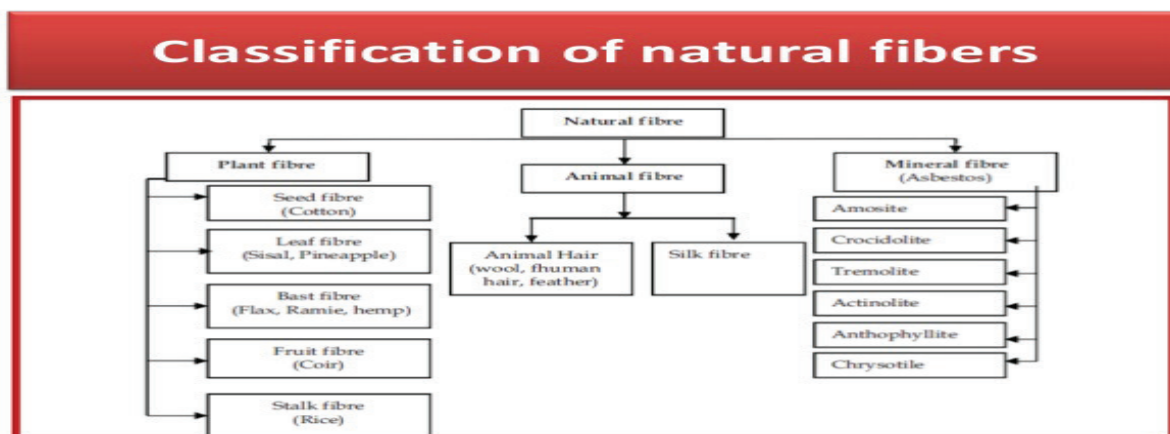
Activity 2

Different textile products are made from different types of fibre:

- a. Draw a flow chart of the different types of natural or man-made fibres and write a summary description of the type you have chosen.
- b. Some textile products carry the label 'double blends'- what does double blend mean?

Activity 3

Use the classification chart to identify local plants that can be grown and developed to be used as the source-base for fibre productions at the local or national level?



Resources:

Research notes and student or teacher reference materials from the school. If computers are available lookup some of the websites;

- <https://i.ytimg.com/vi/bGaxByxyOLM/maxresdefault.jpg>
- [https://i.pinimg.com/564x/9c/b2/ca/9cb2ca6003c66b9fea\)cdb7dcea15211.jpg](https://i.pinimg.com/564x/9c/b2/ca/9cb2ca6003c66b9fea)cdb7dcea15211.jpg)
- <https://i.ytimg.com/vi/bQTQTrk9Des/maxresdefault.jpg>

Lesson 2: Characteristics and properties of fibres and fabrics

Teaching Strategies

Delivery of these lessons will be in the inquiry approach to teaching. Teacher guided questions to establish in the students a starting point and guide them into achieving the objectives in the identified lesson topics.

Learning Strategies

Students are given the opportunity to explore and conduct simple research and decide on the best method to either individually or in pairs or small groups of 3 to work on the assigned activities for each lesson title.

Activity 1

Explain the properties of fibres and use a microscope to determine the three key factors that determine these properties.

Activity 2

Define the terms 'properties and characteristics' and explain the differences using a natural and man-made fibre.

Activity 3

Choose the most suitable word from the list provided to complete the paragraph below.

Words: textile, fibre, length properties, plant, natural, have, fibres, strength

Fibre is the main source of raw material used to produce textile products .

It is characterised by several (1)----- strength, colour, fineness and length.

The (2) -----diameter is miniature to its (3)_____.

There are man-made and natural (4)_____.

Plants, animals and minerals produce (5)_____ fibres. An example of a (6)_____ fibre source is the

banana (7)_____.

Fibres from the banana plant (8)_____good

durability, fineness, tensile (9)_____ and spin ability, therefore are used in

various (10)_____ products.

Resources

Research notes and student or teacher reference materials from the school.

Suggested Books :

1. Tanya Ridgewell;1998 □(PEARSON Longman) TEXTILES &DESIGN IN ACTION

Lesson 3: From Fibres to fabrics

Teaching Strategies

Delivery of these lessons will be in the inquiry approach to teaching. Teacher guided questions to establish in the students a starting point and guide them into achieving the objectives in the identified lesson topics.

Learning Strategies

Students are given the opportunity to explore and conduct simple research and decide on the best method to either individually or in pairs or small groups of 3 to work on the assigned activities for each lesson title.

Activity 1

What is yarn and how is it processed from different fibres (natural or man-made) to fabrics? Present your interpretation of the process in diagram form.

Activity 2

Under the headings 'Linen' and 'Cotton', list down the qualities they are recognised by in textile products.

Activity 3

Describe the fabrics below by stating what type of fibre they are made from, whether it is woven or knitted.



1.



2.

Resources

- Researched notes
- Teacher Guide Design & Technology
- Design & Technology Syllabus OBC)
- Tanya Ridgewell;1998 ©(PEARSON Longman) TEXTILES &DESIGN IN ACTION

UNIT 1: Fibres and Fabrics

Content Standard 1.1 Investigate the evolution, characteristics, designs and trends of fabrics and fabric design, their construction, production, representation, regulation and marketing

Benchmark 9.1.1.3 Explore the elements of design, and the design and construction of fashion needs.

Topic 3: Elements of design

Essential Questions:

1. What are the elements of design?
2. How does affect or support construction of textile products
3. Why is it important to design fashion

Essential Knowledge, Skills and Values/Attitudes

Knowledge	Elements of design and construction
Skills	Explore and design
Context	Elements of fashion design and construction ideas
Attitudes	Appreciate fashion,
Values	Value various fashion designs

Technology and Industrial Arts Application: Textiles Technology: Fibres and Fabrics

Learning Objectives

By the end of this topic, the students will be able to;

1. Describe the elements of design and construction.
2. Explore different types of designs for occasions
3. Select a design and express why it is chosen and how to construct it.

Content Background: Elements of design

In creating designs of clothing and other textile products a certain factor must be considered. This is the 'element of design'. The element of design is accompanied by principles which require flexibility and must be interpreted in the context of the current fashion design. These are the arrangement of lines, direction, colours, tone, shape, and texture and size which form an image that can be seen.

Design principles are rules which govern how elements are combined. The commonly used principles in designing fashion and clothes are balance, rhythm, proportion, repetition and emphasis. The design elements and principles are two important things in designing textile products. They must be considered carefully before, during and after designing a textile product.

The design elements and principles play a very important role. They are the building blocks for creating great and wonderful designs. For example color catches the eyes of customers and gives that feeling to choose or reject a textile product. So designers must use appealing colors in their designs. Textile product designers use elements as the form of vocabulary of a design, whilst principles institute the wide arranged features of the product composition.

It is important to ensure that design elements and principles work together to produce a harmonious design, if this does not happen then the design could turn out peculiar or difficult. To have a harmonious design achieved the formula is 'elements + principles = harmonious design'.

* *Illustrations of types of lines in designing textile products (graphics draw named lines*

• Lines representing feelings		
• Wavy lines – softness (3 -2 wave lines)	• Jagged lines – harshness(3-2 jagged lines)	• Thick lines – bold • 3 thick 2.5cm lines vertical
• Thin lines- delicate • 3 thin 2.5cm lines vertical	• Up-turned curved line-happiness • 1 thin 2.5cm line up curved- half moon)	• Down turned curved lines –sadness • 1 thin 2.5cm line down curve- half moon)
Lines showing direction		
• Horizontal lines –make things look wider • 3 horizontal lines(normal)	• Vertical Lines – make things look thinner • 3 vertical lines(normal)	• Diagonal lines –make things appear restless • 5 diagonal line(normal)

Sources of Fashion Ideas

Fashion came into existence as early as 3500-330 BC, in Mesopotamia and evolved with time from primitive clothing to that of the 21st century, in the world today. Early fashion ideas were formed from lifestyle, ancient hierarchies, religion and royal wear as in Persia to Babylon, Egypt, Greece, and Rome, varying from century to century.

Fashion designers used silhouettes, in the 15th and 16th for both male and female designs with adjustments (linings in the neck, waist and lengths). New inspirations changed the 17th and 18th century's fashions, which saw the rise of English tailoring. The first fashion of modern dresses appeared, in the 19 century, designed with accelerated fashion trends for 20th century. Fashions in this century in the globe were 'flapper' and 'Bias cut' dresses, Youth Quakes', 'Dandies and Hippies' and 'Punk to Power' dresses.

Europe is recognised as fashion power house and global fashion business trends are rising with various brand names created by fashion designers or adapted from the past with modern flavour for consumers today. Some influential fashion designers in 19th and 20th centuries were Charles Fredrick Worth (haute couture), Madelaine Vionnet (Bias Cut), Gabrielle "Coco" Chanel (Sports Wear), Christian Dior (New Look) and LVMH (Moët Hennessey and Louis Vuitton), Gucci Group and many more in the 21st century.

Sources of fashion ideas come from inspirations, imaginations and also creations of certain artistic patterns in sketches and drafts developed by designers until they have the design that best fits the fashion they desire for the consumers is reached. It is also important that the fashion designers of today study the fashions of the early centuries to understand the types of fashions used in different eras.

Designers of fashions and other textile products must know the influences in time and season to be able to design the right type of clothing, and fashions to wear by consumers. Fashion designers are unique individuals who can use their designs to change and ordinary consumer's perception of how we see and feel about our surroundings. They use colours, texture, lines, and shape to increase the levels of their creativity, stimulate and inspire their thoughts of fashion/s they are designing.

A fashion designer has specific roles to play, using arts and crafts, keeping journals of media museums, nature, ethnic, historical, recycled clothing ideas and designs, also as a designer of a specific clothing (sportswear), a derivative knock-off designer, employer or employee. Fashion designers rely heavily on their experiences to expand the fashion company, the types of garments and how much to make and cost for sustainability.

Basic Construction/Design processes

There are four key requirements that all designers must be mindful of as they begin designing textile products. These are;

- Functional
- Aesthetic
- Social and
- Environmental requirements.

The above requirements help designers ensure that the products they design meet expected requirements and the consumers' need. In basic construction of clothing tailoring, draping and a combination of the two make up the basic methods in a construction process. The following are brief explanations of the construction methods:

1. Tailoring of garments is done by cutting shaped flat fabric pieces and sewing them together to fit a 3- dimensional shape. Clothing like trousers, skirts and shirts, dresses etc are tailored,
2. Draping is done with garments that are hung or wrapped around a body, or the same fabric can be used for other purposes like been pinned up or tied or position with a belt or sash or other fastenings, draped over shoulders as a shawl or a skirt wrapped around the waist.
3. Composite garments are constructed using tailoring and draping. This means some parts of a garment are tailored (structuring cutting and sewn together) and also have other parts that may fall softly on or from the shoulders, waist or hips.

A design process involves a series of steps that are planned in a logical sequence, which after applied, result in producing a product. The design process has 6 steps:

1. Problem identification -analyse a situation and recognise a need
2. Research and investigation -find information on how to solve the problem
3. Idea generation -organise ideas or information- in negative and positive categories
4. Optimum selection (stage ideas and choose best idea to solve the problem.
5. Production -make the product that will really solve the problem.
6. Evaluation -in every step an evaluation must be done before moving to the next step. Ensuring that the product is the best you will produce.

Teaching and Learning Strategies

Teachers are encouraged to introduce students to simulations to better understand the concepts taught. Therefore students will learn effectively and master the knowledge prescribed in each topic. Whilst introducing the topic, guided discovery and research will enable students to get a picture of fibres and fabrics.

The knowledge prescribed must be taught. It is not only about teaching what students should know but also to interpret that knowledge for students in a way that makes it relevant to them, and enables them to begin to acquire skills of analysis and problem solving, which will support teaching and learning. Students must be given opportunities to apply their knowledge, to be creative and to solve problems.

Lesson 1: Elements of design and design types

Teaching Strategies

Delivery of these lessons will be in the inquiry approach to teaching. Teacher guided questions to establish in the students a starting point and guide them into achieving the objectives in the identified lesson topics.

Learning Strategies

Students are given the opportunity to explore and conduct simple research and decide on the best method to either individually or in pairs or small groups of 3 to work on the assigned activities for each lesson title.

Activity 1

Do a brainstorm of the title of the lesson. In groups of 4, use the brainstormed ideas to;

- a) Identify the 7 elements of design and explain what they?
- b) How they are used in the designing of a textile product?

Activity 2

In groups of 4, use the brainstormed ideas to

- a) Identify the 5 key concepts of the principles of design and explain what they?
- b) How they are used in the designing of a textile product?

Activity 3

Draw on a sheet of A4 paper a design of a textile product and show an individual interpretation of applying the elements and principles in their product design.

Resources

- Provide own fabric samples as guide
- Ref: Textiles and Design in action - By: Tania Ridwell.

Lesson 2: Sources of Fashion Ideas

Teaching Strategies

Delivery of these lessons will be in the inquiry approach to teaching. Teacher guided questions to establish in the students a starting point and guide them into achieving the objectives in the identified lesson topics.

Learning Strategies

Students are given the opportunity to explore and conduct simple research and decide on the best method to either individually or in pairs or small groups of 3 to work on the assigned activities for each lesson title.

Activity 1

According to the history of fashions design and wear, where and when did the first fashion designers begin from and what did they use?

Activity 2

Discus and identify different sources fashion designers use to get fashion ideas from to design various garments.

Activity 3

Draw a time line to show the development of the first fashion design and indicate the particular developments in each century.

Resources

- Use existing resources in the textile classroom
- Ref: Textiles and Design in action - *By: Tania Ridwell.*

Lesson 3: Basic Construction processes

Teaching Strategies

Delivery of these lessons will be in the inquiry approach to teaching. Teacher guided questions to establish in the students a starting point and guide them into achieving the objectives in the identified lesson topics.

Learning Strategies

Students are given the opportunity to explore and conduct simple research and decide on the best method to either individually or in pairs or small groups of 3 to work on the assigned activities for each lesson title.

Activity 1

Explain the three fashion design and construction methods show your understanding of these methods with an illustration.

Activity 2

What is a design process and if you were to adjust it to suit your context which step would you adjust?

Activity 3

Choose one of the fashion design and construction methods and explain why you have chosen it?.

Resources

- Ref: Textiles and Design in action. - By Tania Ridwell.
- Kikising Salley: (Oxford) LIFE SKILLS IN THE PACIFIC. REMODELING & RECYCLING

UNIT 1: Fibres and Fabrics

Content Standard 1.1 Investigate the evolution, characteristics, designs and trends of fabrics and fabric design, their construction, production, representation, regulation and marketing

Benchmark 9.1.1.4 Describe the functions of tools and equipment and their safe usage.

Topic 4: Functions and safe usage of tools and equipment

Essential Questions:

- What are some different types of textile tools?
- What are some safety tips for tools care/
- Why is it important to learn about the functions of tools?

Essential Knowledge, Skills and Values/Attitudes

Knowledge	Functions of tools and equipment
Skills	Describe, inquiry
Context	Safe use of tools and equipment
Attitudes/Values	Appreciate tools, Be responsible, Care for equipment

Technology and Industrial Arts Application: Textiles Technology: Fibres and Fabrics

Learning Objectives

By the end of this topic, the students will be able to;

1. Explain the uses of different types of textile tools and equipment
2. Describe the functions of a textile equipment or tool.
3. Explain how a certain textile tool is use and care for safely and take good care of them.
4. Categorise particular types of tools and equipment and describe their uses

Content Background: Functions and safe usage of tools and equipment

In textile design and construction there a range of tools and equipment that are very specifically recommended for use in special areas such as laying out and cutting out fabric on pattern sheets. There may be others that are found in big textile industries.

These could be accessed through excursions to tailoring factories and small local firms that are involved in textile, fashion and clothing. One of the first textile machines made was a spinning wheel in the 14 century. The textile machines fall in two categories, textile process machines and textile working machineries, equipment and accessories.

The textile process machines are fabric sewing machineries, ace and label making machines zipper making and thread winding machines, textile finishing and spinning, turfing, weaving knitting and woollen mill machines. There are many more you could look up yourselves. The textile working machineries, equipment and accessories are attaching machines, clothing measuring machines, textile bleaching machines embroidery machines and many more you could research about.

This machinery, equipment may vary in size. They could be heavy duty machines in textile industry factories or slight, small consumer sized sewing machines. Too, there are many tools that are found in the textile product producing environment such as a tailor shop or textile classroom. All these textile equipment and machineries have different functions, uses and care

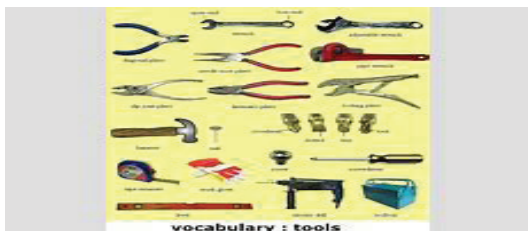
Some of these tools are presented for your reference, for teaching and learning purposes below.



1) Manually operated Sewing Machine



2) Tools accessories for textile class



3) Handy tools for textile construction



4) Tools accessories in a sewing kit

Safety when using textile tools and equipment

Safety in handling equipment and tools is very important in the textile teaching and learning environment as 75- 80% of the tasks involve sewing. Most people may think that sewing is a hobby, but it is not correct. It is a job with a dangerous process and involves sharp blades, pointed, hot surfaces, and even chemicals. The 3 key safety areas are safety in the sewing room, safety of the persons and safety in storage of equipment and tools. All individuals working in textile/or sewing classroom have rules under these key areas and observe and follow them when they enter the room and ensure all requirements are adhered to before they leave the room.

A de-clutter is very crucial for safety in the sewing room. This means any open space, surface, area or floor must be clean and clear of any unnecessary things, rolling off, lying on the floor, hanging on walls and shelves which will cause obstruction in the way of getting tasks done and also hurting persons. No eating and drinking during work to avoid liquid spills and food scraps the sewing room. A break is recommended after 2 or 3 hours of work have a snack or a drink.

Personal safety is very important in a sewing room. Individuals working in a sewing room can get injuries from sharp tools, equipment not carefully handled, head and body aches, even sight problems from long hours of working. Simple rules must be followed to prevent injuries from tools and long hours of sewing. Some of these rules are:

1. Keep pins, needle points and broken needles away from fingers and eyes and move carefully and slowly when sewing on buttons and thick layers of fabric.
2. When cutting material keep fingers clear from scissors points. Do not leave anything (scissors) under the fabric.
3. Properly place big panels of fabric on table tops and handle them carefully so they do not roll off the benches/table tops and land on your feet/foot.
4. Careful of power cords for sewing machines, irons,
5. No bare foot- always have a foot wear that covers your toes and the top part of your foot.
6. Do not put pins in the mouth- pin them on a pin cushion.
7. Wear body fitting clothes. Loose hanging clothes and jewels will get caught in the machine.
8. Be alert always on a sewing machine and use a good working table with proper height.

Every individual is encouraged to use these simple rules at all times when working in a textile classroom. With the help of the simple rules the sewing room should be managed well with other equipment and machines.

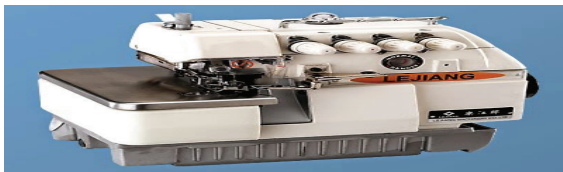
Equipment and tools storage safety is everybody's concern in the textile or sewing classroom. Individuals must ensure that before, during and after using the room all sharp blade and pointed tools, power operated equipment must be carefully tidied and locked, or stored away ready for next use. Never leave tools and equipment carelessly on the floor or still connected to power points without switching them off.

Broken tools or unwanted tools and machines/equipment must be disposed of in the disposal bins. Expensive equipment, tools and machines should be cleaned after use and locked away in the cupboards ready for next use.

Chemical substances such as dyes, bleaches, or oil for the machines and equipment must be kept in locked storages places and keys held by persons in charge. These are on some ideas you could adapt them to suit your work environment.

Care and maintenance of textile-tools and equipment.

All tools, equipment and machines in a textile classroom must be cared for and maintained or kept in good operational conditions at all times. They must have maintenance checks regularly to ensure enduring life cycle of the tool or equipment is increased, its/their function is appropriate, that the product it produces is of quality it has high productivity, reduces and controls wastage, and can economise the process. Maintenance involves setting up of maintenance activity, checking the conditions of the machine, repairing the parts of machines or altering spares and detect what measures to be taken (what part to repair, replace, adjust or set), overhauling is the major component of maintenance and only occurs when it is very necessary to a machine or equipment.



a. Overlock sewing machine



b. Combination Tools – Spanner



c. Pliers



d. Combination Tools (Spanner)



e.



f.



g. -----

h. -----

There are only two systems of maintenance. These are the maintenance planned and maintenance break down. These types of maintenance include preventive, productive, remedial, routines and restorative maintenances. There are special tools used to do maintenance of equipment and machines. A different tool is needed to do certain maintenance. A spanner is use to tighten nuts and a screw driver is used to release screws.

In a textile classroom it is important to be considerate of and about a schedule to carry out sewing machine maintenance or other equipment and tools that are useful for quality production.

Teaching and Learning Strategies

Teachers are encouraged to introduce students to simulations to better understand the concepts taught. Therefore students will learn effectively and master the knowledge prescribed in each topic. Whilst introducing the topic, guided discovery and research will enable students to get a picture of fibres and fabrics.

The knowledge prescribed must be taught. It is not only about teaching what students should know but also to interpret that knowledge for students in a way that makes it relevant to them, and enables them to begin to acquire skills of analysis and problem solving, which will support teaching and learning. Students must be given opportunities to apply their knowledge, to be creative and to solve problems.

Lesson 1: Textile construction methods, tools and their functions (Change – Textile tools and equipment, and their functions)

Teaching Strategies

Delivery of these lessons will be in the inquiry approach to teaching. Teacher guided questions to establish in the students a starting point and guide them into achieving the objectives in the identified lesson topics.

Learning Strategies

Students are given the opportunity to explore and conduct simple research and decide on the best method to either individually or in pairs or small groups of 3 to work on the assigned activities for each lesson title.

Activity 1

Study the parts of the manual sewing machine in your classroom and use the picture given to help you label its parts

Activity 2

Draw a table and fit in all the tools in the picture label them and state their functions.

Activity 3

In textile design and construction how would you use the tools in pictures 3 and 4? Explain separately for each picture given.

Resources

Use Design and technology classes for resources to assist in the lessons.

- References: Textiles and Design in action. *By Tania Ridgewell.*
- The Fashion Design Manual. *By Pamela Stecker*

Lesson 2: Care and maintenance of textile tools and equipment

Teaching Strategies

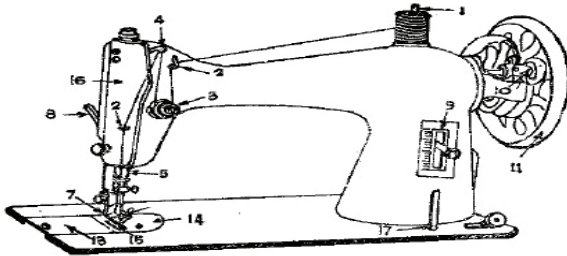
Delivery of these lessons will be in the inquiry approach to teaching. Teacher guided questions to establish in the students a starting point and guide them into achieving the objectives in the identified lesson topics.

Learning Strategies

Students are given the opportunity to explore and conduct simple research and decide on the best method to either individually or in pairs or small groups of 3 to work on the assigned activities for each lesson title.

Activity 1

Caring for an equipment or tool is very important. Describe how to care for this manual sewing machine before during and after use, and label the parts indicated.



Activity 2

Study pictures b, c, and d given in the content notes page 95. Write 1 keep safe and handle safe rule for each one of them.

Activity 3

Identify the names of these tools and describe their functions.



3.1 -----



3.2 -----

Resources

Use Design and technology classes for resources to assist in the lessons.

References:

Textiles and Design in action

By: Tania Ridgewell.

The Fashion Design Manual

By: Pamela Stecker

Lesson 3: Safety when using textile tools and equipment

Teaching Strategies

Delivery of these lessons will be in the inquiry approach to teaching. Teacher guided questions to establish in the students a starting point and guide them into achieving the objectives in the identified lesson topics.

Learning Strategies

Students are given the opportunity to explore and conduct simple research and decide on the best method to either individually or in pairs or small groups of 3 to work on the assigned activities for each lesson title.

Activity 1

In the given notes what are the key areas mentioned about safety and storage of textile tools, equipment and machines.

Activity 2

Do a diagram of the interior of your sewing room and describe how you would organise your sewing room to ensure it is safe for use at all times.

Activity 3

What are the 4 key areas in care and maintenance of tools, equipment, machines and explain what they are?

Resource

1. <https://textilelearner.blogspot.com/2013/03/maintenance-tools-equipments-and-their.html>

References:

Textiles and Design in action

By: Tania Ridgewell.

The Fashion Design Manual

By: Pamela Stecker

UNIT 1: Fibres and Fabrics

Content Standard 1.1 Investigate the evolution, characteristics, designs and trends of fabrics and fabric design, their construction, production, representation, regulation and marketing

Benchmark 9.1.1.5 Explore the range of textile construction techniques.

Topic 5: Techniques in textile construction

Essential Questions:

- What are common techniques in textile construction?
- How important is textile construction
- What is the most important function of textile companies?

Essential Knowledge, Skills, Values /Attitudes:

Knowledge	Textile techniques
Skills	Investigate, explore
Context	Various construction techniques
Attitudes/Values	Appreciate open-mindedness

Technology and Industrial Arts Application: Textiles Technology: Fibres and Fabrics

Learning Objectives

By the end of this topic, the students will be able to;

1. Describe different techniques in textile construction.
2. Define the phrase textile construction

Content Background: **Techniques in textile construction**

In textile construction there are a range of techniques used to produce textile products which are either built or manually assembled. These techniques are very useful and are applied in and by textile industries or small tailoring companies, even individuals. Two familiar areas that have particular techniques for textile construction are fabric and garment construction.

Fabric constructions deal with different types of fibres, both natural and man-made transforming them into fabrics/yarn. Garment construction looks at different techniques in seam construction, techniques in shaping the garment and for making the garment. These techniques are determined by the designer, thus critically considering the weight and the fabric type and verify whether it will be decorative.

- **Textile construction methods** (*Methods in fabric and garment construction*)

In fabric construction the familiar techniques are weaving and knitting, but methods like laminating, bonding and felting are used in non-woven fabrics. However the unfamiliar techniques are tatting, knotting and tufting also in fabric construction. There are 3 forms of weaving are plain (tabby), twill and satin/pile. There are also the complex forms whereby weave attachments combine by hand or mechanical loom produce multiple-plane, pile and gauze weaves and also alterations to the weaves can be caused by manipulating the warp or weft, spacing, beating or tension which may result in loose or compact, or make the weave more or less steady which could get the designer to use interlining and lining methods for making the garment.

The garment construction techniques focus on the different types of seams required in a textile product, such as clothing. Garment construction techniques include different types of seam sewing and they are superimposed, lapped, bound, flat, French, flat fell, edge finished, and ornamental seam. In addition there is the neatening seam used to overlap on woven fabric edge, over locking and zigzag stitching, bias binding. The shaping techniques include darts, pleating and gathering.

Also with seams tailors must ensure that the seams; appear smooth and even on the inside and outside with the threads matching the fabric, be even all the way, pressed open or closed according to the type preferred, appear smooth and neat, ravel, curl, roll, and stretch freely.. The techniques in handling a sewing machine contribute to the appearance of the seam on clothes commonly with stitch defects and appearances. There are also choices of methods for construction garment features like pockets, collars and zippers. It is important to carefully assess the fabric type and decide if it is decorative or not.

- **Colouring and decorating Methods**

Textile construction also involves colouring and decorating methods. This component of fabric construction specifically deals with several methods, and they include, crocheting, macramé, netting, braiding embroidery and quilting. All these methods have very specific requirements which are very unique, and they are:

- Crocheting has its own process and materials (crocheting needle and some yarn or thread), and is not the same as knitting. In crocheting each stitch is completed before moving to the next. This does not apply in knitting.
- Macramé uses the techniques of looming and knotting yarns. The emphasis is placed on the closed areas during construction. and is a textile is
- Netting has two types and they are hand-made netting and knotless netting. It is is a type of fabric construction which is made by knots or fused thermoplastic yarns.
- Braiding comes in two types the flat braiding –mechanism and circular braiding mechanism. It is a handicraft for constructing decorative fabrics which is made by a machine.
- Embroidery is very important in fashion and very appealing to the garment , making it beautiful, and have several types free, surface, counted thread, kinari, gola and phukari.
- Quilting is made through a process and is sewn by hand or machine. There are

three types of quilt and they are pieced, appliqued and paper piercing.

- **Fabric finishes**

Fabric finishing is the term used to describe the finishing touch operation put to a fabric after it is released from a weaving or knitting machine. It is the final treatment in the fabric production as it leaves the machine and is done in dry or wet, cold or heated condition. It is especially done to make the fabric look appealing to the consumer. The finishes are applied to enrich the look and feel and strengthen the quality of the fabric. Therefore all who are engaged in textile must understand the processes involved in applying fabric finishes.

Fabric finishes occurs in 3 stages, pre-treatment, coloration and finishing. In pre-treatment scouring, colouring and bleaching are done to fabrics after leaving the loom to make it attractive and appealing and coloration involves dyeing and printing whilst 'finishing' is recognised as the finishing of all the sequenced activities in the completion of fabric development. In some cases special finishes touches are made to fabrics for serviceable uses.

There are several finishing processes involved in fabric finishes; however the two broad classes are physical and chemical processes. Physical process is supported by mechanical processes. The physical and mechanical finishing processes are brushing, raising, shearing, pressing, beetling, calendaring, folding and cutting. In the chemical process it is the disposition of chemicals into fibres and improves the serviceability (water repulsive, care and durability) and attractiveness. Another thing chemical finishing does is protect the fabric from environmental harshness.

To broaden your knowledge on fabric finishes, here is an additional list you could choose to lookup for your own gain and benefit; acid wash, beetling, anti-microbial, anti-shrinkage treatment anti-bacterial finish, anti-static finish, air jet finish, anti-pill finish,

Teaching and Learning Strategies

Teachers are encouraged to introduce students to simulations to better understand the concepts taught. Therefore students will learn effectively and master the knowledge prescribed in each topic. Whilst introducing the topic, guided discovery and research will enable students to get a picture of fibres and fabrics.

The knowledge prescribed must be taught. It is not only about teaching what students should know but also to interpret that knowledge for students in a way that makes it relevant to them, and enables them to begin to acquire skills of analysis and problem solving, which will support teaching and learning. Students must be given opportunities to apply their knowledge, to be creative and to solve problems.

Lesson 1: Textile construction methods

Teaching Strategies

Delivery of these lessons will be in the inquiry approach to teaching. Teacher guided questions to establish in the students a starting point and guide them into achieving the objectives in the identified lesson topics.

Learning Strategies

Students are given the opportunity to explore and conduct simple research and decide on the best method to either individually or in pairs or small groups of 3 to work on the assigned activities for each lesson title.

Activity 1

What are the most commonly used textile construction methods and describe the difference between them?

Activity 2

In groups of 3 present a summary of each construction methods tating, knotting and tufting.

Activity 3

How do the techniques of handling a sewing machine contribute to the appearance of the seams on clothes?

Resources

Use local resources in textile classroom.

Reference material is:

1. Textiles and Design in action *By: Tania Ridgewell.*
2. <https://www.textileschool.com/258/garment-construction-techniques/>

Lesson 2: Colouring and decorating Methods

Teaching Strategies

Delivery of these lessons will be in the inquiry approach to teaching. Teacher guided questions to establish in the students a starting point and guide them into achieving the objectives in the identified lesson topics.

Learning Strategies

Students are given the opportunity to explore and conduct simple research and decide on the best method to either individually or in pairs or small groups of 3 to work on the assigned activities for each lesson title.

Activity 1

There are several colouring and decoration methods. Identify one and do a paragraph description of what it is and how it is performed.

Activity 2

Why is colouring and decoration a very important part of a textile product development?

Activity 3

There are several different types of quilts. Do a sample of a pieced quilt and describe the process involved.

Resources

Use local resources in textile classroom.

Reference material is:

1. Textiles and Design in action *By: Tania Ridgewell.*
2. [https://textile learner.blogspot.com/2016/04decorative-methods-for-fabric.html](https://textilelearner.blogspot.com/2016/04decorative-methods-for-fabric.html)

Lesson 3: Fabric finishes

Teaching Strategies

Delivery of these lessons will be in the inquiry approach to teaching. Teacher guided questions to establish in the students a starting point and guide them into achieving the objectives in the identified lesson topics.

Learning Strategies

Students are given the opportunity to explore and conduct simple research and decide on the best method to either individually or in pairs or small groups of 3 to work on the assigned activities for each lesson title.

Activity 1

Use the background notes and do a research study on Fabric finishes and present findings to the class.

Activity 2

There are several fabric finishes used in fabric construction. Identify the two broad classes and describe each of their processes. With a friend do a demonstration of 'folding and cutting'.

Activity 3

Read these bulleted sentences and rearrange them in a logical order of what 'fabric finishes' is.

- The finishes are applied to enrich the look and feel and strengthen the quality of the fabric
- It is especially done to make the fabric look appealing to the consumer.
- Therefore all who are engaged in textile must understand the processes involved in applying fabric finishes.
- It is the final treatment in the fabric production as it leaves the machine and is done in dry or wet, cold or heated condition.
- Fabric finishing is the term used to describe the finishing touch operation put to a fabric after it is released from a weaving or knitting machine.

Resources

Use the resources in the textile classroom and the school library.

Ref:

- [https://www.britanica.com/topic/textile/Textile finishing processes.](https://www.britanica.com/topic/textile/Textile%20finishing%20processes)
- <https://www.textileschool.com/211/definition-and-classification-of-fabric-finishing/>

UNIT 1: Fibres and Fabrics

Content Standard 1.1 Investigate the evolution, characteristics, designs and trends of fabrics and fabric design, their construction, production, representation, regulation and marketing

Benchmark 9.1.1.6 Apply appropriate safety practices in fashion design and construction

Topic 6: Safety practices in fashion designing and construction

Essential Questions:

- What are some safety practices commonly used in fashion design and construction?
- Why are these important?
- How are they reinforced by those in the textile industry?

Essential Knowledge, skills, values and attitudes

Knowledge	Fashion design and construction
Skills	Apply, use, utilize and employ
Context	Safety practices
Attitudes/Values	Be aware of, be responsible for

Technology and Industrial Arts Application: Textiles Technology: Fibres and Fabrics

Learning Objectives

By the end of this topic, the students will be able to;

1. Identify and apply appropriately safe practices in textile designing and constructing processes.
2. Describe safe practices and particular responsibilities that must be carried out in a textile class environment

Content Background: Safety practices in fashion designing and construction

Safety is integral part of textile designing and construction. There are tools, chemicals appliances and equipment that need electricity to function and tools that are manually handled in the processes of designing and construction textile products. There are 8 very basic but important safety tips about 'Textile Safety' and they are:

1. Do not over use chemicals such as bleach as they may cause irreversible damage
2. When working with things that have fumes such as glue or paint open the windows and doors or work outside
3. Switch of things that are not ben used, such as iron.
4. Do not rush. Stay cool, calm and collected.
5. Read and follow all instructions.
6. Handle equipment with care.
7. Think before you act. Consider the consequences of your actions
8. Only use things that you feel comfortable with. Get extra help when required.

There are two types of accidents that will very likely occur in a textile classroom. Th minor accidents can involve cutting or poking your finger with a needle or sewing pin. The serious accident can be leaving the iron on and can cause fire in the classroom. Therefore it is a must for students to use common sense and identify symbols and colours as safety measures in the classroom at all times.

Differentiating between textile design and construction processes

Textile designing and construction have development process that a textile designer must follow in order to produce and achieve profitable, consumer satisfying results or products. These processes can be created by the designer or already in place for fashion designers to pick and use. These are often known as the 'Step by Step Design Process'. These include; analysing the brief, think your imagination, innovation, research, draw your design, fabric and trim selection, colour selection, texture, the design selection development process, sample making prototyping, the chosen range or collection and promotion.

Safe practices in textile constructing

Some of these safety regulations are documented for accessing by all involved in textile industries for basic safety measures in a textile classroom or other textile work places. These are specifically cutting room care, duties for respective persons, sewing rooms, reporting accidents, using equipment, hazards, controlling risks at work, evacuation, hazardous substances and being alert or watch out!

Teaching and Learning Strategies

Teachers are encouraged to introduce students to simulations to better understand the concepts taught. Therefore students will learn effectively and master the knowledge prescribed in each topic. Whilst introducing the topic, guided discovery and research will enable students to get a picture of fibres and fabrics.

The knowledge prescribed must be taught. It is not only about teaching what students should know but also to interpret that knowledge for students in a way that makes it relevant to them, and enables them to begin to acquire skills of analysis and problem solving, which will support teaching and learning. Students must be given opportunities to apply their knowledge, to be creative and to solve problems.

Teaching Strategies

Delivery of these lessons will be in the inquiry approach to teaching. Teacher guided questions to establish in the students a starting point and guide them into achieving the objectives in the identified lesson topics.

Learning Strategies

Students are given the opportunity to explore and conduct simple research and decide on the best method to either individually or in pairs or small groups of 3 to work on the assigned activities for each lesson title.

Lesson 1: Differentiating between textile designing and construction processes

Activity 1

In small groups of 5, discuss the difference between textile design and construction processes. Then use the content notes to present on a flowchart the step by step process for textile process or you can use the information to create your own.

Activity 2

Arrange for an excursion to a nearby textile company and arrange with a local designer and get him/her to present a talk on the topic 'A fashion designers designing Process'. Do a 500 word report on the guest speaker's presentation. In the report say what you liked or disliked about the designers process. State an alternate for what you disliked and explain how you would adjust what you liked.

Activity 3

Study the 8 basic safety tips and do a mindmap to show how you these tips can be expanded and for your or others to better use it in your textile learning environment.

Resources;

Use existing safety tips in the school especially in the design and technology resources.

<https://fashion2apparel.blogspot.com/2018/02fashion-design-development.html>

- References: Textiles and Design in action *By: Tania Ridgewell.*
- References: Textiles and Design in action *By: Tania Ridgewell.*

Lesson 2: Safe practices in textile constructing

Teaching Strategies

Delivery of these lessons will be in the inquiry approach to teaching. Teacher guided questions to establish in the students a starting point and guide them into achieving the objectives in the identified lesson topics.

Learning Strategies

Students are given the opportunity to explore and conduct simple research and decide on the best method to either individually or in pairs or small groups of 3 to work on the assigned activities for each lesson title.

Activity 1

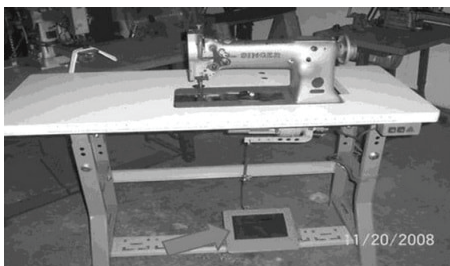
Imagine you are working in a textile factory or tailoring company. What is one of the most important safety practice you should apply at your work place and why?

Activity 2

In small groups identify a risky situation in a textile factory. Describe the risk measures that must be taken to ensure there is no harm done to the equipment or human resource.

Activity 3

In your small groups write up 3 safe practices for the 2 pictures which are common in a textile classroom.



a) -----



b) -----



Resources

Use existing safety tips in the school especially in the design and technology resources.

<https://fashion2apparel.blogspot.com/2018/02fashion-design-development.html>

- References: Textiles and Design in action
- References: Textiles and Design in action

By: Tania Ridgewell.

By: Tania Ridgewell

* Unit Two: Textile Technology

Unit	Benchmark	Topic	Lesson Titles
2. Textiles and Clothing	9.1.2.1 Describe historical influences, technological progression and emerging trends as inspirational sources of design.	Sources of Design	1. Sources of design 2. Technological progression 3. Emerging trends
	9.1.2.2 Demonstrate an awareness of the fundamentals of the design through various artistic versions.	Fundamentals of design process	1. Fundamentals of design process 2. Skills in the design process 3. Various artistic version
	9.1.2.3 Apply a broad range of contemporary and appropriate tools and techniques with competence and in the development projects.	Tools and techniques in project designs	1. Types of tools for textile projects 2. Safe uses of special tools 3. Care for tools
	9.1.2.4 Describe how the properties of textile affect textile wear and care.	Textiles wear and care	1. Properties of textile 2. Fabric care and repair techniques 3. Wear and Tear
	9.1.2.5 Apply the design process to respond to needs and opportunities in textile design projects.	Design Process	1. What is design process 2. Phases in Textile Project development 3. Needs and opportunities in textile design
	9.1.2.6 Select and use appropriate technology to creatively document, communicate and present design and project work	Documenting design and project work.	1. People and textile industry 2. Textile technology equipment 3. Textile Project exhibit

Unpacked Benchmarks

BENCHMARK	9.1.2.1 Describe historical influences, technological progression and emerging trends as inspirational sources of design.	9.1.2.2 Demonstrate an awareness of the fundamentals of the design through various artistic versions.	9.1.2.3 Apply a broad range of contemporary and appropriate tools and techniques with competence and in the development of design projects.	9.1.2.4 Describe how the properties of textile affect textile wear and care.	9.1.2.5 Apply the design process to respond to needs and opportunities in textile design projects.	9.1.2.6 Select and use appropriate technology to creatively document, communicate and present design and project work
KNOWL-EDGE	Sources of design	Fundamentals of design	Tools and techniques	Properties of textile	Design process	Appropriate technology
SKILLS	Describe, expound, account, depict, set forth	Demonstrate, show, exhibit and present design processes	Describe, show, apply	Apply, utilise, use, employ, describe	Apply, Application, employ	Select use, communicate
CONTEXTS	Historical influence, technological progression and emerging trends	Artistic Versions	Contemporary and appropriate tools and techniques	Wear and care	Needs and opportunities in textile design projects	Document, communicate and present design and project work.
VALUES AND ATTITUDES	Appreciate and appraise sources of design	Appreciate and value Artistic versions of self and others	Reasoning with friends, justification, valuing decisions, appreciation, acceptance	Care and concern-aesthetic/appealing, sustainability	Appreciating, sharing, valuing, problem solving, creativity	Appreciation of knowledge, value, acknowledgement, compromise, creativity
LEARNING OBJECTIVES	Explain how historical influences, technological progression and emerging trends have inspired sources of design.	Exhibit the importance of design processes through various artistic versions.	Demonstrate knowledge of a broad range contemporary and appropriate tools and techniques with competence and in the development of design projects.	Explain how the properties of textile affect textile wear and care	Identify the design process to respond to needs and opportunities in textile design projects.	Identify and use appropriate technology to creatively document, communicate and present design and project work

Textile Technology

TOPICS	Sources of Design	Fundamentals of design process	Tools and techniques in project designs	Textile wear and care	Design process	Documenting design and project work (portfolio)
LESSON TITLES	<p>Sources of Design</p> <p>2. Technological progression</p> <p>3. Emerging trends</p>	<p>1. Importance of design process</p> <p>2. Skills required in the design process</p> <p>3. Various artistic fashion</p>	<p>1. Contemporary tools and techniques</p> <p>2. Importance of using appropriate tools and techniques</p> <p>3. Care and maintenance of tools</p>	<p>1. Properties of textile</p> <p>2. Fabric repair techniques</p> <p>3. Wear and care</p>	<p>1. What is design process</p> <p>2. Phases in Textile Project development</p> <p>3. Needs and opportunities in textile design</p>	<p>1. What is a project portfolio</p> <p>2. Textile project exhibit</p>

UNIT 2: Textiles and Clothing

Content Standard 1.2 Integrate and apply principles and techniques in presenting fashion ideas and illustrations in pattern making and garment construction for a variety of needs and occasions

Benchmark 9.1.2.1 Describe historical influences, technological progression and emerging trends as inspirational sources of design.

Topic 1: Sources of Design

Essential Questions:

1. What are the different sources of design that have inspired textile designing today?
2. How are they different from the medieval age?
3. What type of technology was used in the sources of designing?

Essential Knowledge, Skills and Values/Attitudes

Knowledge	Sources of design , historical technological influences
Skills	Describe, expound, account, depict, set forth
Context	Historical Influence technological progression and emerging trends
Attitudes/Values	Appreciate and value sources of design

Technology and Industrial Arts Application: Textiles Technology: Textiles and clothing

Learning Objectives

By the end of this topic, the students will be able to;

1. Explain how historical influences and have inspired sources of design
2. Identify different types of technology used in different ages of textile history
3. Explain how emerging trends have inspired sources of design.

Background of Clothing and Textile Unit

The **history of clothing and textiles** tracks the development and use, back into human history to the ancient times, 8 000BCE to 6500 BC, Iron Age medieval and classical eras (500BC to 300BC, 1200BC to 500 AD). The middle ages saw the Romans, English and Danish created garments and breeches causing the rise of fashion around the 14th century and in the 12th and 13th century. The textile industry is primarily concerned with **the design, production and distribution of yarn, cloth and clothing**. The raw material may be natural or synthetic using products of the chemical industry.

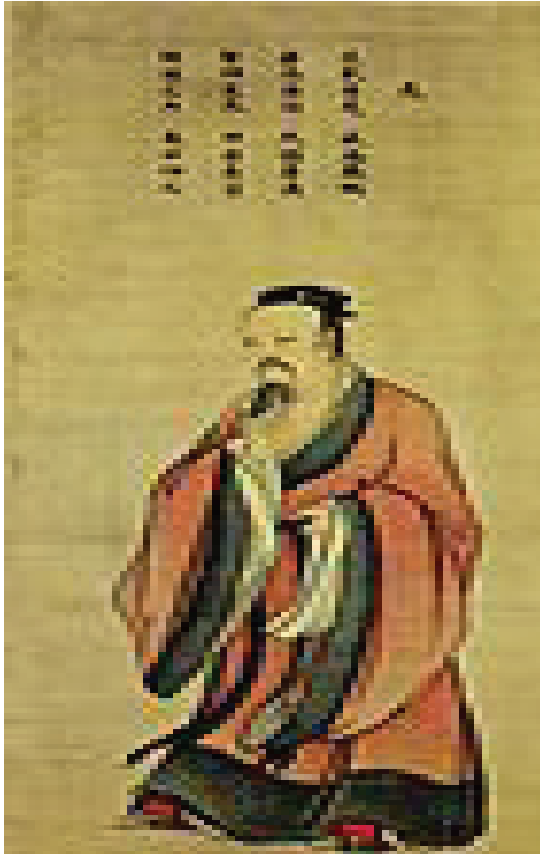
India is one of the nations in the globe that has progressed and advanced technologically into textile industries having 2 important textile industry sectors, handloom and the mechanized.

Clothes all over the world today take many forms, styles, fashions and shapes. They are also made to suit the type of climate, environment and changes lifestyles people all over the world live today and to mention the professional and leisure wears. Clothes and textiles have become a worldwide industry and provide employment opportunities as well as a basic need for an individual.

This unit will further take you through to investigating, exploring, researching, of knowing what clothing and textile can offer you in life now and beyond.

* ***Ancient style of clothing and textile products***





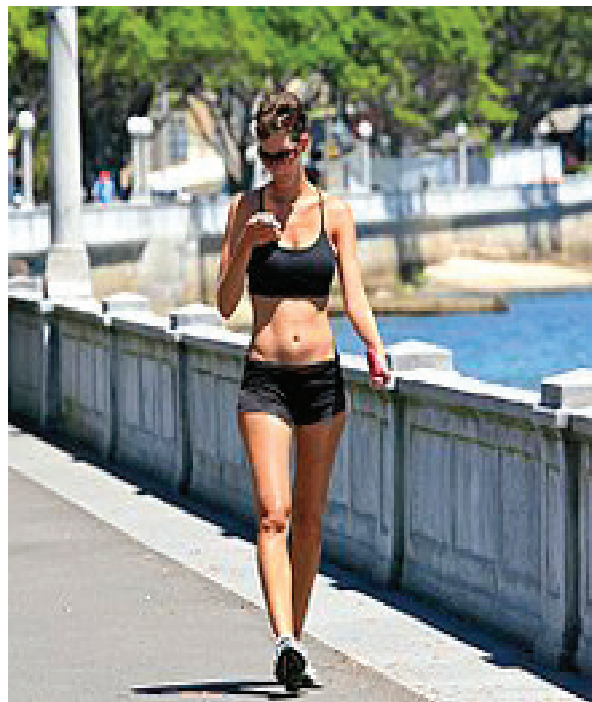
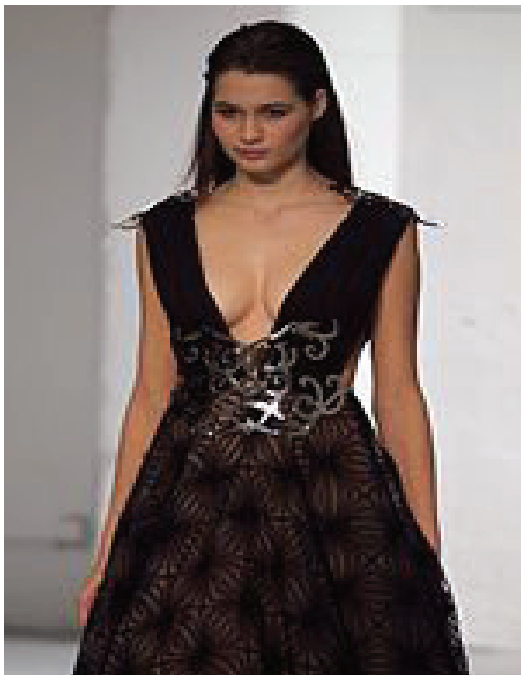
Textile was a trade starting back in the Asian continent, ancient India, China, Japan, Thailand, Middle East in Egypt and Iraq. Changes came about in various civilizations at different times, seeing the trade expand and grow globally through modern technology in the nineteenth, twentieth, and twenty-first centuries.

*** Medieval age and classical Period clothing**



Designing, manufacturing and marketing of all types of clothing, footwear and many other different types of textile products are what clothing and textiles studies are about today

Modern Day Clothing used today



Content background –

Sources of Design

All designers regardless of which particular field web, architecture or textile you will come across designers block. When this happens you need the right type of design inspiration to help you to get creative ideas and produce design products which could be very intriguing to the customers. Design inspirations come in all forms. There are many sources of design aspirations. The most common design inspirations are *nature, travel, markets and stores, friends, families, and acquaintances, architecture and a walk*. With the help of resources in the surrounding environment designers can use these as sources of motivation and creativity when designing textile products.

Source of Design	Description
<p>1. Nature</p> 	<p>Designers prefer to use nature to create ideas on designing of clothing and other textile products. It has all the sources for inspiration. Nature and its beauty will and can influence designers in many different ways to designing products. For example:- using birds to illustrate bullet trains on fabric print is unquestionable. Observing the natural environment drawing patterns, layout and colors are a few designers may base their foundations of design on.</p>
<p>2. Travel</p> 	<p>There are times designers need new views. They may like to take a trip to the nearest town or a new place of choice will have an impact on the thoughts of designing new designs. Immersing yourself in the culture, geography, and people will broaden you minds imaginations and design ideas. Traveling with a companion is commended.</p>
<p>3. Stores and markets</p> 	<p>Markets, antique stores /super markets/stores, no matter how big or small, are beautiful in their own way. Antique stores are peculiar and beautiful as they receive little attention. However they can aid you in finding design inspirations in the most unlikely ways. Always have a project in mind before starting out.</p>
<p>4. Architecture</p> 	<p>You could consider using the architecture (buildings) around you from the tallest skyscraper to a thatched roof huts in the rural settings of your environment are unique to cause design inspirations. Their shapes, sizes and colors will create unusually beautiful patterns on products. Otherwise the internet can provide you with various styles of buildings, you could begin from.</p>

5. Friends, families, acquaintances



Solo design work is good but the process involves friends and family members. You must visit and engage in activities they plan on doing. These activities can impact and inspire you in creativity. The moments can be sketched to form designs and improved in the workplace and lead you into the design process. An option may be at a social media, where friends who have travelled can share experiences which may inspire ideas for designs.

6. A walk



Where you live do not really matter, you will always go for a walk. Taking a walk is another strategy you could use to get design inspirations. Walking and orienting in the recreation parks with no particular destination will inspire with ideas for designing such as the streets winding around corners and bends, traffic lights (colors) or may be the sidewalk and street signs, it is all worth trying.... Too, having updated information on the current affairs of the events and issues in the nation can be a source of inspiration for designing fashions of clothing products.

Technological progression (*Technological Progress in Textiles*)

Technological progress is about the discovery of new and improved methods of producing goods and in this case textile goods and technology refers to the process through which inputs are transformed into outputs. Changes in technology have shown increase in productivity of labour, capital and other factors of production. The technological advancements in textile industry include the use of new machines.

Two examples of technological progress today are invention of knitting and pleating machines. In factories today machines knit and pleat unlike in the past these were done manually. Knitting machines today create knitted fabrics in large swaths of material, which are looped and sewn together. This also is happening for pleating. Textile technology has had an impact in the diffusion process throughout the industry and the society.

Another progress is using technology to measure its progression- that is keeping data of production input and output in the making and selling of the textile products. This can spill into accounting for how much manpower & workload, changes in the stock manufacturing and the use of scientific principles and techniques. One method for measuring the technological progression is the *Solow Residual* method.

This method works under the assumption that all changes in output that can't be explained by variations in the capital stock or in the number of workers have an impact on the technological progress. Its key role is to measure the total factor productivity and its empirical property is about cyclical fluctuations of residual.

Phases of Technological Progress

1. Invention
2. Innovation
3. Diffusion

Textile Technology has reached heights of development through technological changes leaning towards engineering where the use of scientific principles and techniques are made use of for manufacturing and development in all types of yarns and textile fabrics from textile fibres. These have lead textile which was once a trade turned into industries and are seen to be progressing on very well globally. Textile product mills convert raw textiles into finished products other than apparel. Some of the items made in this sector include household items, such as carpets and rugs, towels, curtains and sheets, cord and twine, furniture and automotive upholstery, and industrial belts and fire hoses.

Technological innovations have affected Textile industry/ies in a huge way that it has triggered tremendous scientific innovation, resulting in key inventions such as the flying shuttle, spinning jenny, water frame, and spinning mule. This greatly improved productivity drove further technological advancements that turned textiles into a fully mechanized industry.



Different trends have caused technology to reshape the textiles industry to meet demands as innovation hits textile industries. An evidence is the coming of industry 4.0-automation and introducing man-made intelligence in the textile machinery sector to do once manually performed tasks electronically. *For example-Making pleats in various garments.*

Emerging Trends

The major emerging trends in the globe today are consumer, retail, sourcing and products with minor trends in the textile industries. The minor trends are non-woven materials, domestic sales, green textiles, digitalization, environmental sustainability and social justice which are fluctuating time and time again.

Many textile industries are affected by these trends to some degree at the same time, trying to keep the industry's global market afloat. Shown is a trade fair sourcing centre in Cape Town- South Africa. (<https://www.fibre2fashion.com/news/textile-news/allfashion-sourcing-china-premium-tex-postponed-266898-newsdetails.htm>)

This is an example of a meeting place for textile manufacturing companies / countries meet at certain times for marketing needs in textile industries



The occurring of the trends mentioned are increased demand in marketing experienced as well as in growth and services, which require **craftsmanship, sustainability and proximity to nature**, demonstrated by materials such as vegan leather, recycled plastics, natural fabrics and patterns, ecologically dyed, handmade and many more.

Sustainability for the environment (planets' future), digitalization (increased individual and people networking with devices, having progressive product automation/logistics processes) and social justice are popular amongst consumers, thus pressure is placed on fashion brands that do not display eco-friendly uses.

In addition the 'casual wear' fashion trend is the most common for consumers and has behaviours which include:

- most health conscious now than in the past..
- mental health aware. ...
- community driven and interest in eco-friendly products ...
- virtual workers and learners. ..
- flexible and fuss-free first time shoppers online and in fashion and apparel industries the globe can see e-commerce continuing to grow, clothes become genderless, increase in sales of comfortable clothing, ethical and sustainable buying behaviour, the growth of re commerce.

Fashion a global trend.

Fashion today is a global concern. As the fashion designers look to having garments that meets the professional and social lifestyle and the environment today. Here are some of the fashions seen in the global market



TikTok the 21st Century Fashion- creations

One of the very latest 21st century fashions which the largest group of populations (teenagers) in the globe as well as in the nation.



The latest fashion **TikTok**, a creation by Lorena Pages had many cute and smart outfits such as pilgrim collars micro minis, a bunch of strange new denim shapes for the **TikTok** season clashed with the COVID_19 pandemic and could not be worn as there sudden change of clothes to suit the pandemic period which were leggings and sweat shirts Other styles like the mid-waist belts with vests are now seen today to be worn and going strong. These are simple and easily managed, instead of a dress with so many straps and sleeves. These only lead the globe to see that fashion plays a very important role in textile industries

Teaching and Learning Strategies

Teachers are encouraged to introduce students to simulations to better understand the concepts taught. Therefore students will learn effectively and master the knowledge prescribed in each topic. Whilst introducing the topic, guided discovery and research will enable students to get a picture of fibres and fabrics. The knowledge prescribed must be taught. It is not only about teaching what students should know but also to interpret that knowledge for students in a way that makes it relevant to them, and enables them to begin to acquire skills of analysis and problem solving, which will support teaching and learning. Students must be given opportunities to apply their knowledge, to be creative and to solve problems.

Lesson 1: What is 'Sources of Design?'

This lesson is about Sources of design. Teacher will provide copies of the 6 sources of design given on page -----. Students work on activities according to the source they prefer and identify different types of sources used in constructing textile products.

Teaching Strategies

Delivery of these lessons will be in the inquiry approach to teaching. Teacher guided questions to establish a starting point and guide students into achieving the objectives in the lessons top.

Learning Strategies

Give the opportunity to explore and conduct simple research and decide on the best method to individually/ pairs/small groups (3) to work on assigned lesson activities for each lesson title.

Activity 1

Brain storms the lesson title 'sources of design'. Record all views from students on a chart and place on display board. Discuss and group views into the 6 sources.

Activity 2

Form groups and choose one of the sources of design discuss how they can create inspiring, creative ideas to create a design of a textile product.

Activity 3

Present the created design from the chosen source of design and present the work to the class.

Resources

There could be other resources teacher can identify for students to meaningfully teach this lesson. Textile Technology Teacher Guide

7 surprising sources of design inspiration – InVision <https://www.invisionapp.com> › inside-design › design-i...

- [Our top 6 sources of design inspiration - In The Box Marketing https://inthebox.marketing](https://inthebox.marketing) › top-6-sources-design-inspi...

Lesson 2: Technological progression

This lesson is about Technological Progression Teacher will provide handouts based on the content background on page ----- . Students use this information as the key resource to do the following activities in this lesson.

Teaching Strategies

Delivery of these lessons will be in the inquiry approach to teaching. Teacher guided questions to establish in the students a starting point and guide them into achieving the objectives in the identified lesson topics.

Learning Strategies

Students are given the opportunity to explore and conduct simple research and decide on the best method to either individually or in pairs or small groups of 3 to work on the assigned activities for each lesson title.

Activity 1

Students will define the meaning of the phrase “*technological progression*’ and give an example of an event to show their understanding of the phrase.

Activity 2

In groups choose one of the phases (invention, innovation diffusion) of technological progress and identify the types of projects in the respective phase. For example- In which phase would textile industry occur?

Activity 3

Do a flow chart of their interpretation of the project identified in activity 2 and present to the class.

Resources

Teacher resources to commend to students for researching on the topic

- [Textile, Textile Product, and Apparel Manufacturing Industry - College Grad](#)
- <https://collegegrad.com › industries › textile-product-and->.
- **Solow Residual Definition - Investopedia**<https://www.investopedia.com › ... › Macroeconomics>
- [Growth Accounting | Equation | Solow Residual | Example - XPLAIND.com](#)<https://xplained.com › growth-account>

Lesson 3: Emerging Trends

This lesson is about **emerging trends**. Teacher will provide copies of pictures newspaper articles of the common trends affecting textile industries around the globe for the students use in this lesson.

Teaching Strategies

Delivery of these lessons will be in the inquiry approach to teaching. Teacher guided questions to establish in the students a starting point and guide them into achieving the objectives in the identified lesson topics.

Learning Strategies

Students are given the opportunity to explore and conduct simple research and decide on the best method to either individually or in pairs or small groups of 3 to work on the assigned activities for each lesson title.

Activity 1

Do a mind map of a emerging trends in textiles in groups of 4.
Use the guiding question:
What are the textile trends in the 21st century?

Activity 2

“How are these trends affecting consumers and textile industries?’ In groups of 4 list the positive and negative impacts and share with class.

Activity 3

Fashion in 21st century is a high demand in the consumer markets. One of the fashions demanded on the fashion markets is clothes with Tik-Tok labels- If you were the CEO of an textile industry, how would you address this issue to satisfy your consumer needs?

Resources

These teaching and learning resources are commended for use in this lesson. Teacher can cater for specific resources according to the needs of the students learning.

- 8 Current Trends in Consumer Behaviour | Insights - Freedman...
<https://www.freedmaninternational.com › insights › 8-curr...>
- These Were the Biggest Fashion Trends of 2021 - Pure Wow
<https://www.purewow.com › fashion › biggest-fashion-tree>.

UNIT 2: Textiles and Clothing

Content Standard 1.2 Integrate and apply principles and techniques in presenting fashion ideas and illustrations in pattern making and garment construction for a variety of needs and occasions

Benchmark 9.1.2.2 Demonstrate an awareness of the fundamentals of design process through various artistic versions.

Topic 2: Fundamentals of design process

Essential Questions:

1. What are the fundamentals of design?
2. When do designers use artistic views in textile designing?
3. How important is an artistic version and when does it occur?

Essential Knowledge, Skills and Values/Attitudes

Knowledge	Fundamentals of design
Skills	Demonstrate, show, exhibit, and present design processes
Context	Artistic version
Attitudes/Values	Appreciate and value artistic versions of self and others

Technology and Industrial Arts Application: Textiles Technology: Fibres and Fabrics

Learning Objectives

By the end of this topic, the students will be able to;

1. Explain the fundamentals of design process
2. Demonstrate the skills of designing a textile product(garments)
3. Describe and define design process terminologies.

Content Background

The fundamentals of design process

The fundamentals of design process, involves “critical thinking and mental process capable of manipulating information from various sources , blend them into a logically arranged set of ideas and create something as a realization of those ideas”. Information is the critical component in this definition. That is, through the processing of information designers are able to create a foundation for generating design solutions Designers gather information to achieve a desired outcome or solve a particular problem, such as an approach to developing more environmentally sustainable products.

Some theorists describe designers as “*creators of models, prototypes and propositions*”. It is thought that designers occupy a dialectical space between the worlds (that is as we see it today), the world that could be as the mind sees it.” Some famous designer implies that the role of designers is to engage in imaginative exploration that fosters solutions to present and future societal needs. Designers have an opportunity to envision solutions to diverse issues surrounding human health and environmental sustainability.

Designing a product requires critical thinking creativity and of course the desired planning of actions. The actions to take in a design process must occur in a logical sequence/order for the end product to come out as anticipated. There are four fundamental things to consider in a textile design process, but some designers may not think so. It is important that designers consider these four things before beginning the process, as not having one of these will affect the whole design process steps.

These are:

1. Conceptualization of new designs.
2. Creating design samples.
3. Experimenting with various hues, to select shades complimenting with each other.
4. Designing the fabric, going in par with the current fashion trends.

It must be noted that designing a textile product does not take 10 minutes 10 hours. It's a process whereby each step in the process has its own time duration. The steps of the design process include:

1. identify the need
2. research the problem
3. develop possible solutions
4. select the most promising solution,
5. construct a prototype
6. test and evaluate the prototype,
7. communicate the design, and
8. Redesign.

Skills for design process

Having good knowledge of design skills about and for textile technology is a must for persons who want to establish and invest his/her interests for a living in textile industry. They must have basic understanding of textile, without this knowledge finding a job in textile industry is not commended.

Textile designers must have in-depth knowledge of:

- understanding of color, shape and form textures, and patterns;
- design-related software and knowledge of concept boards;
- variations in weaving, finishing methods, and textile properties;
- texture, patterns, dyes and yarns. flammability and durability of materials, and
- marketing strategies which are vital to have a firm base in the industry.

As a textile designer you need a range of skills use in applying the knowledge you have acquired as an enabler to better practice the design process knowledge in creating and producing different textile products. The skills highly commended are

- artistic skills
- creativity (drawing, artistic sense, aesthetics, color coordination, sewing, embroidery)
- communication skills (good communication, presentation and negotiation skills)
- problem-solving skills.
- printing, dyeing, embellishment techniques,
- budgets and schedules to work deadlines an
- colour palettes and an eye for details.

The skills commended are hereby described for the student- teacher convenience in the delivery of the lesson activities.

Commended Skill	Skill description
1. Creativity	The textile industry requires people who think “out of the box” and bring fresh ideas to the table. The courses are also designed in such a way that even students with rudimentary creativity skills end up improvising their creative streak, for they will know that it is a basic requirement to survive in this highly competitive environment.
Communication skills.	Textile designers rarely work alone. They are always surrounded by a team, which is why communication skills are crucial to discuss, understand, and interpret the needs of his/her clients. They must know how to coordinate with graphic designers, textile engineers, project managers, artists, and apparel designers. Communication skills also include professionalism in conveying ideas, work delegation to team members, and precise deliverance of concepts to clients.

Artistic Skills.	An edition is a copy or replica of a work of art made from a master. It commonly refers to a series of identical impressions or prints made from the same printing surface, but can also be applied to series of other media such as sculpture, photography and video.
Problem Solving	The process of finding solutions to difficult or complex issues. “an expert at creative problem-solving” Problem solving is the act of defining a problem; determining the cause of the problem; identifying, prioritizing, and selecting alternatives for a solution; and implementing a solution. The problem-solving process.
Project management	Project management is the use of specific knowledge, skills, tools and techniques to deliver something of value to people. The development of software for .. Project management is the application of processes, methods, skills, knowledge and experience to achieve specific project objectives according to the project acceptance criteria within agreed parameters. Project management has final deliverables that are constrained to a finite timescale and budget.

Teaching and Learning Strategies

Teachers are encouraged to introduce students to simulations to better understand the concepts taught. Therefore students will learn effectively and master the knowledge prescribed in each topic. Whilst introducing the topic, guided discovery and research will enable students to get a picture of fibres and fabrics.

The knowledge prescribed must be taught. It is not only about teaching what students should know but also to interpret that knowledge for students in a way that makes it relevant to them, and enables them to begin to acquire skills of analysis and problem solving, which will support teaching and learning. Students must be given opportunities to apply their knowledge, to be creative and to solve problems.

Lesson 1: Importance of design process

This lesson is about **importance of design process therefore** teachers are encouraged to provide learning aids pictures newspaper articles of various design processes for student's information, also extract content background given to support understanding of the lesson title.

Teaching Strategies

Delivery of these lessons will be in the inquiry approach to teaching. Teacher guided questions to establish in the students a starting point and guide them into achieving the objectives in the identified lesson topics.

Learning Strategies

Students are given the opportunity to explore and conduct simple research and decide on the best method to either individually or in pairs or small groups of 3 to work on the assigned activities for each lesson title.

Activity 1

Make a list of the terms in the knowledge and skills design process and define them and in a sentence say how they will be used

Terms/Words	Meaning
1. prototypes	
1. propositions	
2. embellishment techniques	
3. aesthetics	
4. artistic sense	
5. flammability	
6. hues	

Activity 2

Answer these questions from the reading given in the content background.

1. What are designers sometimes referred to as?
2. What are four main things a designer must consider when planning the design process?
3. If you were a designer what are two very key social issues that you must consider possible solutions should problems arise from a secondary level production.

Activity 3

Discuss the 8/7 steps of design process given and how best to describe the design process using practically materials. Describe using real materials (papers) For example in sewing a Meri blouse

Resources

Teacher-student resources to look up for research and extra content information include:

- websites ,Get familiar with your textile production processes | Textile Guide [https:// textileguide.chemsec.org](https://textileguide.chemsec.org) › find › get-familiar-with-..
- Technology & industrial Arts (TIA) Syllabus Grade 9-10.
- Design and Technology Teacher Guide for Lower Secondary
- Design and Technology -Syllabus Lower Secondary (

Lesson 2: Skills required for designing the design process.

This lesson is about designer **skills required for designing a design process**. Teacher has to make available suitable information on what, how, where, when these skills will be actually occurring in the design process of a product. Students are introduced to the designer skills through some demonstration of a skill or two.

Teaching Strategies

Delivery of these lessons will be in the inquiry approach to teaching. Teacher guided questions to establish in the students a starting point and guide them into achieving the objectives in the identified lesson topics.

Learning Strategies

Students are given the opportunity to explore and conduct simple research and decide on the best method to either individually or in pairs or small groups of 3 to work on the assigned activities for each lesson title.

Activity 1

Think of a textile product. Discuss with a friend or a group and sketch out the design process for this new creation of a product.

Activity 2

Using the steps in your design process steps given in the content reading assign a team member to each step. He/she say, draw or make in each step.

Activity 3

Discus what type of design skills did you use in or can use in each of the steps of the design process and why you think that every designer must acquire these skills?
Draw a flow chart to interpret the application of this skill

Resources

[Get familiar with your textile production processes | Textile Guide](https://textileguide.chemsec.org)
<https://textileguide.chemsec.org> › find › get-familiar-with-..

- Technology & industrial Arts (TIA) Syllabus Grade 9-10.
- Design and Technology Teacher Guide for Lower Secondary
- Design and Technology -Syllabus Lower Secondary

Lesson 3: Various artistic fashion

This lesson is about **various artistic fashions**. Teacher will provide copies of pictures newspaper articles of the common trends affecting textile industries around the globe for the students use in this lesson.

Teaching Strategies

Delivery of these lessons will be in the inquiry approach to teaching. Teacher guided questions to establish in the students a starting point and guide them into achieving the objectives in the identified lesson topics.

Learning Strategies

Students are given the opportunity to explore and conduct simple research and decide on the best method to either individually or in pairs or small groups of 3 to work on the assigned activities for each lesson title.

Activity 1

Have a favourite clothe brought and displayed in the classroom. Allow the class to make comments on whether they like or not like the fashions on display, what is the artistic feature in those clothes, do they have a special artistic feature. Take the one that most students preferred and do a recreation of it.

Activity 2

Using the design process steps you used in lesson 1, to lay out your new creation using butcher paper or any other available material to do the new creation.

Activity 3.

Answer these questions from the reading given in the content background.

- a. What are four main things a designer must consider when planning the design process?
- b. What are designers sometimes referred to as?
- c. If you were a designer what are two very key social issues that you must consider and identify possible solutions should problems arise from a secondary level production.

Resources

This is a list of suggested resources teachers can use to deliver the content learning activities for their lessons.

- Technology & industrial Arts (TIA) Syllabus Grade 9-10.
- Design and Technology Teacher Guide for Lower Secondary
- Design and Technology -Syllabus Lower Secondary
- Get familiar with your textile production processes | Textile Guide [https:// textile guide. chemsec.org](https://textileguide.chemsec.org) › find › get-familiar-with-
- [Textile Designing and Fabric Designing for Print Fabrics https://www.fibre2fashion.com](https://www.fibre2fashion.com) › industry-article › a-bridg...

UNIT 2: Textiles and Clothing

Content Standard 1.2 Integrate and apply principles and techniques in presenting fashion ideas and illustrations in pattern making and garment construction for a variety of needs and occasions

Benchmark 9.1.2.3 Apply a broad range of contemporary and appropriate tools and techniques with competence and in the development projects.

Topic 3: Tools and techniques in project

Essential Questions:

1. What is the difference between contemporary and appropriate tools?
2. Why is it important to use the appropriate tools in developing a textile project?
3. What are the techniques applied in textile project development?

Essential Knowledge, Skills and Values/Attitudes

Knowledge	Contemporary Tools and techniques
Skills	Describe show and apply
Context	Contemporary and appropriate tools and techniques
Attitudes/Values	Reasoning with friends, justifying and valuing decision

Technology and Industrial Arts Application: Textiles Technology: Fibres and Fabrics

Learning Objectives

By the end of this topic, the students will be able to;

1. Demonstrate knowledge of a broad range of contemporary and appropriate tools and techniques
2. Explain the functions of tools what they are used for , when and where development procedure of design projects

Content Background

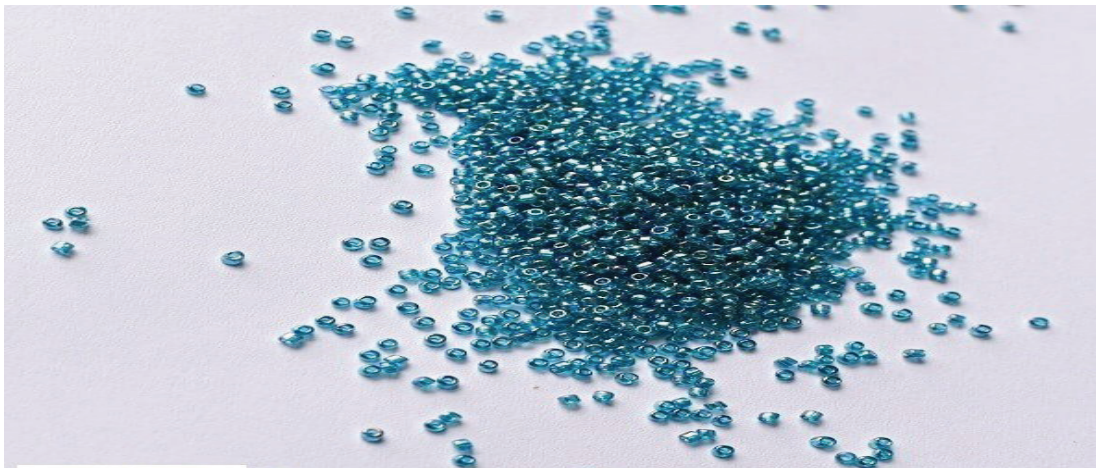
In the textile industry, there are certain types of tools and techniques used in the development processes of various textile products this includes jewellery, wall hangings etc...

This content information is about the the types of tools that are specifically used in the production oa particular textile projects such as jewellery. Considering the fact that jewellery is part of a fashion makeup, this information on how to make simple body ornaments with the use of special tools make them even more special.

Supplies and Tools needed for Beadwork

Bead work requires special tools. Find out what these tools and how they are used to do beading.

Beads



The most commonly used beads in bead weaving are the round seed beads and the cylinder beads. Besides these, the most liked are the Japanese beads (Delica), which is a result of smart work done to produce the beads. The other qualifier for beads to buy is the cuts and abrasions on the bead surface. Beads come in different sizes the smallest is size 15 and the largest size 5.

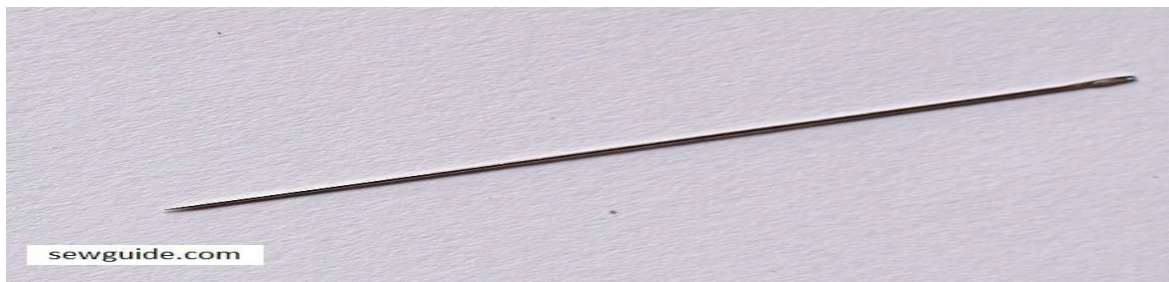
The most preferred bead size is size 10. Adding other beds to the brand you have chosen and these could be glass beads and gem stone beads.

- To start a bead weaving project it is good to plan the project that means, deciding on: how big the project is going to be;
- types of tools you will need for the beading project;
- where the beads will be used;
- who the beads are for
- how much space or body size and
- how many beads will be needed other wise estimating will probably be difficult.

Here are basic tools and materials the bead weaver may need for weaving beads. There may be others but these are commended for use as they are easily accessible. They include;

- beading needles and thread,
- beading loom and beading wires
- beading board and beading tray,
- beading mat and metal wire
- glue and patterns

Needle



Selecting a needle or needles for beading is not difficult. The very simple but important thing to be sure of is that the needle can go through the bead holes smoothly. The normal hand sewing needles will not pass through high quality beads. They may in the low quality beads and the big size beads. The commended types of needles for beading are:

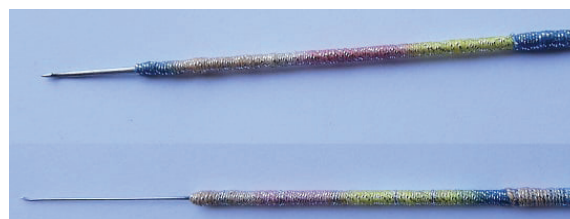
- those with small eyes,
- strong and lasting
- wont bend after some use and
- can go across the threads on a beading loom.

These are recognized by the name Beading Needles shown in the photograph above.

On the flip side if you do embroidery, use embroidery needles sizes 10 and 12 as they work on normal bead seed sizes 10 and 11. Beads small in size will need needle size 12 and 13. Most importantly bead weavers at all times remember one thing and that is, the higher the number (size of bead), the thinner the needle.

An alternative needle is a twisted wire needle, a collapsible eye needle or a special beading hook needle.

Thread



Bead weaving use a number of threads, silk, nylon, stretch floss, elastic or stretch cords.

The 2 types of beading threads that most bead weavers use as they are stronger than the normal sewing and embroidery threads. The woven nylon and the silk threads, both threads come in different colors. Silk threads look good on pearls but will fray some time later. Nylon thread is frequently used both in weaving beads in the loom and embroidery. Nylon threads are waxed before use for smooth passing through the bead holes.

Thread seed beads use size 2 nylon threads, however it is good to try out other brands of threads and buy the best that won't tangle or fray easily through the beading needle eye.

To avoid tangling, use a thin plastic called Stretch Floss for bead weaving or the elastic or stretch cords are another type. They stretch and can be bought in different sizes, 0.5mm to 0.7mm. Select the beads first and then choose the cord to pass through the bead holes.

Beading wire

Some bead weavers prefer to use the beading wires from using the beading threads. The beading wires shape the beads as you arrange them and you want them to look.

Bead weavers must choose beading wires that will pass through the hole of the small bead. Beading wires with many strands are flexible and do not break easily so are better than the single strand wires. There are beading wires with 40 strands you can use. The smallest beading wire can go through a bead whole 0.010 to 0.15 in diameter.

Beading loom



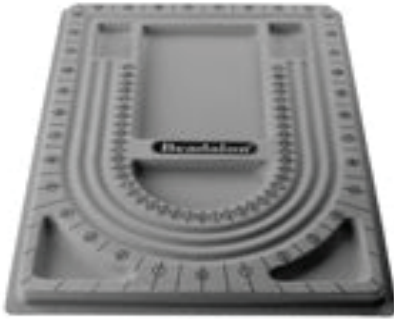
There are many types of bead looms available in the market – from simple to complex. The best is to buy a Bead Loom with an adjustable wooden frame or an Ojibwa loom (Continuous Warp Bead Loom). It can be adjusted to make long bead weaving projects. Both of them can make bead projects which are as long as 25 inches long. You will need a strong thread as warping thread

Bead board, tray and mat

There are wooden and plastic bead boards, trays and mats some simple and others complex. The bead boards, Bead weavers used these boards to lay out bead in designs they create before the beads are threaded. The boards have measurements

which are useful for measuring the lengths of the bead boards make the weavers see how the designs look and help the bead threading design process flow well. The boards can be used to thread other things such as bracelets and necklaces.

Bead Board



<https://www.firemountaingems.com/resources/jewelry-making-articles/f12e>

Bead Tray



<https://www.aliexpress.com/item/1005001672166370.html>

Bead Mat



A bead mat is usually a 14-inch square but when you make it yourself you can cut it the size you need. The best is to buy a bead mat tray.
<https://www.aliexpress.com/item/4001263139225.html>

Metal wire tools

A pair of chain-nose pliers and Flat nose pliers (Needle Nose or Chain Nose Pliers) and wire cutters are the most essential things when working with beading wire. Flat nose pliers are used to press the crimp beads and also to press wires together. There are other tools you can also purchase if you decide to take on bead weaving or jewellery making.

Here are pictures of Chain nose pliers. Flat nose pliers and wire cutters

Chain Nose Pliers



Flat Nose Pliers



<https://www.interweave.com/article/beading/top-10-beading-tools/>

Glue

Glue comes handy in beading, when the beaver decides to glue beads onto fabrics. One of the types of glue that most beaders use is pictured below. It is not flammable. It is important to make sure the surface where the glue will be applied is cleaned before glue is applied. When you have made knots on your bead stringing material, it can come off after sometime. You have to apply glue (a flexible glue) to make it secure.

GEM-TAC GLUE



https://www.harmanbeads.com/ALL-ABOUT-GLUE_b_5.html#:~:text=Gem%2D-Tac%20glue%20is%20the,and%20clear%20and%20is%20waterproof.

Patterns

Beading patterns are the market and can be purchased online get patterns for bead weaving from websites or better still you could create your own patterns on paper and the try it out on your beading loom. NG has rech cultural and traditional patterns, designs on carved figures and crafts try them out.

Miscellaneous tools

In a textile classroom all students must have good knowledge of what miscellaneous tools are. This are tools from different groups put together as they will be handy for doing very necessary things in the beading project. This category includes things like; a ruler, good sharp scissors, thread sniper and a, masking tape. These are all handy when working with beads.

Convenient tools

A convenient tool is a **tool**, an instrument, equipment a student needs to do or use in a special type of work. An example is, for digging you need a spade otherwise not all spades can help you to dig properly. Beading is eye straining or back breaking and other ailments an individual may experience, however if you have the right kind of tools you will enjoy and be passionate about beading. The ergonomics of beading involves proper seating, magnifiers, good lighting and proper tools to see good results. The following are some of the most needed convenient tools. They are:

- bead reamer and
- bead spinner

Bead Reamer

A bead reamer is a pointed, round needle file that is used to either smooth the edges of the drill-hole in a bead, or to enlarge or straighten the hole itself. This is a tool used to make holes bigger inside beads.



<https://www.firemountaingems.com › resources › jewelr...>

Bead spinner

A convenience in string beading is possible by using a bead spinner. This device lets you string plenty of beads (should be of the same size and color) very quickly. If you are interested in this, it means you are passionate about bead weaving and bead work.



<https://beadandblossom.com> › [lets-talk-about-bead-spin...](#)

Fiber based Artwork

Using either the miscellaneous or convenient tools you can create decorations for your house and use the patterns you create for beading. The decoration below is an artwork using leftovers from fabrics. Use this sample and do small projects work

Here is a creation of a fibre-based house decoration using two and three dimensional shapes, and creativity used in a special way using inexpensive materials lying around the house. The materials and tools used to produce this decoration are kept safely and stored with care. These include:

- silk, cotton, velvet, wool and paper,
- sewing machine, scissors, pliers and a needle

The basic shapes used are the two- and three-dimensional shapes.

Ref:(annaray.co.uk; brookfieldproperties.com)(to be adapted.)



Teaching and Learning Strategies

Teachers are encouraged to introduce students to simulations to better understand the concepts taught. Therefore students will learn effectively and master the knowledge prescribed in each topic. Whilst introducing the topic, guided discovery and research will enable students to get a picture of fibres and fabrics.

The knowledge prescribed must be taught. It is not only about teaching what students should know but also to interpret that knowledge for students in a way that makes it relevant to them, and enables them to begin to acquire skills of analysis and problem solving, which will support teaching and learning. Students must be given opportunities to apply their knowledge, to be creative and to solve problems.

Lesson 1: Contemporary tools and techniques

This lesson is about **contemporary tools and techniques**. Teacher will provide copies of pictures newspaper articles of various tools for student's background information to understand the lesson. Before the lesson tell students to do a research on the concept title

Teaching Strategies

Delivery of these lessons will be in the inquiry approach to teaching. Teacher guided questions to establish in the students a starting point and guide them into achieving the objectives in the identified lesson topics.

Learning Strategies

Students are given the opportunity to explore and conduct simple research and decide on the best method to either individually or in pairs or small groups of 3 to work on the assigned activities for each lesson title.

Activity 1

Brainstorm the concept '**contemporary tools and techniques**'. Get students to make comparisons of the brainstormed points to their researched information and share with others..

Activity 2

Relate the information on Beading tools. Discuss why beading tools are very different from most of the common tools use to make textile products. Compare the Beading tools to the tools needed to make hand wall hanger and the tools used.

Activity 3

How are the techniques in the tools applied in beading different from those used in making wall hanger.

Resources

Students need resources to make bead-threading and wall hanger projects

- Local materials seeds, shells paper color/plain, scissors, beeding thred needls
- (annaray.co.uk; brookfieldproperties.com)
- SBC TIA Syllabus
- SBC TIA Textile Technology Teacher Guide

Lesson 2: Importance of using appropriate tools and techniques

In this lesson the students will learn about the importance of using certain tools for certain products and be mindful of how these tools cannot be used for the production of common textile products.

Teaching Strategies

Delivery of these lessons will be in the inquiry approach to teaching. Teacher guided questions to establish in the students a starting point and guide them into achieving the objectives in the identified lesson topics.

Learning Strategies

Students are given the opportunity to explore and conduct simple research and decide on the best method to either individually or in pairs or small groups of 3 to work on the assigned activities for each lesson title.

Activity 1

Discuss the question 'What do we mean by appropriate tools?' Work in groups and report their answers to the class after 5 minutes

Activity 2

Identify a tool for the use in making a special product. Draw this tool and write 5 lines of description for its appropriate ness.

Activity 3

In your cultural setting identify a textile product which can be made by a special tool- Draw the tool and the product- almost close to their normal resemblance.

Resources

- **Let's Talk About Bead Spinners (and a DIY ... - Bead & Blossom**
- <https://beadandblossom.com › lets-talk-about-bead-spin...>
- (annaray.co.uk; brookfieldproperties.com)(to be adapted.)
- [Jewelry Making Article - Selecting the Right Bead Reamer](#)
- <https://www.firemountaingems.com › resources › jewelr...>

Lesson 3: Care and maintenance of tools

Students will learn about the care and maintenance of tools used to make certain textile products. Consider the fact that if tools are not cared for properly/correctly- the consequences are that production maybe ruined and expenses higher.

Teaching Strategies

Delivery of these lessons will be in the inquiry approach to teaching. Teacher guided questions to establish students' starting point and guide them into achieving the objectives in the.

Learning Strategies

Students are given the opportunity to explore and conduct simple research and decide on the best method to either individually or in pairs or small groups of 3 to work on the assigned activities.

Activity 1

Discuss these 3 questions with a friend and share the responses with class should be asked/discussed

- What is the most important factor to consider when taking care of the appropriate tools
- Why are appropriate tools so expensive?
- What type of textile products acquire appropriate tools.?

Activity 2

You were asked to make a set of jewellery to match a suite for. Draw a set of the types of jewellery you will design to match the suite

Activity 3.

Continue with the activity introduced in activity 2/.

Resources

Teachers are encouraged students to collect their own resources in the local community to do this activity, broom sticks fine fibers from tulip bark, shells and beads etc.

UNIT 2: Textiles and Clothing

Content Standard 1.2 Integrate and apply principles and techniques in presenting fashion ideas and illustrations in pattern making and garment construction for a variety of needs and occasions

Benchmark 9.1.2.4 Describe how the properties of textile affect textile wear and care.

Topic 1: Textile wear, tear and care

Essential Questions:

1. What are textile properties?
2. How do textile properties affect textile wear and care?
3. What does wear and tear mean?

Essential Knowledge, Skills and Values/Attitudes

Knowledge	Properties of textile, wear , care and tear
Skills	Describe, apply, utilise, use, employ
Context	Wear and care
Attitudes/Values	Care& concern-aesthetics, appealing and sustainability

Technology and Industrial Arts Application: Textiles Technology.

Learning Objectives

By the end of this topic, the students will be able to;

1. Explain how the properties of textile affect textile wear and tear.
2. Describe special ways to maintain the use and care of clothes, furniture and other textile products
3. Demonstrate a simple mending of tear and laundering of dirty clothes.

Content Background- Textile wear and Care

Textile wear and care is an important feature in clothing and other textile products that we use in everyday life. Users of textile and clothing products must recognise and be knowledgeable off this feature as different types of fabrics require different ways of caring when worn

Properties of Textiles

The primary or basic properties of textiles are characterised by the specific type of materials with a combination or no combinations. The basic properties include; fibre strength (tenacity) of fibres, flexibility, uniformity (evenness of fibre in length and diameter) elasticity and extensibility, softness, durability, heat insulation, low weight, water absorbency/repellence, dye ability and resistance to chemicals, spinning quality (cohesiveness) and High length to width ratio.

Knowing about these properties enables individuals who may venture or dream of becoming seamstresses and tailors gives a head start of what makes quality in textile industry. These properties become part of the development processes of producing textile products including of the quality of materials which are basically the fibres in the fabrics and other materials chosen.

Wear and tear

Clothing are damaged both from within and without that is our body sheds skin cells and body oils, and exudes sweat, urine, and feces are contributing factors to damaging the clothes worn. From the outside, sun damage, moisture, abrasion, and dirt assault garments. Other things in the environment like fleas and lice can hide in seams using it as their homes laying eggs and feed on the fabric and causes it to decay, rot and tear.

Worn clothing, if not cleaned and refurbished, itches, becomes outworn, and loses its aesthetics and functionality. This is when buttons fall off, seams come undone, fabrics thin or tear, and zippers get stuck and fail. There are other textile products which are made of skins which are subject to rot and decay easily if not cared for in the correct way.

Often, people wear an item of clothing until it falls apart. Some materials present problems. Cleaning leather is difficult, and bark cloth (tapa) cannot be washed without dissolving it. Owners may patch tears and rips, and brush off surface dirt, but materials like these inevitably age.

However, most clothing consists of cloth, and most cloth can be laundered and mended (patching, darning, but compare felt)

Clothing care and maintenance



All clothing is subject to wear and tear. Some causes of wear and tear in clothing are by nature, chemicals and mishandling by people. Just the act of wearing clothes is enough for gradual erosion. ... But when combined with bacteria, it can weaken and discolor clothes over time. Never wear torn and dirty clothes, as this is one of the worst things you can do to undermine your personality. It may be fashionable and cool to wear faded, torn or frayed denim, but be warned that dressing like this brings very bad luck.

Here are common things we all encounter with clothing we wear. Therefore it is a must we as users must be knowledgeable of how to care, for our clothes, laundering, ironing, storing and mending.

Fabric Care Techniques

Caring for clothes	Description- Tips for washing clothes
<p>Taking care of your clothes</p>	<p>It is good to own clothes which:</p> <ul style="list-style-type: none"> • are made of strong fabric and • do not wear out easily and are not washed frequently. <p style="padding-left: 40px;">• Manage the care by ensuring that clothes :</p> <ul style="list-style-type: none"> • are folded along the seams, • aired out and elastic are relaxing • are not ironed every so often • must be repaired correctly • pockets must be emptied after use or quite often and • fasteners are safely secured



Taking good care of the clothes we wear is very important. This helps individuals to see that the clothes will last longer, will not wear out quickly make purchasing of new clothes in durable time like 2 years and not 3 months. Also it is important to ensure that the quality of the clothing owned is of quality fabric materials and not poorly processed fabric materials. This will also reduce fabric waste for such things like carbon water and waste footprints during the manufacturing processes.



Caring For Clothes – and Keeping Them Longer

- Wash less. Think twice before washing your clothes. ...
- Wash at low temperatures. ...
- Pay attention to care labels. ...
- Use eco-laundry powders and detergents. ...
- Wash inside out and air dry
- Store properly.
- Alter to fit or refresh the style.

Proper care and maintenance of our clothes is very important **for healthy living**. ... Clothes not only cover our body but also improve our personality. Dirty clothes carry many germ and bacteria which can cause infection in our bodies. Dirty clothes make us upset and unhealthy.6/08

Laundry	Humans have developed many specialized methods for laundering, ranging from early methods of pounding clothes against rocks in running streams, to the latest in electronic <u>washing machines</u> and <u>dry cleaning</u> (dissolving dirt in <u>solvents</u> other than water). Hot water washing (boiling), chemical cleaning and ironing are all traditional methods of <u>sterilizing</u> fabrics for <u>hygiene</u> purposes
Ironing,	Many kinds of clothing are designed to be <u>ironed</u> before they are worn to remove wrinkles. Most modern formal and semi-formal clothing is in this category (for example, <u>dress shirts</u> and <u>suits</u>). Ironed clothes are believed to look clean, fresh, and neat. Much contemporary casual clothing is made of knit materials that do not readily wrinkle, and do not require ironing. Some clothing is <u>permanent press</u> , having been treated with a coating (such as <u>polytetrafluoroethylene</u>) that suppresses wrinkles and creates a smooth appearance without ironing. Excess lint or debris may end up on the clothing in between launderings. In such cases, a <u>lint remover</u> may be useful.

Textile Technology

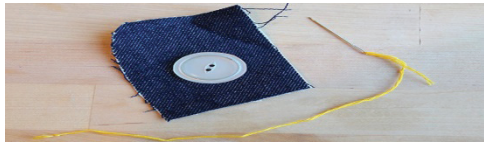
Storage	<p>Keep all laundered clothes nicely folded and place in the cupboard, suitcase, baskets, carton keep them away from insects Too you can iron them anlaun-dered and ironed, they are hung on <u>clothes hangers</u> or folded, to keep fresh until worn. Folding allow the clothes to be stored compactly, to prevent creasing, to preserve creases or to present them in a more pleasing manner, for instance when they are put on sale in stores.</p> <p>Certain types of insects and larvae feed on clothing and textiles, such as the <u>black carpet beetle</u> and <u>clothing moths</u>. To deter such pests, clothes may be stored in cedar-lined closets ^[46] or chests, or placed in drawers or containers with materials having pest repellent properties, such as <u>lavender</u> or <u>mothballs</u>. Air-tight containers (such as sealed, heavy-duty plastic bags) may also deter insect pest damage to clothing materials.</p>
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Repair techniques

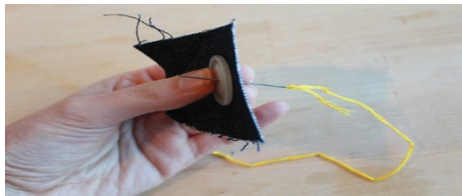
Repair Techniques	Description
<ul style="list-style-type: none"> • <i>Mending</i> 	<p>Users of textile products must acquire skills and knowledge to fix/mend the products if they are worn out, torn, weather beaten, broken or are loose from the join. One key skill is mending. Mending can be done manually or by machines (sewing machines.) Different types of clothes require different mending techniques. Some helpful skills listed for your convenience are:</p> <ul style="list-style-type: none"> • Sew on buttons, hems/seams, stitch darn sockless, patch holes
<ul style="list-style-type: none"> • Fix Torn Seams. 	<p>Use a sewing machine, to run a straight stitch. Start a little before the rip, stitch onto the existing seam line. Back-stitch to secure the seam and then sew along unravelled section till you meet the stitching on the other side and backstitch back again to secure the thread.</p>

Sew on a Button.

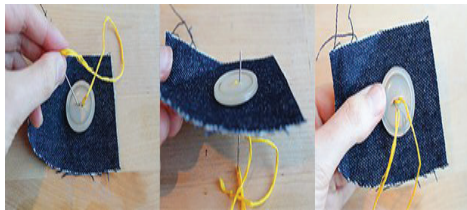
i.



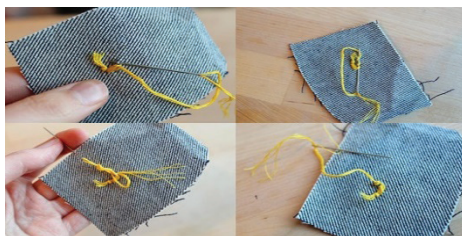
ii.



iii.



iv.



1. Before you sit down to replace a fallen or broken button; Always have replacement buttons, cotton and needles, pins kept away in your sewing kit at all times.

2. Check the cloth and find where the button was previously placed. Place the replacement button in the same place. Match it to the hole already on the fabric. Thread your needle and make a knot at the end of the thread. (see picture 1)

3. Get the threaded needle place it at the back of the fabric and push it through the fabric then through the button hole. It must come out in front of the fabric, where the button should be. (See picture 2)

4. Now push your needle through the other button hole, through the fabric onto the other side, and back up through the next button hole for about 6 times. Repeat this process for all the button holes keeping the stitches tight to hold the button firmly in place. If 4 button holes the thread must over each button hole 6 time forming an x.

5. When the button is secured, check to see that the thread is on the back of the fabric. With your needle pick up 3 or 4 threads from the fabric. Wrap the thread around the needle 3 or 4 times. Then pull the thread-wrapped needle through to the end to form a knot. This action completes the button replacement.

Teaching and Learning Strategies

Teachers are encouraged to introduce students to simulations to better understand the concepts taught. Therefore students will learn effectively and master the knowledge prescribed in each topic. Whilst introducing the topic, guided discovery and research will enable students to **better understand clothing and textiles**.

The knowledge prescribed must be taught. It is not only about teaching what students should know but also to interpret that knowledge for students in a way that makes it relevant to them, and enables them to begin to acquire skills of analysis and problem solving, which will support teaching and learning. Students must be given opportunities to apply their knowledge, to be creative and to solve problems.

Lesson 1: Properties of textile

In this lesson the students will learn about the properties of textiles. It is important to know textile types and properties needed for use in different environments.

Teaching Strategies

Delivery of these lessons will be in the inquiry approach to teaching. Teacher guided questions to establish in the students a starting point and guide them into achieving the objectives.

Learning Strategies

Students are given the opportunity to explore and conduct simple research and decide on the best method to either individually or in pairs or small groups of 3 to work on the assigned activities for each lesson title.

Activity 1

Discuss generally the different subheadings under caring for clothes, the importance of the;

- properties of textiles;
- wear and tear;
- fabric care techniques;
- repair techniques for clothes and
- the negative impacts of not caring for clothes.

Activity 2

In a group of 3 or 4 discuss and develop a plan on what and how to do one for the above listed and present their idea and to the class.

Activity 3

In pairs interpret the plan developed in Activity by showing the processes steps on how to put the plan into use. List materials ready for the activity.

Resources

Materials for students to do practical activity: buttons, needles, different colour cottons

Lesson 2: Fabric repair techniques

In this lesson the students will learn about fabric repair techniques. It is important to know the particulars of mending clothing or other products that can be easily mended and used again. A simple example is clothes and shoes etc.

Teaching Strategies

Delivery of these lessons will be in the inquiry approach to teaching. Teacher guided questions to establish in the students a starting point and guide them into achieving the objectives in the identified lesson topics.

Learning Strategies

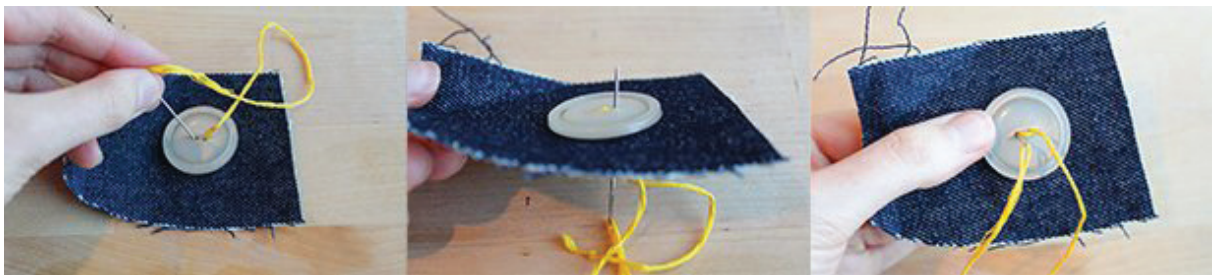
Students are given the opportunity to explore and conduct simple research and decide on the best method to either individually or in pairs or small groups of 3 to work on the assigned activities for each lesson title.

Activity 1

Identify and list different ways for repairing fabrics or other garments for all ages.

Activity 2

Prepare a button hole mending kit and do a sample according to the steps given or do a sample of fixing on a fallen button.



Activity 3

Continue with the activity from activity 2. Encourage students to choose their own button pieces of cloth.

Resources

Teachers encourage students to bring their own buttons, pieces of clothes, needles and cotton and scissors.

Lesson 3: Wear and care

In this lesson the students will learn about wear and tear of clothes and other textile products. It is important to know the particulars of certain fabrics, their qualities and their wear duration. The same with other products like cushions chairs, beddings work wear etc . Have them mended at the first sight of their wear outs.

Teaching Strategies

Delivery of these lessons will be in the inquiry approach to teaching. Teacher guided questions to establish in the students a starting point and guide them into achieving the objectives in the identified lesson topics. *Teacher asks students to bring to class garments made of different fabrics cotton, silk, nylon, rayon etc for display in class.*

Learning Strategies

Students are given the opportunity to explore and conduct simple research and decide on the best method to either individually or in pairs or small groups of 3 to work on the assigned activities.

Activity 1

From a display of clothing displayed by the teacher choose a clothing and identify its;

- Fabric type,
- Its quality
- Type of climate it can be worn in
- One way to care for it.

Activity 2

Draw the clothing/garment chose in activity 1.

Activity 3.

Choose one of the above listed in activity 1 and describe the action to take , should a situation occur.

Resources

Students decide on the resources they want to use in this lesson.

UNIT 2: Textiles and Clothing

Content Standard 1.2 Integrate and apply principles and techniques in presenting fashion ideas and illustrations in pattern making and garment construction for a variety of needs and occasions

Benchmark 9.1.2.5 Apply the design process to respond to needs and opportunities in textile design projects.

Topic 1: Design Process

Essential Questions:

1. Why is it important to apply design process?
2. What are the needs and opportunities in textile design process?
3. How should a textile project be chosen?

Essential Knowledge, Skills and Values/Attitudes

Knowledge	Design Process
Skills	Apply, application and employ
Context	Needs and opportunities in textile design projects
Attitudes/Values	Appreciating , sharing, valuing, problem solving, creativity

Technology and Industrial Arts Application: Textiles Technology: Fibres and Fabrics

Learning Objectives

By the end of this topic, the students will be able to;

1. Define and describe a 'design process' of a textile product
2. Gather data on needs and opportunities and use it to design textile projects
3. Describe a textile project

Content Background Topic: Design Process (*What is design process?*)

The textile design process can involve a designer in many different activities, from deciding what to design, through controlling the production of sample ranges and establishing production specifications to controlling design storage systems. A well planned-out design process is investigative, creative and rational, and decision making.

The design process starts with a need, involves research, ideas generation and design development, and ends with a new design. Design projects have to be completed to schedules and within set budgets, so efficient project management and time management are important. Planning is about managing and controlling events to achieve a goal or goals. The aims and objectives of any project require to be identified. This is usually done at the briefing meeting, and here checklists can be a helpful tool. There are different methods that can be used to help in planning projects.

These include backwards planning, Gantt charts and network analysis. How an individual uses time is unique to that individual. Planning how to best use time is crucial. Research is important to the designer — both primary and secondary research. Information can be gathered from a variety of sources and in different ways. Generation of ideas can be aided by brainstorming and this can be carried out formally or very informally. Range planning, range development and presentation are vital functions of the textile design process.

Textile design is the process of creating textiles and the patterns on them for knitted, woven, and printed fabrics. A design starts with a drawing, often done in CAD software, which is used to make very precise two-dimensional or three-dimensional illustrations on the computer screen.

To become a Textile Designer, you need:

- artistic and creative skills.
- knowledge of texture, patterns, dyes and yarns.
- an understanding of colour, shape and form.
- knowledge of design-related software.
- good communication, presentation and negotiation skills.
- to work to deadlines and budgets.
- problem-solving skills.

Needs and opportunities in a design process

Design opportunity is a platform that connects non-profit organizations that have and use design colleges and gives meaningful design briefs to challenge talented students. In relation to project management, a problem can be defined as an issue that is preventing the organization from achieving business goals and objectives. However opportunities, on the other hand, are initiatives that will assist the organization in reaching business goals and objectives if implemented appropriately. There are many opportunities which individuals taking up textile manufacturing can pursue.

The seven most common needs that designers must uphold in clothing and textile production:

- knowledge
- technology
- product
- service or experience
- lifestyle
- physical resource
- trading and commodity.

These are some of the best needs to apply design thinking: “redefining value, re-inventing business models, shifting markets and behaviours, organizational culture change, and problems affecting diverse stakeholders and multiple systems”. Learning design thinking helps students develop a growth mindset and important problem solving, analytical and spatial thinking skills.

Therefore it is encouraged that students must have an in-depth knowledge what ‘opportunity statements’ are. Brief evaluation of a product concept or idea to determine if the idea is worth pursuing, within the context of many other ideas and opportunities (Technology Training).

Entrepreneurship Opportunities and Keeping Records

The opportunities in the textile industries include an innovative approach, established methodology, model, and proven results. These embrace the opportunity sources which designers can tap into to identify entrepreneurship strategies through textile production workshops, projects and research data on textile industries.

The Opportunity Source some what defines the origination of the prospective sales. An example of an opportunity source would be telemarketing and tradeshow, web contact referral. By definition, a business opportunity is a well-thought idea that needs to be developed. Examples of these are

- franchising;
- distribution and deals;
- marketing and
- licensing.

Keeping Records

To be able to access the required information on possible entrepreneurship activities it is important that some form of record keeping must be done to determine the types of marketing strategies that an individual may want to explore. Depending on the interest area an individual is used to do a research activity plan to find out how best to keep records of

- a make believe Textile company
- the important things to consider in the process of creating a textile company
- the types of equipment and facilities should be sourced
- how to source funds
- the best record keeping strategy

Teaching and Learning Strategies

Teachers are encouraged to introduce students to simulations to better understand the concepts taught. Therefore students will learn effectively and master the knowledge prescribed in each topic. Whilst introducing the topic, guided discovery and research will enable students to get a picture of fibres and fabrics.

The knowledge prescribed must be taught. It is not only about teaching what students should know but also to interpret that knowledge for students in a way that makes it relevant to them, and enables them to begin to acquire skills of analysis and problem solving, which will support teaching and learning. Students must be given opportunities to apply their knowledge, to be creative and to solve problems.

Lesson 1: What is design process?

The activities in this lesson bring out the essence of understanding the concept 'design process'

Teaching Strategies

Delivery of these lessons will be in the inquiry approach to teaching. Teacher guided questions to establish in the students a starting point and guide them into achieving the objectives in the identified lesson topics.

Learning Strategies

Students are given the opportunity to explore and conduct simple research and decide on the best method to either individually or in pairs or small groups of 3 to work on the assigned activities for each lesson title.

Activity 1

Several lessons have covered the concept of 'design processes. Students express their own interpretations of design process as a yet to be textile product designer.

Activity 2

Discuss and identify the key needs of an yet to be designer of products clothes, furniture,

Activity 3

Discuss and identify which opportunity source you would use to market your imaginary product (you could write up a description or show your process in a flow chart.

Resources

Encourage students to provide their own resources as a yet to be ' textile product designer.

Lesson 2: Phases in Textile Project development

The activities in this lesson bring out the essence of understanding the concept 'design process'

Teaching Strategies

Delivery of these lessons will be in the inquiry approach to teaching. Teacher guided questions to establish in the students a starting point and guide them into achieving the objectives in the identified lesson topics.

Learning Strategies

Students are given the opportunity to explore and conduct simple research and decide on the best method to either individually or in pairs or small groups of 3 to work on the assigned activities. **This is a follow up lesson from Lesson 1.**

Activity 1

Get students to form groups of a like-minded selection of a textile product and decide or create a product project development phase.

Activity 2

Continue and complete the phases of the project as agreed started in the group in the first activity.

Activity 3

Completed the imaginary development phases of the selected project and present their completed sample to the class.

Resources

Teacher assist students with resources they request to completed their imaginary project development phase activities.

Lesson 3: Needs and opportunities in textile design

The activities in this lesson bring out the essence of understanding the concept needs and opportunities in textile design

Teaching Strategies

Delivery of these lessons will be in the inquiry approach to teaching. Teacher guided questions to establish in the students a starting point and guide them into achieving the objectives in the identified lesson topics.

Learning Strategies

Students are given the opportunity to explore and conduct simple research and decide on the best method to either individually or in pairs or small groups of 3 to work on the assigned activities for each lesson title.

Activity 1

Do a brainstorm activity on the title of the lesson 'Needs and opportunities in textile design'. Discuss the views listed and sought individual opinions on why they had that view.

Activity 2

Sort the views gathered in activity 1 into categories- needs and opportunities.

Activity 3

Each student do a narrative report on the differences between needs and opportunities from a textile designers point of view

Resources

Students decide on what resources they want to use to present their views.

UNIT 2: Textiles and Clothing

Content Standard 1.2 Integrate and apply principles and techniques in presenting fashion ideas and illustrations in pattern making and garment construction for a variety of needs and occasions

Benchmark 9.1.2.6 Select and use appropriate technology to creatively document, communicate and present design and project work

Topic 6: Documenting design and project work (*portfolio*)

Essential Questions:

1. What is a document design?
2. What is the difference between document design and project work
3. What is your understanding of project design?

Essential Knowledge, Skills and Values/Attitudes

Knowledge	Design Process
Skills	Apply, application and employ
Context	Needs and opportunities in textile design projects
Attitudes/Values	Appreciating , sharing, valuing, problem solving, creativity

Technology and Industrial Arts Application: Textiles Technology: Fibres and Fabrics

Learning Objectives

By the end of this topic, the students will be able to;

1. Write up a plan on the action steps of how to document a project for presentation to a selected audience.
2. Identify and use appropriate technology to document and present design and project work

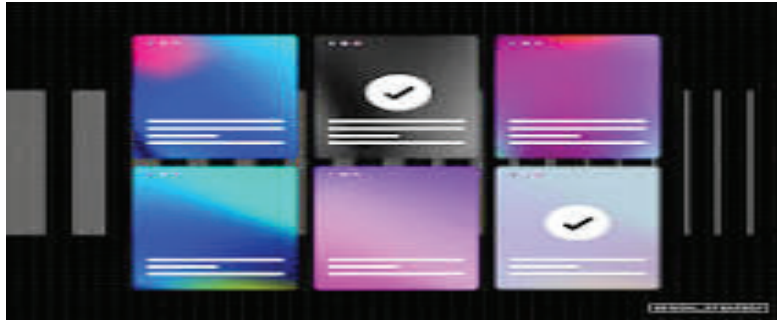
Content Background

People around the globe have ventured into textile industry on large and small scale. The industry provides opportunities for employment as well as lifestyle dressings of all sores from designers of textiles products to models of fashions. The globe is booming with the latest of the latest fashions and documenting them through the technology used in the 21st century.

Some of the notes will guide you to explore and research more on what textile industries are today.

Documenting design means creating a collection of documents and resources that covers all aspects of the product design. This should include information about your users, product features and services, along with project deadlines, resources used and the people involved in the project, with their job role and remit.20 Sept 2022

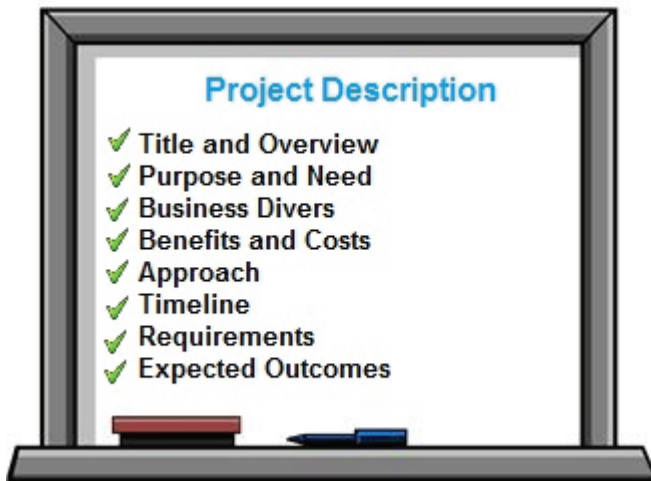
The Project Design Document (**PDD**) is a detailed description of the proposed project, including a management plan and methods for quantifying the proposed project and shall include all appropriate, relevant and required documentation and materials necessary for the validation of the proposed project against the Natural (*What is design documentation?*)



Design documentation is a collection of documents that cover all of the most important aspects of your product or service design. It keeps everyone on the same page and if there's a new team member, it lets them know what's been done, why it's been done, how to implement certain elements, what's next, and more. Clearly documenting this correlation enables greater uniformity in matching business and design goals. This is especially true when design documents are developed throughout the product design life cycle.

Here listed is a list of things one might like to consider when documenting textile industries in the society:

- An Overview of Design Documentation
- The Importance of Investing in Design Documentation
- The Key Elements of a Design Document
- The Life of a Design Document Post Development
- Deciding Who Writes Your Design Document
- The Dangers of Hiring Freelancers



Textile design is the process of creating patterns or designs onto fabrics by way of weaving, knitting, or printing. In digital textile design, artists create patterns and designs through a CAD program, which is a computer-aided drawing program.²⁷
May 2022

Project Portfolio

Project profiling is the process of extracting a characterization from the known attributes of a project. The characterization will provide a more comprehensive understanding of the project that should result in developing an appropriate execution approach and the assignment of organizational resources.

Portfolio/s for school projects

Portfolio is a term generically used when talking about or putting together a group of things basically relating to the context which could be a collection of products or assets other items. A portfolio in project management refers to a grouping of projects, and programs. It can also include other project-related activities and responsibilities. The purpose of a portfolio is to establish centralized management and oversight for many projects and programs. A portfolio also helps establish standardized governance across the organization.

The purpose of creating and managing a portfolio is to ensure the business takes on the right projects and that they align with the company's values, strategies, and goals.

How portfolios relate to projects.

Programs are created to group similar or related projects. This allows for the strategic management of interdependencies, such as shared resources. Portfolios are created to ensure projects and programs align with the strategy of the business. Let's say your company builds and repairs ships. The construction of a naval ship would be a project. The repairs of a commercial ferry would be another project. These two projects are unlikely to be grouped into a program because they're not very similar. If there were five separate projects to construct five separate naval ships, they would likely have many factors in common, such as:

- Similar scopes
- Common requirements
- The same resource demands
- Shared stakeholders
- Identical quality measures
- Similar timelines, and so on

Therefore, management may decide it's best to group them as a program under a program manager. This could allow for opportunities, such as discounts for ordering five ships worth of material together. It could also assist with sharing resources, knowledge, best practices, and other assets across projects.

Now consider that your shipyard can only take on so much work at a time. For instance, you may only be able to take on five projects at a time, regardless of the type of job (repair or build). Although commercial repairs and naval construction are not in the same program, they may become part of the same portfolio, if it makes sense for the business.

Portfolio management would help ensure the company balances the overall number and type of projects it takes on. In this case, it would ensure the total projects planned at one time do not exceed its maximum capacity of five. It can also help ensure the company takes on the appropriate project ratio. For example, repair projects are likely to be shorter-term and higher risk, but more profitable, while construction projects will be longer-term and lower-risk, but less profitable. Depending on the company's priorities and appetite for risk, management may want to maximize one type of project over the other. But if they're not managed under a centralized portfolio, this type of strategic planning would be difficult, if not impossible.

Textile project exhibit



Different ways to display fabric

There are certain things all involved in textile exhibits must be knowledgeable of in relation to textile exhibitions. They would include simple things as those listed here:

1. Hang a fabric using Velcro.
2. Hang the textile on a rod.
3. Frame your fabric behind a glass frame.
4. Mount textiles on stretchers.
5. Mount using Velcro-stretcher combination.
6. Mount textiles 3M command adhesive strips.
7. Mount textile using foam core.
8. Mount textile using facing and board method.

Innovation

TFI is committed to showcasing the latest innovations and technologies in the textile industry, providing attendees with insights and opportunities to stay ahead of the curve.

Network

TFI brings together manufacturers and buyers from around the world, providing a collaborative environment that fosters connections, partnerships, and knowledge sharing.

Sustainable

TFI is dedicated to promoting sustainability and ethical practices in the textile industry, highlighting exhibitors and partners who are leaders in these areas and providing attendees with best practices and insights for building a more sustainable future.

Teaching and Learning Strategies

Teachers are encouraged to introduce students to simulations to better understand the concepts taught. Therefore students will learn effectively and master the knowledge prescribed in each topic. Whilst introducing the topic, guided discovery and research will enable students to get a picture of fibres and fabrics.

The knowledge prescribed must be taught. It is not only about teaching what students should know but also to interpret that knowledge for students in a way that makes it relevant to them, and enables them to begin to acquire skills of analysis and problem solving, which will support teaching and learning. Students must be given opportunities to apply their knowledge, to be creative and to solve problems.

Lesson 1: People and textile industry

The activities in this lesson bring out the essence of understanding what a project **portfolio** and students execute the activities involved.

Teaching Strategies

Delivery of these lessons will be in the inquiry approach to teaching. Teacher guided questions to establish in the students a starting point and guide them into achieving the objectives in the identified lesson topics.

Learning Strategies

Students are given the opportunity to explore and conduct simple research and decide on the best method to either individually or in pairs or small groups of 3 to work on the assigned activities for each lesson title.

Activity 1

Provide handouts from the content background on the lesson. Students read and digest give their interpretations in class discussion.

Activity 2

Describe an imaginary project and its portfolio

Activity 3

Complete activity 1 in the form of a project design.

Resources

Here are some websites to look up for individual reference.

- [Project Design Document Template - Natural Forest Standard](#)
- naturalforeststandard.com
- <https://www.naturalforeststandard.com> › 2013/04 › NFS
- Medium
- <https://medium.com> › digital-pharma-by-graphite › the-i

Lesson 2: Textile project exhibit

The activities in this lesson bring out the essence of understanding what **textile project exhibit** project **portfolio** and students execute the activities involved.

Teaching Strategies

Delivery of these lessons will be in the inquiry approach to teaching. Teacher guided questions to establish in the students a starting point and guide them into achieving the objectives in the identified lesson topics.

Learning Strategies

Students are given the opportunity to explore and conduct simple research and decide on the best method to either individually or in pairs or small groups of 3 to work on the assigned activities for each lesson title.

Activity 1

Use Internet to do a research and report findings on the Lesson title. Present as discussion on the advantages and disadvantages of hosting a textile project exhibition.

Activity 2

Describe the a textile project exhibition process

Activity 3

Use activity 2 to develop an awareness pamphlet on textile project exhibition

Resources

Here are some websites to look up for individual reference.

- [Textile Fairs India – Integrating the textile value chain](#)
- [Textile Fairs India](#)
- <https://textilefairsindia.com>

Lesson 3: Textile technology equipment

The activities in this lesson bring out the essence of understanding what types of equipment can be used in documenting textile technology activities.

Teaching Strategies

Delivery of these lessons will be in the inquiry approach to teaching. Teacher guided questions to establish in the students a starting point and guide them into achieving the objectives in the identified lesson topics.

Learning Strategies

Students are given the opportunity to explore and conduct simple research and decide on the best method to document textile industries in the global arena.

Activity 1

Identify media technology equipment to document and present news or articles on textile industry

Activity 2

Continuation of activity 1

Activity 3

Do a sample presentation of how to document a textile business at the local or national level.

Resources

Here are some websites to look up for individual reference.

- [Project Design Document Template - Natural Forest Standard](#)
- naturalforeststandard.com
- <https://www.naturalforeststandard.com> › 2013/04 › NFS
- Medium
- <https://medium.com> › digital-pharma-by-graphite › the-i

PLANNING AND PROGRAMING

TECHNOLOGY AND INDUSTRIAL ARTS PLANNING AND PROGRAMMING

Planning and Programming Process

The Planning and Programming Process used by the Business and Technology Subjects is a 8 step process. This process begins from Unpacking the Content Standards and Benchmarks and ends with planning a daily lesson plan.

Step 1: Identify the number of Strands and Units in the subject Syllabus

Step 2: Identify the total number of Content Standards, Benchmarks and Number of Topics (Syllabus and Teacher Guide)

Step 3: Consider the Facts and Considerations in the Planning and Programming Process (subject related)

Step 4: Distribute the Content evenly across the 4 school terms in a Matrix (Proposed Template)

Step 5: Expand and plot the distributed content into the complete Yearly Content Overview for the subject for the grade (Proposed Template)

Step 6: Develop the Termly Programs (Proposed Template – 3 part programme)

Step 7: Develop the Weekly Teaching Program (ProposedTemplate) Daily Lesson Plan (SBC Template)

Step 8: Review, Evaluate and Re-plan the yearly, termly, weekly Programs

TECHNOLOGY AND INDUSTRIAL ARTS PLANNING AND PROGRAMMING PROCESS

Planning and Programming Process involves 8 steps. The steps are outlined and described with samples provided to assist and guide you.

Step 1: Identify the number of Strands and Units in the subject Syllabus (Grade 9&10 TIA Syllabus Page 31)

It is important to first identify the strand and unit names for familiarization and also the number of strands and units in the Grade 9 Technology and Industrial Arts subject.

Technology and Industrial Arts has 5 strands and 13 Units.

Table of Strands and Units

The table below outlines the strands and units for grade 9 Technology and Industrial Arts subject. This helps teachers understand how to deal with units per strand when they are expanded into evidence outcomes and benchmarks at each grade.

The strands and units of content standards explain the progression from Grade 9 to Grade 10, linking to senior high school Technology and Industrial Arts content. The order and linkage of units signifies what the students will achieve from one grade to the next.

Technology and Industrial Arts is organised around five strands – Textile Technology, Food Technology, Construction Technology, Communication Technology and Computer Technology. These strands are comparable with the strands used internationally. The Content Standard of each Strand is based on units.

The Strands, Units and Content Standards are outlined in the table below:

Step 1: Identify the number of Strands and Units in the subject Syllabus (Grade 9&10 TIA Syllabus Page 31)

STRANDS	UNITS
Textile Technology	Fibres and Fabrics
	Textiles and Clothing
Food Technology	Food and Nutrition
	Food Science
Construction Technology	Building Technology
	Electrical Technology
	Plumbing Technology
	Welding Technology
	Engineering Technology
Communication Technology	Data Communication and Network
	Computer Security and Safety
Computer Technology	Computer Architecture
	Computer Software

Step 2: Identify the total number of Content Standards, Benchmarks and Number of Topics(Syllabus andTeacher Guide)

Use the Syllabus to derive the total number of Content Standards and total number of Benchmarks

Use the unpacking tool to derive your topics and the total number of topics

Place or slot them in a matrix as in the sample shown below so you are knowledgeable and made aware of the total number of content standards, benchmarks and topics that you will be working with in the planning and programming of teaching and learning for the subject in a school year for that grade.

Grade 9 Technology and Industrial Arts Content Matrix

Consult the Grade 9 Technology and Industrial Arts Content Matrix showing the total number of strands, units, content standards, Benchmarks and topics to be covered in Grade 9. Note that this would be in the teacher Guide but because the teacher guides are not available, we have provided this matrix for you to use to program.

Total Number Of Strands	Total Number Of Units	Total Number of Content Standards	Total Number Of Benchmarks	Total Number Of Topics
1	2	2	11	11
2	2	2	13	13
3	5	5	29	29
4	2	2	12	12
5	2	2	11	11
Totals	13	13	77	77

Step 3: Consider the Facts and Considerations in the Planning and Programming Process (*subject related*)

It is important to consider and analyse facts that are worth considering if these facts will help or if these facts will pose a challenge to the planning and programming process.

Facts and Considerations about the Grade 9 Technology and Industrial Arts

1. As per the Matrix, there are a total of 77 Benchmarks and Topics which must be programmed and taught in a school year.
2. TIA is now a subject which requires all students to take all 5 strands in the subject unlike the OBE practice.
3. There are no specialist teachers who are trained to teach all the specialist content in the TIA subject.
4. Current practice has one teacher who can teach Food and Textile (Currently Home Economics), one teacher who can teach Construction Technology (currently Practical Skills) and one teacher who can teach Communication and computer Technology (currently Computer Studies and ICT).
5. With consideration #4, there are 3 personnel who will be required to teach TIA together to deliver the subject. **Thus, this fact is considered to propose the Planning and Programming Process for TIA subject into a 3-part Teaching and Learning Planning and Programming Process.** Which means TIA Subject

Program is made up of 3 sub-programs

6. Time Allocation for Grade 9 Technology and Industrial Arts is 200 minutes per week which means it has 5 periods/5 lessons a week: 1 block of 40 minutes (1 period) and 1 x 160 minutes (4 periods blocked)
7. There is a total of 40 teaching weeks in a school year (4 Terms x 10 Weeks each)
8. In a term, there are about 8 weeks of actual teaching weeks which gives us 40 periods/40 lessons of actual teaching in a term (5 periods a week x 8 actual teaching weeks in a term)
9. Using these facts and considerations, we can Plan and Program the TIA according to this understanding:

Understanding 1:

There are 3 x Teachers who are required to teach the TIA subjects in 40 weeks. Therefore teaching and learning must be programmed using the 3 parts ($40 / 3 = 13.3$ weeks per part).

Understanding 2:

There are 77 Benchmarks for TIA that must be planned and programmed for 40 weeks but distributed equally according to the 3-parts: Textile & Food = 34 BMs; Construction = 33 BMs; Communication & Computer = 33. (use the strand with the highest BMS to determine the number of BMS per week = $34 / 16 = 2.1$ BMS week)

Understanding 3:

The 3-factor plan and program for TIA becomes the Yearly plan and Program (meaning to say, the plan and program will be utilised by the teacher for 3 lots of students taking TIA in a rotation approach for a year. The TIA Content distribution will be determined by the 3 parts (3 available personnel) and therefore the content will be distributed.

Understanding 4:

In the instance where the school decides to deliver the Food Technology, Textile Technology, Communication Technology and Computer Technology from term 1-3, then the Construction Technology gets to be taught in Term 4. This allows for the school to acquire or make available the necessary requirements for the Construction Technology strand. Otherwise, it becomes school-based and students are awarded an attainment certificate- for the strands they have learnt and NOT TIA. TIA is externally examined and certified.

Step 4: Distribute the Content evenly across the 3-Parts (Proposed Template)

The teaching content outweighs the teaching weeks and therefore considerations must be made on teaching and learning approaches for example; integration, project-based learning, etc. we have provided some information to help you distribute the Technology and Industrial Arts subject content to be programmed fairly across the

3-parts. The tables include:

Grade 9 Technology and Industrial Arts Content distribution for the Teaching Year

The Grade 9 TIA has been distributed according to the 3-parts in a 13 week rotation program.

The content standards and Benchmarks according to the Distribution are also written and provided for you in a table (4a).

Week	Textile Technology and Food Technology	Construction Technology	Communication and Computer Technology
1	Textile Technology: Fibres and Fabrics: CS: 9.11 BMs: 9.1.1.1 and 9.1.1.2	Building Technology CS: 9.3.1 BMS: 9.3.1.1, 9.3.1.2, 9.3.1.3,	Communication Technology Data Communication and Network CS: 9.4.2 BMs: 9.4.1.1, 9.4.1.2, ,
2	Textile Technology: Fibres and Fabrics: CS: 9.11 BMs: 9.1.1.3, .1.1.4,	Building Technology CS: 9.3.1 BMs: 9.3.1.4, 9.3.1.5, 9.3.1.6,	Communication Technology Data Communication and Network CS: 9.4.1 BMs: 9.1.4.3, 9.1.4.4, 9.1.4 .5
3	Textile Technology: Textile and Clothing: CS: 9.1.2 BMs:9.1.2.1, 9.1.2.2,	Electrical Technology CS: 9.3.1 BMs: 9.3.2.1, 9.3.2.2, 9.3.2.3,	Communication Technolo- gy Computer Security and Safety CS: 9.4.2 BMs: 9.4.2.1, 9.4.2.2,
	Assessment	Assessment	Assessment
4	Textile Technology: Textile and Clothing: CS: 9.1.2 BMs: 9.1.2.3, 9.1.2.4,	Electrical Technology CS: 9.3.2 BMs: 9.3.2.4, 9.3.2.5,	Communication Technolo- gy Computer Security and Safety CS: 9.4.2 BMs: 9.4.2.3, 9.4.2.4
5	Textile Technology: Textile and Clothing: CS: 9.1.2 BMs: 9.1.2.5, 9.1.2.6,	Electrical Technology CS: 9.3.2 BMs: 9.3.2.6, 9.3.2.7	Communication Technolo- gy Computer Security and Safety CS: 9.4.2 BMs: 9.4.2.5, 9.4.2.6,
6	Food Technology: Food and Nutrition: CS: 9.2.1BMs: 9.2.1.1. 9.2.1.2	Plumbing Technology CS: 9.3.3 BMs: 9.3.3.1, 9.3.3.2	Computer Technology Computer Architecture CS: 9.5.1BMs: 9.5.1.1, 9.5.1.2
	Assessment	Assessment	Assessment
7	<i>Food Technology:</i> <i>Food and Nutrition:</i> CS: 9.2.1 BMs: 9.2.1.3, 9.2.1.4	<i>Plumbing Technology</i> CS: 9.3.3 BMs: 9.3.3.3, 9.3.3.4,	
8	<i>Food Technology:</i> <i>Food and Nutrition:</i> CS: 9.2.1 BMs: 9.2.1.5, 9.2.1.6,	<i>Welding Technology</i> CS: 9.3.4 BMs: 9.3.4.1, 9.3.4.2,	<i>Computer Technology</i> <i>Computer Architecture</i> CS: 9.5.1 BMs: 9.1.5.3, 9.1.5.4

Textile Technology

9	Food Technology: Food and Nutrition: CS: 9.2.1 BMs: 9.2.1.7	Welding Technology CS: 9.3.4 BMs: 9.3.4.3, 9.3.4.4, 9.3.4.	Computer Technology Computer Architecture CS: 9.5.1 BMs: 9.1.5.5
	Assessment	Assessment	Assessment
10	Food Technology: Food Science: CS: 9.2.1 BMs: 9.2.2.1, 9.2.2.2	Engineering Technology CS: 9.3.5 BMs: 9.3.5.1, 9.3.5.2,	Computer Technology Computer Software CS: 9.5.2 BMs: 9.5.2.1, 9.5.2.2
11	Food Technology: Food Science: CS: 9.2.1 BMs: 9.2.2.3, 9.2.2.4,	Engineering Technology CS: 9.3.5 BMs: 9.3.5.3, 9.3.5.4,	Computer Technology Computer Software CS: 9.5.2 BMs: 9.5.2.3, 9.5.2.4
12	Food Technology: Food Science: CS: 9.2.1 BMs: 9.2.2.5	Engineering Technology CS: 9.3.5 BMs: 9.3.5.5, 9.3.5.6, 9.3.5.7	Computer Technology Computer Software CS: 9.5.2 BMs: 9.5.2.5,
13	Summative Assessment		

Grade 9 Technology and Industrial Arts Content Standards and Benchmarks Overview as per Strands and Units

The five strands – Textile Technology, Food Technology, Construction Technology, Communication Technology and Computer Technology are unpacked into units to Benchmarks as outlined in the table below:

STRAND 1: TEXTILE TECHNOLOGY	
UNIT 1: FIBRES AND FABRICS	
Content Standard	Benchmarks
CS1.1 Investigate the evolution, characteristics, designs and trends of fabrics and fabric designs, their construction, production, representation, regulation and marketing.	9.1.1.1 – 9.1.1.6
	9.1.1.1 Compare and contrast social, economic, cultural and technological changes to textiles, fashion and clothing
	9.1.1.2 Distinguish the properties and characteristics of fibres and fabrics
	9.1.1.3 Explore the elements of design and the design and construction of fashion ideas
	9.1.1.4 Describe the functions of tools and equipment and their safe usage
	9.1.1.5 Explore the range of textile construction techniques
	9.1.1.6 Apply appropriate safety practices in fashion design and construction
STRAND 1: TEXTILE TECHNOLOGY	
UNIT 2: TEXTILE AND CLOTHING	

Textile Technology

CS1.2 Integrate and apply principles and techniques in presenting fashion ideas and illustrations in pattern making and garment construction for a variety of needs and occasions	9.1.2.1 – 9.1.2.6
	9.1.2.1 Describe historical influences, technological progression and emerging trends as inspirational sources of design
	9.1.2.2. Demonstrate an awareness of the fundamentals of the design process through various artistic versions
	9.1.2.3 Apply a broad range of contemporary and appropriate tools and techniques with competence and in the development of design projects
	9.1.2.4 Describe how the properties of textile fibres affect textile wear and care
	9.1.2.5 Apply the design process to respond to needs and opportunities in textile design projects
	9.1.2.6 Select and use appropriate technology to creatively document, communicate and present design and project work
STRAND 2: FOOD TECHNOLOGY	
UNIT 1: FOOD AND NUTRITION	
CS 2.1 Students will be able to examine and analyze the characteristics and properties of different types of food and the social, economic, political, cultural and technological influences on the production and compliance with ethical principles and standards	9.2.1.1 – 9.2.1.7
	9.2.1.1 Compare and contrast the nature and properties of food
	9.2.1.2 Practice safety and hygiene procedures in tool and equipment, food handling, meal preparation and food development
	9.2.1.3 Examine the nutritional components of food and food development and the impact of food consumption on nutrition.
	9.2.1.4 Explore nutrition as integral to making food choices
	9.2.1.5 Discuss economic, social and technological influences of food, food product and food sciences
	9.2.1.6 Explore ways of meeting nutritional requirements to maintain optimum nutrition or manage nutritional issues
	9.2.1.7 Apply the design process to create food items using combinations of basic ingredients with variations using a selection of techniques and food preparation equipment

STRAND 2: FOOD TECHNOLOGY	
UNIT 2: FOOD SCIENCE	
<p>CS 2.2 Students will be able to investigate and analyse the cultural, physical, chemical, nutritional, biological and sensory characteristics of food and how they influence the development and production of food to meet different demands (e.g., health, occasions, lifestyle, business)</p>	9.2.2.1 – 9.2.2.6
	<p>9.2.2.1 Identify and describe the cultural, physical, biological and nutritional characteristics of food that influence food development</p>
	<p>9.2.2.2 Describe the nutritional and sensory characteristics of food to meet the needs, health and occasions.</p>
	<p>9.2.2.3 Apply management strategies in food selection, meal preparation, product development, storage and preservation</p>
	<p>9.2.2.4 Explore safety and hygiene practices relating to food, and changes that occur in the functional properties of food.</p>
	<p>9.2.2.5 Examine the social, economic and environmental impact of food processing technology, and the role packaging plays in the distribution of food from the point of production to consumption</p>
<p>9.2.2.6 Apply the design process to create food solutions.</p>	
STRAND 3: CONSTRUCTION TECHNOLOGY	
UNIT 1: BUILDING TECHNOLOGY	
<p>CS 3.1 Investigate the history and theory of buildings and analyse the components and systems of buildings, occupational health and safety procedures, the properties of building materials and the processes in which those materials and equipment are used according to industry standards.</p> <p>9.3.1.1 Investigate the history and theory of buildings</p> <p>9.3.1.2 Identify and describe a variety of construction materials, components, and processes</p> <p>9.3.1.3 Describe the elements of drawings, and their application in technical drawings.</p> <p>9.3.1.4 Identify and describe the elements of safety</p> <p>9.3.1.5 Describe the scope and purpose of building codes, and identify other regulations and standards that apply to construction projects</p> <p>9.3.1.6 Apply mathematical skills and scientific concepts in the planning and building of a variety of construction projects</p>	9.3.1.1 – 9.3.1.6
STRAND 3: CONSTRUCTION TECHNOLOGY	
UNIT 2: ELECTRICAL TECHNOLOGY	

Textile Technology

CS 3.2 Analyse and apply the technological processes, concepts, principles and practices related to Electrical Technology and its social contribution with regard to economic growth, entrepreneurship, sustainability and as a tool for change, improving the quality of life responsive to individual, community and industrial needs.	9.3.2.1 – 9.3.2.7
	9.3.2.1 Describe the historical development of electricity
	9.3.2.2 Investigate and communicate OHS legislation and regulation and assess and employ emergency procedures whilst observing safety
	9.3.2.3 Identify, design, develop and evaluate processes and products related to electrical technology and communicate the findings through the use of appropriate electrical and electronic terminology.
	9.3.2.4 Define electricity and conductivity and differentiate insulators from conductors
	9.3.2.5 Identify symbols used and explain the functions of components and devices in electrical circuit diagrams
	9.3.2.6 Identify the different types of circuits and explain the parts and operation of a simple practical circuit.
	9.3.2.7 Investigate the concepts, principles and practices related to electrical

STRAND 3: CONSTRUCTION TECHNOLOGY	
UNIT 3: PLUMBING TECHNOLOGY	
<p>CS 3.3 Investigate and analyse fundamental concepts of plumbing and theories, OHS, Occupational Health and safety Regulations and standards ,trade drawing, demonstrations and applications of tools and materials specifications, installation of plumbing fittings and accessories in (DWV) Drain, waste, vent system, and water distribution system.</p> <p>9.3.3.1 Describe and explain the fundamentals, concepts, and their relevance in the plumbing trade</p> <p>9.3.3.2 Analyse and describe OHS Regulations and standards in the plumbing trade and work places.</p> <p>9.3.3.3 Demonstrate and apply basic plumbing tools and equipment and their specifications and practice in trade math.</p> <p>9.3.3.4 Explore and apply basic concepts of trade drawings in plumbing.</p>	9.3.3.1 – 9.3.3.4
STRAND 3: CONSTRUCTION TECHNOLOGY	
UNIT 4: WELDING TECHNOLOGY	
<p>CS 3.4 Investigate and analyse safety procedures, print reading, measurement and layout, identify properties of metals, the welding techniques, cutting processes according to welding codes, inspections, testing principles and apply fundamentals of fabrication.</p>	9.3.4.1 – 9.3.4.5
	9.3.4.1 Investigate safe workshop setup and safety procedures in welding
	9.3.4.2 Explore and interpret welding principles, codes and standards
	9.3.4.3 Demonstrate knowledge in fundamental print reading, measurement and layout or fi t-up techniques
	9.3.4.4 Investigate and analyse the properties of metals
9.3.4.5 Investigate the various welding techniques and cutting processes	
STRAND 3: CONSTRUCTION TECHNOLOGY	
UNIT 5: ENGINEERING TECHNOLOGY	

Textile Technology

CS 3.5 Investigate and analyse the historical and societal influences in Engineering by understanding the engineering principles, practices, the design process, the management, problem-solving and communication skills appropriate to any engineering field.	9.3.5.1 – 9.3.5.7
	9.3.5.1 Describe how history and society has influenced the engineering field and critically analyse innovations.
	9.3.5.2 Investigate the scope of engineering, roles and responsibilities of an engineer and recognise current innovations
	9.3.5.3 Explore and distinguish the different types of the Engineering fields.
	9.3.5.4 Explore and discuss engineering principles and practices and the appropriate materials in engineering.
	9.3.5.5 Explore and analyse the general safety practices in engineering.
	9.3.5.6 Outline management and problem solving skills using the engineering design process.
9.3.5.7. Explore and utilise communication practices appropriate to engineering.	

STRAND 4: COMMUNICATION TECHNOLOGY

UNIT 1: DATA COMMUNICATION AND NETWORK

CS 4.1 Investigate and analyse communication technology utilising multimedia and the practices and systems in designing, installing, configuring and managing networks.	9.4.1.1 – 9.4.1.7
	9.4.1.1 Define the elements of data communication system.
	9.4.1.2 Describe the functions of the different components of a computer network.
	9.4.1.3 Define the OSI (Open Systems Interconnect) model and how it functions.
	9.4.1.4 Explore the use of technical terminology, basic scientific concepts, and mathematical concepts used in communications technology and apply them to the creation of media products.
	9.4.1.5 Explore and articulate the core concepts, techniques, and skills required to produce a range of communications media products or services.
	9.4.1.6 Research and apply the design brief to design, configure and manage simple network.

9.4.1.7 Explore the Authoring Software or Multimedia associate software

STRAND 4: COMMUNICATION TECHNOLOGY

UNIT 2: COMPUTER SECURITY AND SAFETY

CS 4.2 Investigate and analyse the ergonomics, social and ethical issues and the development of a monitoring and control system for both hardware, software and information security in society.	9.4.2.1 – 9.4.2.5
	9.4.2.1 Investigate and demonstrate appropriate posture in using computer equipment
	9.4.2.2 Identify health hazards associated with the use of ICT and propose good ergonomic practices

	9.4.2.3 Identify effects of the widespread use of computers and associated technologies on society	
	9.4.2.4 Evaluate the impact of past, current and emerging technologies on the Individual, society and environments.	
	9.4.2.5 Demonstrate an understanding of and apply safe work practices in communications technology activities	

STRAND 5: COMPUTER TECHNOLOGY

UNIT 1: COMPUTER ARCHITECTURE

CS 5.1 Explore and analyse computer fundamentals, the skills to manage and maintain; diagnose, troubleshoot and solve issues that encompass computer systems, networking, interfacing and programming as well as electronics and robotics and be aware of related environmental and societal issues.

9.5.1.1 – 9.5.1.6

9.5.1.1 Comprehend and explain the Computer System and types of computer.

9.5.1.2 Explore generations of computer

9.5.1.3 Investigate and describe the design brief of solving problems.

9.5.1.4 Identify and describe the functions of, as well as important advances related to, electronic and computer components;

9.5.1.5 Demonstrate a basic understanding of binary numbers and digital logic

9.5.1.6 Explore and describe hardware and software troubleshooting principles

STRAND 5: COMPUTER TECHNOLOGY

UNIT 2: COMPUTER SOFTWARE

CS 5.2 Investigate and analyse computer system and application software, programming, algorithm, web design and databases, and develop and apply the skills and knowledge in the various software.

9.5.2.1 – 9.5.2.5

9.5.2.1 Explore programming software and applications

9.5.2.2 Demonstrate the understanding of Operating Systems/ Software and File Management

9.5.2.3 Apply typing skills with speed (20wpm) and accuracy (80%)

9.5.2.4 Create documents using Microsoft Office

9.5.2.5 Explore the Authoring Software or Multimedia associate software

Grade 9 Technology and Industrial Arts Content Standards, Benchmarks and Topics Overview as per the Strands and Units

STRAND 1: FOOD TECHNOLOGY		
UNIT 1: FIBRES AND FABRICS		
Content Standard	Benchmark	Topic
CS1.1 Investigate the evolution, characteristics, designs and trends of fabrics and fabric designs, their construction, production, representation, regulation and marketing.	9.1.1.1 Compare and contrast social, economic, cultural and technological changes to textiles, fashion and clothing	Impact of changes on textiles, fashion and clothing
	9.1.1.2 Distinguish the properties and characteristics of fibres and fabrics	Introduction to fibres and fabrics
	9.1.1.3 Explore the elements of design and the design and construction of fashion ideas	Designing and Construction
	9.1.1.4 Describe the functions of tools and equipment and their safe usage	Functions and safe usage of tools and equipment
	9.1.1.5 Explore the range of textile construction techniques	Techniques in textile construction
	9.1.1.6 Apply appropriate safety practices in fashion design and construction	Safety practices in fashion designing and construction
STRAND 1: TEXTILE TECHNOLOGY		
UNIT 2: TEXTILE AND CLOTHING		
Content Standard	Benchmark	Topic
CS1.2 Integrate and apply principles and techniques in presenting fashion ideas and illustrations in pattern making and garment construction for a variety of needs and occasions	9.1.2.1 Describe historical influences, technological progression and emerging trends as inspirational sources of design	Sources of Design
	9.1.2.2. Demonstrate an awareness of the fundamentals of the design process through various artistic versions	Fundamentals of design process
	9.1.2.3 Apply a broad range of contemporary and appropriate tools and techniques with competence and in the development of design projects	Tools and techniques in project designs
	9.1.2.4 Describe how the properties of textile fibres affect textile wear and care	Textiles wear and care
	9.1.2.5 Apply the design process to respond to needs and opportunities in textile design projects	Designing a textile project
	9.1.2.6 Select and use appropriate technology to creatively document, communicate and present design and project work	Documenting a project portfolio

STRAND 2: FOOD TECHNOLOGY

UNIT 1: FOOD AND NUTRITION

Content Standard	Benchmark	Topic
CS 2.1 Students will be able to examine and analyze the characteristics and properties of different types of food and the social, economic, political, cultural and technological influences on the production and compliance with ethical principles and standards	9.2.1.1 Compare and contrast the nature and properties of food	Nature and properties of food
	9.2.1.2 Practice safety and hygiene procedures in tool and equipment, food handling, meal preparation and food development	Safety and hygienic practices in food product development
	9.2.1.3 Examine the nutritional components of food and food development and the impact of food consumption on nutrition.	Food and nutrients
	9.2.1.4 Explore nutrition as integral to making food choices	Food metabolism
	9.2.1.5 Discuss economic, social and technological influences of food, food product and food sciences	Influences on food product development
	9.2.1.6 Explore ways of meeting nutritional requirements to maintain optimum nutrition or manage nutritional issues	Food composition and energy metabolism
	9.2.1.7 Apply the design process to create food items using combinations of basic ingredients with variations using a selection of techniques and food preparation equipment	Food product development

STRAND 2: FOOD TECHNOLOGY

UNIT 2: FOOD SCIENCE

Content Standard	Benchmark	Topic
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Textile Technology

CS 2.2 Students will be able to investigate and analyse the cultural, physical, chemical, nutritional, biological and sensory characteristics of food and how they influence the development and production of food to meet different demands (e.g., health, occasions, lifestyle, business)	9.2.2.1 – 9.2.2.6	
	9.2.2.1 Identify and describe the cultural, physical, biological and nutritional characteristics of food that influence food development	Characteristics and properties of cereals, vegetables, fruits, legumes, fats and oils
	9.2.2.2 Describe the nutritional and sensory characteristics of food to meet the needs, health and occasions.	Sensory characteristics of food
	9.2.2.3 Apply management strategies in food selection, meal preparation, product development, storage and preservation	Food management
	9.2.2.4 Explore safety and hygiene practices relating to food, and changes that occur in the functional properties of food.	Food safety and hygienic practices
	9.2.2.5 Examine the social, economic and environmental impact of food processing technology, and the role packaging plays in the distribution of food from the point of production to consumption	Factors influencing food processing and packaging
	9.2.2.6 Apply the design process to create food solutions	The technology design

STRAND 3: CONSTRUCTION TECHNOLOGY

UNIT 1: BUILDING TECHNOLOGY

Content Standard	Benchmark	Topic
CS 3.1 Investigate the history and theory of buildings and analyse the components and systems of buildings, occupational health and safety procedures, the properties of building materials and the processes in which those materials and equipment are used according to industry standards.	9.3.1.1 Investigate the history and theory of buildings	The history and theory of buildings
	9.3.1.2 Identify and describe a variety of construction materials, components, and processes	Building construction materials
	9.3.1.3 Describe the elements of drawings, and their application in technical drawings.	Trade drawing
	9.3.1.4 Identify and describe the elements of safety	The Elements Occupational Health and Safety
	9.3.1.5 Describe the scope and purpose of building codes, and identify other regulations and standards that apply to construction projects	Building Codes, Standards and regulations
	9.3.1.6 Apply mathematical skills and scientific concepts in the planning and building of a variety of construction projects	Trade Maths

STRAND 3: CONSTRUCTION TECHNOLOGY			
UNIT 2: ELECTRICAL TECHNOLOGY			
Content Standard	Benchmark	Topic	
CS 3.2 Analyse and apply the technological processes, concepts, principles and practices related to Electrical Technology and its social contribution with regard to economic growth, entrepreneurship, sustainability and as a tool for change, improving the quality of life responsive to individual, community and industrial needs.	9.3.2.1 – 9.3.2.7		
	9.3.2.1 Describe the historical development of electricity	History of Electricity	
	9.3.2.2 Investigate and communicate OHS legislation and regulation and assess and employ emergency procedures whilst observing safety	Workplace and Electrical safety	
	9.3.2.3 Identify, design, develop and evaluate processes and products related to electrical technology and communicate the findings through the use of appropriate electrical and electronic terminology.	Electrical or Electronic processes and products	
	9.3.2.4 Define electricity and conductivity and differentiate insulators from conductors	Fundamentals of electricity	
	9.3.2.5 Identify symbols used and explain the functions of components and devices in electrical circuit diagrams	Components and devices used on circuit diagrams	

Textile Technology

	9.3.2.6 Identify the different types of circuits and explain the parts and operation of a simple practical circuit.	Circuits	
	9.3.2.7 Investigate the concepts, principles and practices related to electrical	Electrical Fundamentals	

STRAND 3: CONSTRUCTION TECHNOLOGY

UNIT 3: PLUMBING TECHNOLOGY

Content Standard	Benchmark	Topic
<p>CS 3.3 Investigate and analyse fundamental concepts of plumbing and theories, OHS, Occupational Health and safety Regulations and standards ,trade drawing, demonstrations and applications of tools and materials specifications, installation of plumbing fittings and accessories in (DWV) Drain, waste, vent system, and water distribution system.</p> <p>9.3.3.1 Describe and explain the fundamentals, concepts, and their relevance in the plumbing trade</p> <p>Fundamental concept and relevance of plumbing trade</p> <p>9.3.3.2 Analyse and describe OHS Regulations and standards in the plumbing trade and work places.</p> <p>Topic 2: Occupational Health and Safety regulations and standard</p> <p>9.3.3.3 Demonstrate and apply basic plumbing tools and equipment and their specifications and practice in trade math.</p> <p>Plumbing tool and equipment</p> <p>9.3.3.4 Explore and apply basic concepts of trade drawings in plumbing.</p> <p>Trade Drawing</p>	9.3.3.1 – 9.3.3.4	

STRAND 3: CONSTRUCTION TECHNOLOGY

UNIT 4: WELDING TECHNOLOGY

Content Standard	Benchmark	Topic
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Textile Technology

<p>CS 3.4 Investigate and analyse safety procedures, print reading, measurement and layout, identify properties of metals, the welding techniques, cutting processes according to welding codes, inspections, testing principles and apply fundamentals of fabrication.</p>	<p>9.3.4.1 – 9.3.4.5</p>		
	<p>9.3.4.1 Investigate safe workshop setup and safety procedures in welding</p>	<p>Workshop Organisation</p>	
	<p>9.3.4.2 Explore and interpret welding principles, codes and standards</p>	<p>Welding Standards</p>	
	<p>9.3.4.3 Demonstrate knowledge in fundamental print reading, measurement and layout or fit-up techniques</p>	<p>Measurement Techniques</p>	
	<p>9.3.4.4 Investigate and analyse the properties of metals</p>	<p>Metals</p>	
	<p>9.3.4.5 Investigate the various welding techniques and cutting processes</p>	<p>Cutting and Welding</p>	
<p>STRAND 3: CONSTRUCTION TECHNOLOGY</p>			
<p>UNIT 5: ENGINEERING TECHNOLOGY</p>			
<p>Content Standard</p>	<p>Benchmark</p>		<p>Topic</p>
<p>CS 3.5 Investigate and analyse the historical and societal influences in Engineering by understanding the engineering principles, practices, the design process, the management, problem-solving and communication skills appropriate to any engineering field.</p>	<p>9.3.5.1 – 9.3.5.7</p>		

	9.3.5.1 Describe how history and society has influenced the engineering field and critically analyse innovations.	Historical aspects of Engineering Design Process	
	9.3.5.2 Investigate the scope of engineering, roles and responsibilities of an engineer and recognise current innovations	Introduction to Engineering	
	9.3.5.3 Explore and distinguish the different types of the Engineering fields.	Engineering Fields	
	9.3.5.4 Explore and discuss engineering principles and practices and the appropriate materials in engineering.	Engineering Principles and practices	
	9.3.5.5 Explore and analyse the general safety practices in engineering.	Occupational Health & safety	
	9.3.5.6 Outline management and problem solving skills using the engineering design process.	Engineering Design Process	
	9.3.5.7. Explore and utilise communication practices appropriate to engineering.	Engineering Communication	

STRAND 4: COMMUNICATION TECHNOLOGY

UNIT 1: DATA COMMUNICATION AND NETWORK

Content Standard	Benchmark	Topic	
CS 4.1 Investigate and analyse communication technology utilising multimedia and the practices and systems in designing, installing, configuring and managing networks.	9.4.1.1 Define the elements of data communication system.	Data Communication Systems	
	9.4.1.2 Describe the functions of the different components of a computer network.	Computer Networks	
	9.4.1.3 Define the OSI (Open Systems Interconnect) model and how it functions.	OSI Model	

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	9.4.1.4 Explore the use of technical terminology, basic scientific concepts, and mathematical concepts used in communications technology and apply them to the creation of media products.	Communication Technology Terminologies Basic Scientific and Mathematical Concepts in creating media products	
	9.4.1.5 Explore and articulate the core concepts, techniques, and skills required to produce a range of communications media products or services.	Media Communication	
	9.4.1.6 Research and apply the design brief to design, configure and manage simple network.	Design Brief-Simple Network	
	9.4.1.7 Explore the Authoring Software or Multimedia associate software	Authoring Software Multimedia	

STRAND 4: COMMUNICATION TECHNOLOGY

UNIT 2: COMPUTER SECURITY AND SAFETY

Content Standard	Benchmark	Topic
CS 4.2 Investigate and analyse the ergonomics, social and ethical issues and the development of a monitoring and control system for both hardware, software and information security in society.	9.4.2.1 – 9.4.2.6	9.4.2.1 – 9.4.2.6
	9.4.2.1 Investigate and demonstrate appropriate posture in using computer equipment	Postures in Computer Equipment Usage
	9.4.2.2 Identify health hazards associated with the use of ICT and propose good ergonomic practices	Health and Safety in ICT
	9.4.2.3 Identify effects of the widespread use of computers and associated technologies on society	Effects of Computer Usage
	9.4.2.4 Evaluate the impact of past, current and emerging technologies on the Individual, society and environments.	Emerging Technological Impact
	9.4.2.5 Demonstrate an understanding of and apply safe work practices in communications technology activities	Safe Working Practices/Habits

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STRAND 5: COMPUTER TECHNOLOGY

UNIT 1: COMPUTER ARCHITECTURE

Content Standard	Benchmark	Topic
<p>CS 5.1 Explore and analyse computer fundamentals, the skills to manage and maintain; diagnose, troubleshoot and solve issues that encompass computer systems, networking, interfacing and programming as well as electronics and robotics and be aware of related environmental and societal issues.</p> <p>9.5.1.2 Explore generations of computer</p> <p>9.5.1.3 Investigate and describe the design brief of solving problems.</p> <p>9.5.1.4 Identify and describe the functions of, as well as important advances related to, electronic and computer components;</p> <p>9.5.1.5 Demonstrate a basic understanding of binary numbers and digital logic</p> <p>9.5.1.6 Explore and describe hardware and software troubleshooting principles</p>	9.5.1.1 Comprehend and explain the Computer System and types of computer.	Computer System
	History of Computers	
	Design Brief	
	Computer Electronics	
	Binary	
	Troubleshooting	

STRAND 5 COMPUTER TECHNOLOGY

UNIT 2: COMPUTER SOFTWARE

Content Standard	Benchmark	Topic
<p>CS 5.2 Investigate and analyse computer system and application software, programming, algorithm, web design and databases, and develop and apply the skills and knowledge in the various software.</p>	9.5.2.1 Explore programming software and applications	Software Programming
	9.5.2.2 Demonstrate the understanding of Operating Systems/ Software and File Management	Operating System
	9.5.2.3 Apply typing skills with speed (20wpm) and accuracy (80%)	Keyboarding
	9.5.2.4 Create documents using Microsoft Office	Microsoft Office
	9.5.2.5 Explore the Authoring Software or Multimedia associate software	Authoring Software/ Multimedia

Grade 9 Technology and Industrial Arts Topics and Lesson Titles given as per Strands and Units.

The strand, Units and Benchmarks are further unpacked into Topics and Lesson Titles in the Teacher Guides. These are outlined in the table below:

STRAND 1: TEXTILE TECHNOLOGY	
UNIT 1: FIBRES AND FABRICS	
Topics	Lesson Titles
Benchmarks	9.1.1.1 – 9.1.1.6
Topic 1: Impact of changes on textiles, fashion and clothing	Lesson 1: Exploring Textiles? Lesson 2: Origins of textiles, fashion and clothing Lesson 3: Factors affecting changes in textile, fashions and clothing
Topic 2: Introduction to fibres and fabrics	Lesson 1: What are fibres and fabrics? Lesson 2: Characteristics and properties of fibres and fabrics Lesson 3: From fibres to fabrics.
Topic 3: Designing and Construction	Lesson 1: Elements of design and design types. Lesson 2: Sources of fashion ideas. Lesson 3: Basic construction processes.
Topic 4: Functions and safe usage of tools and equipment	Lesson 1: Textile Construction methods tools and their functions. Lesson 2: Safety when using textile tools and equipment. Lesson 3: Care and maintenance of textile products.
Topic 5: Techniques in textile construction	Lesson 1: Textile construction methods Lesson 2: Colouring and decorating methods Lesson 3: Fabric finishes
Topic 6: Safety practices in fashion designing and construction	Lesson 1: Differentiating between textile designing and construction processes Lesson 2: Safety practices in textile.
STRAND 1: TEXTILE TECHNOLOGY	
UNIT 2: TEXTILE AND CLOTHING	
Benchmarks	9.1.2.1 – 9.1.2.6
Topic 1: Sources of Design	Lesson 1: Sources of design Lesson 2: Technological progression Lesson 3: Emerging trends
Topic 2: Fundamentals of design process	Lesson 1: Importance of design process Lesson 2: Skills in the design process Lesson 3: Various artistic version
Topic 3: Tools and techniques in project designs	Lesson 1: Fashion and types of garments Lesson 2: Transferring patterns from garment to garment Lesson 3: Patterning techniques

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Topic 4: Textiles wear and care	Lesson Types of tools for textile projects Lesson Safe uses of special tools Lesson Care for tools
Topic 5: Designing a textile project	Lesson What is design process Lesson Phases in Textile Project development Lesson Textile Projects
Topic Documenting a project portfolio	Lesson People and textile industry Lesson Textile technology equipment Lesson Textile Project exhibit

STRAND 2: FOOD TECHNOLOGY

UNIT 1: FOOD AND NUTRITION

Benchmarks

9.2.1.1 – 9.2.1.7

Topic 1: Nature and properties of food	Lesson 1: Introduction to food –(Nature and sources of food) Lesson 2: Food groups and dietary guidelines Lesson 3: Properties of starch, carbohydrates, fats and oil Lesson 4: Introduction to food product development
Topic 2: Safety and hygienic practices in food product development	Lesson 1: Personal hygiene and safety practices Lesson 2: Kitchen hygiene Lesson 3: Hygiene practices and safety in food development (preparation etc.)
Topic 3: Food and nutrients	Lesson 1: Functions of nutrients and food sources Lesson 2: Eating practices Lesson 3: Meal planning
Topic 4: Food metabolism	Lesson 1: Digestion and absorption of food Lesson 2: Functions of food and nutrients in human body Lesson 3: Over nutrition and malnutrition (anorexia, bulimia, obesity, hypertension etc.)
Topic 5: Influences on food product development	Lesson 1: Food ingredients Lesson 2: Principles of cooking methods Lesson 3: Food management Lesson 4: Economic, Social and technological influences on food product development
Topic 6: Food composition and energy metabolism	Lesson 1: Food composition Lesson 2: Food labelling Lesson 3: Energy metabolism Lesson 4: Meals for special needs

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Topic 7: Food product development	Lesson 1: Introduction to food product development Lesson 2: Design process Lesson 3: Design Brief Lesson 4: Sensory analysis
STRAND 2: FOOD TECHNOLOGY	
UNIT 2: FOOD SCIENCE	
Benchmarks	9.2.2.1 – 9.2.2.6
Topic 1: Characteristics and properties of cereals, vegetables, fruits, legumes, fats and oils	Lesson 1 Cooking methods in food product development Lesson 2 Physical and biological properties of cereals, vegetables and fruits Lesson 3 Physical and biological properties of fruits, legumes, fats and oils
Topic 2: Sensory characteristics of food	Lesson 1 Sensory analyses of food Lesson 2 Nutritional functions of food Lesson 3 Functional foods
Topic 3: Food management	Lesson 1 Food management Lesson 2 Trends, fashion and food Lesson 3 Seasons and food
Topic 4: Food safety and hygienic practices	Lesson 1 Food borne diseases Lesson 2 Contamination Lesson 3 First Aid
Topic 5: Factors influencing food processing and packaging	Lesson 1 Factors that influence food processing Lesson 2 The role of food packaging Lesson 3 Developments in packaging and distribution Lesson 4 Techniques to evaluate products and processes
Topic 6: The technology design	Lesson 1 Design brief and the technological process Lesson 2 Using a design product to create a new product Lesson 3 Evaluate the new product
STRAND 3: CONSTRUCTION TECHNOLOGY	
UNIT 1: BUILDING TECHNOLOGY	
Benchmarks	9.3.1.1 – 9.3.1.6
Topic 1: The history and theory of buildings	Lesson 1: Introduction to Building Lesson 2: Definition of Building Lesson 3: Different Types of Building Lesson 4: Types of material used Lesson 5: Importance of building and career paths.

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Topic 2: Building construction materials	Lesson 1: Define Building materials Lesson 2: Timber Building Materials Lesson 3: Bricks and Concrete materials Lesson 4: Metal and steel materials
Topic 3: Trade drawing	Lesson 1: Define trade drawing Lesson 2: Types of trade drawing Lesson 3: Isometric drawing Lesson 4: Pictorial drawing Lesson 5: Orthographic drawing Lesson 6: Types of lines use
Topic 4: The Elements Occupational Health and Safety	Lesson 1: Define occupational Health and safety Lesson 2: The regulations of OHS Lesson 3: The standards of OHS
Topic 5: Building Codes, Standards and regulations	Lesson 1: Define Building legislations and regulations Lesson 2: Types of building codes Lesson 3: Types of building regulations
Topic 6: Trade Maths	Lesson 1: Define Applied maths Lesson 2: Formulae to calculate substructure Lesson 3: Define sub-structure member (footings, post, bearers) Lesson 4: Define super-structure members (Floor joist, studs, roofing frame) Lesson 5: Types of building defect
STRAND 3: CONSTRUCTION TECHNOLOGY	
UNIT 2: ELECTRICAL TECHNOLOGY	
Benchmarks	9.3.2.1 – 9.3.2.7
Topic 1: History of Electricity	Lesson 1: Electrical Energy Production & Supply Lesson 2: Modern Power Generation methods Lesson 3: Renewable and sustainable energy practices.
Topic 2: Workplace and Electrical safety	Lesson 1: Electrical Energy Production & Supply Lesson 2: Renewable and sustainable energy practices. Lesson 3: Career Pathway in Electrical Technology
Topic 3: Electrical or Electronic processes and products	Lesson 1: OHS legislation & Regulation Lesson 2: Personal Safety Lesson 3: Emergency procedures.

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Topic 4: Fundamentals of electricity	Lesson 1: Electrical or Electronic processes Lesson 2: Electrical or Electronic products
Topic 5: Components and devices used on circuit diagrams	Lesson 1: Electricity Lesson 2: Conductivity Lesson 3: Conductors and Insulators
Topic 6: Circuits	Lesson 1: Electrical components & devices Lesson 2: Electrical symbols used in circuit diagrams
Topic 7: Electrical Fundamentals	Lesson 1: OHMs LAW Lesson 2: Kirchhoff's Law Lesson 3: Circuit Calculations
STRAND 3: CONSTRUCTION TECHNOLOGY	
UNIT 3: PLUMBING TECHNOLOGY	
Benchmarks	9.3.3.1 – 9.3.3.4
Topic 1: Fundamental concept and relevance of plumbing trade	Lesson 1: Introduction to plumbing trade. Lesson 2: Importance of plumbing trade. Lesson 3: Career pathways of plumbing trade.
Topic 2: Occupational Health and Safety regulations and Standard	Lesson 1: Define Occupational Health Safety regulations and standards. Lesson 2: Types of regulations and standards.
Topic 3: Plumbing tool and equipment	Lesson 1: Define plumbing tools and equipment. Lesson 2: Types of manual tools and equipment. Lesson 3: Types of plumbing materials and specifications.
Topic 4: Trade Drawing	Lesson 1: Define trade drawing. Lesson 2: Methods of Isometric drawing. Lesson 3: Methods of Pictorial drawing. Lesson 4: Types of lines used.
STRAND 3: CONSTRUCTION TECHNOLOGY	
UNIT 4: WELDING TECHNOLOGY	
Benchmarks	9.3.4.1 – 9.3.4.5
Topic 1: Workshop Organisation	Lesson 1: Workshop Set-up Lesson 2: Workshop safety procedures
Topic 2: Welding Standards	Lesson 1: Welding Principles Lesson 2: Welding Codes Lesson 3: Welding Standards
Topic 3: Measurement Techniques	Lesson 1: Measurement Lesson 2: Print reading Lesson 3: Layout/ fit-up Techniques

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Topic 4: Metals	Lesson 1: Types of metals Lesson 2: Metal Properties
Topic 5: Cutting and Welding	Lesson 1: Types of Welding Lesson 2: Thermal cutting, heating and gouging Lesson 3: Brazing Lesson 4: Welding processes
STRAND 3: CONSTRUCTION TECHNOLOGY	
UNIT 5: ENGINEERING TECHNOLOGY	
Benchmarks	9.3.5.1 – 9.3.5.7
Topic 1: Historical aspects of Engineering Design Process	Lesson 1: Engineering, past, present & Future Lesson 2: Engineering Innovations Lesson 3: Influence of Engineering in the society.
Topic 2: Introduction to Engineering	Lesson 1: Introduction to Engineering Lesson 2: Scope of Engineering Lesson 3: Roles and responsibilities of Engineers
Topic 3: Engineering Fields	Lesson 1: Types of engineering fields Lesson 2: Specific terminologies for the different types of engineering. Lesson 3: Processes of manufacturing materials in various engineering discipline
Topic 4: Engineering Principles and practices	Lesson 1: Engineering principles Lesson 2: Engineering practices Lesson 3: Engineering materials
Topic 5: Occupational Health & safety	Lesson 1: OHS legislations and regulations for Engineers Lesson 2: Hazards & Risk Control Measures Lesson 3: Risk Assessment & Management Lesson 4: Basic First –Aid and CPR
Topic 6: Engineering Design Process	Lesson 1: Steps of Engineering Design Lesson 2: Management skills
Topic 7: Engineering Communication	Lesson 1: Effective communication Lesson 2: Interpersonal and intrapersonal communication skills Lesson 3: Telephones, emails, directories Lesson 4: Report writing, Lesson 5: Memorandums
STRAND 4: COMMUNICATION TECHNOLOGY	
UNIT 1: DATA COMMUNICATION AND NETWORK	
Benchmarks	9.4.1.1 – 9.4.1.7
Topic 1: Data Communication Systems	Lesson 1: Introduction to Data Communication Systems Lesson 2: Elements of Data Communication systems
Topic 2: Computer Networks	Lesson 1: Introduction to Computer Networks Lesson 2: Functions of Computer Network Components

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Topic 3: OSI Model	Lesson 1: Introduction OSI Model Lesson 2: Functions of the OSI Model
Topic 4: Communication Technology Terminologies Basic Scientific and Mathematical Concepts in creating media products	Lesson 1: Communication Technology Terminologies Lesson 2: Application of Terminologies Lesson 3: Media Products.
Topic 5: Media Communication	Lesson 1: Introduction to Media Communication Lesson 2: Techniques and Skills for application purposes
Topic 6: Design Brief-Simple Network	Lesson 1: Introduction to Design Brief Lesson 2: Research and apply Design Lesson 3: Brief in simple Networking
Topic 7: Authoring Software Multimedia	Lesson 1: Introduction to Multimedia, Authoring Software Lesson 2: Categories of Authoring Software Lesson 3: Features of Multimedia, Authoring Software
STRAND 4: COMMUNICATION TECHNOLOGY	
UNIT 2: COMPUTER SECURITY AND SAFETY	
Benchmarks	9.4.2.1 – 9.4.2.6
Topic 1: Postures in Computer Equipment Usage	Lesson 1: Introduction to Ergonomics Lesson 2: Correct Posture or Positions Lesson 3: Case Study - Posture
Topic 2: Health and Safety in ICT	Lesson 1: Types Health Hazards associated with use of ICT Lesson 2: Good ergonomics practices to minimise Health hazards associated in ICT usage
Topic 3: Effects of Computer Usage	Lesson 1: Introduction to computer technology Lesson 2: Effects of Computer Technology Usage on society
Topic 4: Emerging Technological Impact	Lesson 1: The evolution of emerging technologies Lesson 2: Impact of emerging technologies on society and environment Lesson 3: Case-Study (Music)
Topic 5: Safe Working Practices/ Habits	Lesson 1: Introduction to Work Place Safety Lesson 2: Safe Work Practices
STRAND 5: COMPUTER TECHNOLOGY	
UNIT 1: COMPUTER ARCHITECTURE	
Benchmarks	9.5.1.1 – 9.5.1.5

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Topic 1: Computer System	Lesson 1: Information-Processing- Cycle Lesson 2: Computer Hardware and Software Lesson 3: Types of Computer
Topic 2: History of Computers	Lesson 1: History of Computers Lesson 2: Generation of Computers Lesson 3: Classification of Computers
Topic 3: Design Brief	Lesson 1: Introduction to Design Brief Lesson 2: Stage Design Brief Lesson 3: Case Study of Design Brief
Topic 4: Computer Electronics	Lesson 1: Fundamentals of Computer Electronics Lesson 2: Functions of computer electronic components
Topic 5: Binary	Lesson 1: Introduction to Binary Numbers Lesson 2: Binary Numbers Lesson 3: Digital Logic Circuitry
Topic 6: Troubleshooting	Lesson 1: Introduction to Computer Troubleshooting Lesson Lesson 2: Troubleshooting Lesson 3: Case Study of Troubleshooting
STRAND 5: COMPUTER TECHNOLOGY	
UNIT 2: COMPUTER SOFTWARE	
Benchmarks	9.5.2.1 – 9.5.2.5
Topic 1: Software Programming	Lesson 1: Introduction to Programming. Lesson 2: Types of Programming software and applications Lesson 3: Example of Software Programs and associated programming languages
Topic 2: Operating System	Lesson 1: Introduction to Operating System Lesson 2: Categories of Operating Systems Software Lesson 3: File Management
Topic 3: Keyboarding	Lesson 1: Introduction to Keyboard Lesson 2: Keyboard Techniques Lesson 3: Hands on Typing
Topic 4: Microsoft Office	Lesson 1: Introduction to Microsoft Word Lesson 2: Introduction to Microsoft Excel Lesson 3: Introduction to Microsoft PowerPoint/Publisher
Topic 5: Authoring Software/ Multimedia	See Strand 4 , Benchmark 9.4.1.7

Step 5: Expand and plot the distributed content into the complete 16 Week 3-Part Yearly Content Overview for the grade

The Strand, Units and Benchmarks are further unpacked into Topics and Lesson Titles in the Teacher Guide;

- ▶ The Yearly Content Overview for the Technology and Industrial Arts is a 16 week 3-part Content Overview which is Yearly Content Overview for the Technology and Industrial Arts Subject. .
- ▶ It outlines the Strands, Units, Content Standards, Benchmarks, Topics and Lessons to be taught in 16 weeks for each part. Teachers have the option of outlining the Yearly Content Overview in a template that can be easily read and understood by all who will be using the Yearly Overview to derive their Termly teaching programs. (a sample template is provided below)
- ▶ In the sample below, the Strands, Units, Content Standards, Benchmarks, Topics and Lesson Titles are distributed evenly across the 16 weeks for each part that must be programmed
- ▶ A sample is given below for your convenience to help you plan for your termly program.

GRADE 9 TEXTILE AND FOOD TECHNOLOGY YEARLY CONTENT OVERVIEW

Week	Textile Technology and Food Technology	Content Standard	Benchmark	Topic	Lesson Title
1	Textile Technology: Fibres and Fabrics: CS: 9.11 BMs: 9.1.1.1 and 9.1.1.2, 9.1.1.3,	CS1.1 Investigate the evolution, characteristics, designs and trends of fabrics and fabric designs, their construction, production, representation, regulation and marketing.	9.1.1.1 Compare and contrast social, economic, cultural and technological changes to textiles, fashion and clothing	Impact of changes on textiles, fashion and clothing	Lesson 1: Exploring Textiles? Lesson 2: Origins of textiles, fashion and clothing Lesson3: Factors affecting changes in textile, fashions and clothing
			9.1.1.2 Distinguish the properties and characteristics of fibres and fabrics	Introduction to fibres and fabrics	Lesson 1: What are fibres and fabrics? Lesson 2: Characteristics and properties of fibres and fabrics Lesson 3: From fibres to fabrics.
			9.1.1.3 Explore the elements of design and the design and construction of fashion ideas	Designing and Construction	Lesson 1: Elements of design and design types. Lesson 2: Sources of fashion ideas. Lesson 3: Basic construction processes
2	Textile Technology: Fibres and Fabrics: CS: 9.11 BMs: 9.1.1.4, 9.1.1.5, 9.1.1.6	CS1.1 Investigate the evolution, characteristics, designs and trends of fabrics and fabric designs, their construction, production, representation, regulation and marketing.	9.1.1.4 Describe the functions of tools and equipment and their safe usage	Functions and safe usage of tools and equipment	Lesson 1: Textile Construction methods tools and their functions. Lesson 2: Safety when using textile tools and equipment. Lesson 3: Care and maintenance of textile products.
			9.1.1.5 Explore the range of textile construction techniques	Techniques in textile construction	Lesson 1: Textile construction methods Lesson 2: Colouring and decorating methods Lesson 3: Fabric finishes
			9.1.1.6 Apply appropriate safety practices in fashion design and construction	Safety practices in fashion designing and construction	Lesson 1: Differentiating between textile designing and construction processes Lesson 2: Safety practices in textile.

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3	Textile Technology: Textile and Clothing: CS: 9.1.2 BMs:9.1.2.1, 9.1.2.2,	CS1.2 Integrate and apply principles and techniques in presenting fashion ideas and illustrations in pattern making and garment construction for a variety of needs and occasions	9.1.2.1 Describe historical influences, technological progression and emerging trends as inspirational sources of design	Sources of Design	Lesson 1: Sources of design Lesson 2: Technological progression Lesson 3: Emerging trends
			9.1.2.2. Demonstrate an awareness of the fundamentals of the design process through various artistic versions	Fundamentals of design process	Lesson 1: Importance of design process Lesson 2: Skills in the design process Lesson 3: Various artistic version
4	Textile Technology: Textile and Clothing: CS: 9.1.2 BMs: 9.1.2.3, 9.1.2.4,	CS1.2 Integrate and apply principles and techniques in presenting fashion ideas and illustrations in pattern making and garment construction for a variety of needs and occasions	9.1.2.3 Apply a broad range of contemporary and appropriate tools and techniques with competence and in the development of design projects	Tools and techniques in project designs	Lesson 1: Fashion and types of garments Lesson 2: Transferring patterns from garment to garment Lesson 3: Patterning techniques
			9.1.2.4 Describe how the properties of textile fibres affect textile wear and care	Textiles wear and care	Lesson Types of tools for textile projects Lesson Safe uses of special tools Lesson Care for tools
5	Textile Technology: Textile and Clothing: CS: 9.1.2 BMs: 9.1.2.5, 9.1.2.6,	CS1.2 Integrate and apply principles and techniques in presenting fashion ideas and illustrations in pattern making and garment construction for a variety of needs and occasions	9.1.2.5 Apply the design process to respond to needs and opportunities in textile design projects	Designing a textile project	Lesson What is design process Lesson Phases in Textile Project development Lesson Textile Projects
			9.1.2.6 Select and use appropriate technology to creatively document, communicate and present design and project work	Documenting a project portfolio	Lesson People and textile industry Lesson Textile technology equipment Lesson Textile Project exhibit

6	Food Technology: Food and Nutrition: CS: 9.2.1 BMs: 9.2.1.1, 9.2.1.2	CS 2.1 Students will be able to examine and analyze the characteristics and properties of difference types of food and the social, economic, political, cultural and technological influences on the production and compliance with ethical principles and standards	9.2.1.1 Compare and contrast the nature and properties of food	Nature and properties of food	Lesson 1: Introduction to food –(Nature and sources of food) Lesson 2: Food groups and dietary guidelines Lesson 3: Properties of starch, carbohydrates, fats and oil Lesson 4: Introduction to food product development
			9.2.1.2 Practice safety and hygiene procedures in tool and equipment, food handling, meal preparation and food development	Safety and hygienic practices in food product development	Lesson 1: Personal hygiene and safety practices Lesson 2: Kitchen hygiene Lesson 3: Hygiene practices and safety in food development (preparation etc.)
7	Food Technology: Food and Nutrition: CS: 9.2.1 BMs: 9.2.1.3, 9.2.1.4	CS 2.1 Students will be able to examine and analyze the characteristics and properties of difference types of food and the social, economic, political, cultural and technological influences on the production and compliance with ethical principles and standards	9.2.1.3 Examine the nutritional components of food and food development and the impact of food consumption on nutrition.	Food and nutrients	Lesson 1: Functions of nutrients and food sources Lesson 2: Eating practices Lesson 3: Meal planning
			9.2.1.4 Explore nutrition as integral to making food choices	Food metabolism	Lesson 1: Digestion and absorption of food Lesson 2: Functions of food and nutrients in human body Lesson 3: Over nutrition and malnutrition (anorexia, bulimia, obesity, hypertension etc.)

8	<p>Food Technology:</p> <p>Food and Nutrition:</p> <p>CS: 9.2.1</p> <p>BMs: 9.2.1.5, 9.2.1.6,</p>	<p>CS 2.1 Students will be able to examine and analyze the characteristics and properties of difference types of food and the social, economic, political, cultural and technological influences on the production and compliance with ethical principles and standards</p>	<p>9.2.1.5 Discuss economic, social and technological influences of food, food product and food sciences</p>	<p>Influences on food product development</p>	<p>Lesson 1: Food ingredients</p> <p>Lesson 2: Principles of cooking methods</p> <p>Lesson 3: Food management</p> <p>Lesson 4: Economic, Social and technological influences on food product development</p>
			<p>9.2.1.6 Explore ways of meeting nutritional requirements to maintain optimum nutrition or manage nutritional issues</p>	<p>Food composition and energy metabolism</p>	<p>Lesson 1: Food composition</p> <p>Lesson 2: Food labelling</p> <p>Lesson 3: Energy metabolism</p> <p>Lesson 4: Meals for special needs</p>
9	<p>Food Technology:</p> <p>Food and Nutrition:</p> <p>CS: 9.2.1</p> <p>BMs: 9.2.1.7</p>	<p>CS 2.1 Students will be able to examine and analyze the characteristics and properties of difference types of food and the social, economic, political, cultural and technological influences on the production and compliance with ethical principles and standards</p>	<p>9.2.1.7 Apply the design process to create food items using combinations of basic ingredients with variations using a selection of techniques and food preparation equipment</p>	<p>Food product development</p>	<p>Lesson 1: Introduction to food product development</p> <p>Lesson 2: Design process</p> <p>Lesson 3: Design Brief</p> <p>Lesson 4: Sensory analysis</p>

10	Food Technology: Food Science: CS: 9.2.2 BMs: 9.2.2.1, 9.2.2.2	CS 2.2 Students will be able to investigate and analyse the cultural, physical, chemical, nutritional, biological and sensory characteristics of food and how they influence the development and production of food to meet different demands (e.g., health, occasions,	9.2.2.1 Identify and describe the cultural, physical, biological and nutritional characteristics of food that influence food development	Characteristics and properties of cereals, vegetables, fruits, legumes, fats and oils	Lesson 1 Cooking methods in food product development Lesson 2 Physical and biological properties of cereals, vegetables and fruits Lesson 3 Physical and biological properties of fruits, legumes, fats and oils
			9.2.2.2 Describe the nutritional and sensory characteristics of food to meet the needs, health and occasions.	Sensory characteristics of food	Lesson 1 Sensory analyses of food Lesson 2 Nutritional functions of food Lesson 3 Functional foods
11	Food Technology: Food Science: CS: 9.2.2 BMs: 9.2.2.3, 9.2.2.4,	CS 2.2 Students will be able to investigate and analyse the cultural, physical, chemical, nutritional, biological and sensory characteristics of food and how they influence the development and production of food to meet different demands (e.g., health, occasions,	9.2.2.3 Apply management strategies in food selection, meal preparation, product development, storage and preservation	Food management	Lesson 1 Food management Lesson 2 Trends, fashion and food Lesson 3 Seasons and food
			9.2.2.4 Explore safety and hygiene practices relating to food, and changes that occur in the functional properties of food	Food safety and hygienic practices	Lesson 1 Food borne diseases Lesson 2 Contamination Lesson 3 First Aid

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12	<p>Food Technology:</p> <p>Food Science:</p> <p>CS: 9.2.1</p> <p>BMs: 9.2.2.5</p> <p>9.2.2.6</p>	<p>CS 2.2 Students will be able to investigate and analyse the cultural, physical, chemical, nutritional, biological and sensory characteristics of food and how they influence the development and production of food to meet different demands (e.g., health, occasions,</p>	<p>9.2.2.5 Examine the social, economic and environmental impact of food processing technology, and the role packaging plays in the distribution of food from the point of production to consumption</p> <p>9.2.2.6 Apply the design process to create food solutions.</p>	<p>Factors influencing food processing and packaging</p> <p>The technology design</p>	<p>Lesson 1 Factors that influence food processing</p> <p>Lesson 2 The role of food packaging</p> <p>Lesson 3 Developments in packaging and distribution</p> <p>Lesson 4 Techniques to evaluate products and processes</p> <p>Lesson 1 Design brief and the technological process</p> <p>Lesson 3 Evaluate the new product</p> <p>Lesson 2 Using a design product to create a new product</p>
13	Textile and Food Summative Assessment				

GRADE 9 CONSTRUCTION TECHNOLOGY YEARLY CONTENT OVERVIEW

Week	Construction Technology	Content Standard	Benchmark	Topic	Lesson Title
1	Building Technology CS: 9.3.1 BMS: 9.3.1.1. 9.3.1.2, 9.3.1.3,	CS 3.1 Investigate the history and theory of buildings and analyse the components and systems of buildings, occupational health and safety procedures, the properties of building materials and the processes in which those materials and equipment are used according to industry standards.	9.3.1.1 Investigate the history and theory of buildings	The history and theory of buildings	Lesson 1: Introduction to Building Lesson 2: Definition of Building Lesson 3: Different Types of Building Lesson 4: Types of material used Lesson 5: Importance of building and career paths.
			9.3.1.2 Identify and describe a variety of construction materials, components, and processes	Building construction materials	Lesson 1: Define Building materials Lesson 2: Timber Building Materials Lesson 3: Bricks and Concrete materials Lesson 4: Metal and steel materials
			9.3.1.3 Describe the elements of drawings, and their application in technical drawings.	Trade drawing	Lesson 1: Define trade drawing Lesson 2: Types of trade drawing Lesson 3: Isometric drawing Lesson 4: Pictorial drawing Lesson 5: Orthographic drawing Lesson 6: Types of lines use

2	<p>Building Technology</p> <p>CS: 9.3.1</p> <p>BMs: 9.3.1.4, 9.3.1.5, 9.3.1.6,</p>	<p>CS 3.1 Investigate the history and theory of buildings and analyse the components and systems of buildings, occupational health and safety procedures, the properties of building materials and the processes in which those materials and equipment are used according to industry standards.</p>	<p>9.3.1.4 Identify and describe the elements of safety</p>	<p>The Elements Occupational Health and Safety</p>	<p>Lesson 1: Define occupational Health and safety</p> <p>Lesson 2: The regulations of OHS</p> <p>Lesson 3: The standards of OHS</p>
			<p>9.3.1.5 Describe the scope and purpose of building codes, and identify other regulations and standards that apply to construction projects</p>	<p>Building Codes, Standards and regulations</p>	<p>Lesson 1: Define Building legislations and regulations</p> <p>Lesson 2: Types of building codes</p> <p>Lesson 3: Types of building regulations</p>
			<p>9.3.1.6 Apply mathematical skills and scientific concepts in the planning and building of a variety of construction projects</p>	<p>Trade Maths</p>	<p>Lesson 1: Define Applied maths</p> <p>Lesson 2: Formulae to calculate substructure</p> <p>Lesson 3: Define sub-structure member (footings, post, bearers)</p> <p>Lesson 4: Define super -structure members (Floor joist, studs, roofing frame)</p> <p>Lesson 5: Types of building defect</p>

3	<p>Electrical Technology</p> <p>CS: 9.3.2</p> <p>BMs: 9.3.2.1, 9.3.2.2, 9.3.2.3,</p>	<p>CS 3.2 Analyse and apply the technological processes, concepts, principles and practices related to Electrical Technology and its social contribution with regard to economic growth, entrepreneurship, sustainability and as a tool for change, improving the quality of life responsive to individual, community and industrial needs.</p>	<p>9.3.2.1 Describe the historical development of electricity</p>	History of Electricity	<p>Lesson 1: Electrical Energy Production & Supply</p> <p>Lesson 2: Modern Power Generation methods</p> <p>Lesson 3: Renewable and sustainable energy practices.</p>
			<p>9.3.2.2 Investigate and communicate OHS legislation and regulation and assess and employ emergency procedures whilst observing safety</p>	Workplace and Electrical safety	<p>Lesson 1: Electrical Energy Production & Supply</p> <p>Lesson 2: Renewable and sustainable energy practices.</p> <p>Lesson 3: Career Pathway in Electrical Technology</p>
			<p>9.3.2.3 Identify, design, develop and evaluate processes and products related to electrical technology and communicate the findings through the use of appropriate electrical and electronic terminology.</p>	Electrical or Electronic processes and products	<p>Lesson 1: OHS legislation & Regulation</p> <p>Lesson 2: Personal Safety</p> <p>Lesson 3: Emergency procedures.</p>

4	Electrical Technology CS: 9.3.2 BMs: 9.3.2.4, 9.3.2.5,	CS 3.2 Analyse and apply the technological processes, concepts, principles and practices related to Electrical Technology and its social contribution with regard to economic growth, entrepreneurship, sustainability and as a tool for change, improving the quality of life responsive to individual, community and industrial needs.	9.3.2.4 Define electricity and conductivity and differentiate insulators from conductors	Fundamentals of electricity	Lesson 1: Electrical or Electronic processes Lesson 2: Electrical or Electronic products
			9.3.2.5 Identify symbols used and explain the functions of components and devices in electrical circuit diagrams	Components and devices used on circuit diagrams	Lesson 1: Electricity Lesson 2: Conductivity Lesson 3: Conductors and Insulators
5	Electrical Technology CS: 9.3.2 BMs: 9.3.2.6, 9.3.2.7	CS 3.2 Analyse and apply the technological processes, concepts, principles and practices related to Electrical Technology and its social contribution with regard to economic growth, entrepreneurship, sustainability and as a tool for change, improving the quality of life responsive to individual, community and industrial needs.	9.3.2.6 Identify the different types of circuits and explain the parts and operation of a simple practical circuit.	Circuits	Lesson 1: Electrical components & devices Lesson 2: Electrical symbols used in circuit diagrams
			9.3.2.7 Investigate the concepts, principles and practices related to electrical	Electrical Fundamentals	Lesson 1: OHMs LAW Lesson 2: Kirchhoff's Law Lesson 3: Circuit Calculations
6	Plumbing Technology CS: 9.3.3 BMs: 9.3.3.1, 9.3.3.2	CS 3.3 Investigate and analyse fundamental concepts of plumbing and theories, OHS, Occupational Health and safety Regulations and standards ,trade drawing, demonstrations and applications of tools and materials specifications, installation of plumbing fittings and accessories in (DWV) Drain, waste, vent system, and water distribution system.	9.3.3.1 Describe and explain the fundamentals, concepts, and their relevance in the plumbing trade	Fundamental concept and relevance of plumbing trade	Lesson 1: Introduction to plumbing trade. Lesson 2: Importance of plumbing trade. Lesson 3: Career pathways of plumbing trade.
			9.3.3.2 Analyse and describe OHS Regulations and standards in the plumbing trade and work places.	Topic 2: Occupational Health and Safety regulations and standard	Lesson 1: Define Occupational Health Safety regulations and standards. Lesson 2: Types of regulations and standards.

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7	Plumbing Technology CS: 9.3.3 BMs: 9.3.3.3, 9.3.3.4,	CS 3.3 Investigate and analyse fundamental concepts of plumbing and theories, OHS, Occupational Health and safety Regulations and standards ,trade drawing, demonstrations and applications of tools and materials specifications, installation of plumbing fittings and accessories in (DWV) Drain, waste, vent system, and water distribution system.	9.3.3.3 Demonstrate and apply basic plumbing tools and equipment and their specifications and practice in trade math.	Plumbing tool and equipment	Lesson 1: Define plumbing tools and equipment. Lesson 2: Types of manual tools and equipment. Lesson 3: Types of plumbing materials and specifications.
			9.3.3.4 Explore and apply basic concepts of trade drawings in plumbing.	Trade Drawing	Lesson 1: Define trade drawing. Lesson 2: Methods of Isometric drawing. Lesson 3: Methods of Pictorial drawing. Lesson4: Types of lines used.
8	Welding Technology CS: 9.3.4 BMs: 9.3.4.1, 9.3.4.2,	CS 3.4 Investigate and analyse safety procedures, print reading, measurement and layout, identify properties of metals, the welding techniques, cutting processes according to welding codes, inspections, testing principles and apply fundamentals of fabrication.	9.3.4.1 Investigate safe workshop setup and safety procedures in welding	Workshop Organisation	Lesson 1: Workshop Set-up Lesson 2: Workshop safety procedures
			9.3.4.2 Explore and interpret welding principles, codes and standards	Welding Standards	Lesson 1: Welding Principles Lesson 2: Welding Codes Lesson 3: Welding Standards

9	Welding Technology CS: 9.3.4 BMs: 9.3.4.3, 9.3.4.4, 9.3.4.5	CS 3.4 Investigate and analyse safety procedures, print reading, measurement and layout, identify properties of metals, the welding techniques, cutting processes according to welding codes, inspections, testing principles and apply fundamentals of fabrication.	9.3.4.3 Demonstrate knowledge in fundamental print reading, measurement and layout or fit-up techniques	Measurement Techniques	Lesson 1: Measurement Lesson 2: Print reading Lesson 3: Layout/fit-up Techniques
			9.3.4.4 Investigate and analyse the properties of metals	Metals	Lesson 1: Types of metals Lesson 2: Metal Properties
			9.3.4.5 Investigate the various welding techniques and cutting processes	Cutting and Welding	Lesson 1: Types of Welding Lesson 2: Thermal cutting, heating and gouging Lesson 3: Brazing Lesson 4: Welding processes
10	Engineering Technology CS: 9.3.5 BMs: 9.3.5.1, 9.3.5.2,	CS 3.5 Investigate and analyse the historical and societal influences in Engineering by understanding the engineering principles, practices, the design process, the management, problem-solving and communication skills appropriate to any engineering field.	9.3.5.1 Describe how history and society has influenced the engineering field and critically analyse innovations.	Historical aspects of Engineering Design Process	Lesson 1: Engineering, past, present & Future Lesson 2: Engineering Innovations Lesson 3: Influence of Engineering in the society.
			9.3.5.2 Investigate the scope of engineering, roles and responsibilities of an engineer and recognise current innovations	Introduction to Engineering	Lesson 1: Introduction to Engineering Lesson 2: Scope of Engineering Lesson 3: Roles and responsibilities of Engineers

11	Engineering Technology CS: 9.3.5 BMs: 9.3.5.3, 9.3.5.4,	CS 3.5 Investigate and analyse the historical and societal influences in Engineering by understanding the engineering principles, practices, the design process, the management, problem-solving and communication skills appropriate to any engineering field.	9.3.5.3 Explore and distinguish the different types of the Engineering fields.	Engineering Fields	Lesson 1: Types of engineering fields Lesson 2: Specific terminologies for the different types of engineering. Lesson 3: Processes of manufacturing materials in various engineering discipline
			9.3.5.4 Explore and discuss engineering principles and practices and the appropriate materials in engineering.	Engineering Principles and practices	Lesson 1: Engineering principles Lesson 2: Engineering practices Lesson 3: Engineering materials

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12	Engineering Technology CS: 9.3.5 BMs: 9.3.5.5, 9.3.5.6, 9.3.5.7	CS 3.5 Investigate and analyse the historical and societal influences in Engineering by understanding the engineering principles, practices, the design process, the management, problem-solving and communication skills appropriate to any engineering field.	9.3.5.5 Explore and analyse the general safety practices in engineering.	Occupational Health & safety	Lesson 1: OHS legislations and regulations for Engineers Lesson 2: Hazards & Risk Control Measures Lesson 3: Risk Assessment & Management Lesson 4: Basic First –Aid and CPR
			9.3.5.6 Outline management and problem solving skills using the engineering design process.	Engineering Design Process	Lesson 1: Steps of Engineering Design Lesson 2: Management skills Lesson 3: Problem-solving skills
			9.3.5.7. Explore and utilise communication practices appropriate to engineering.	Engineering Communication	Lesson 1: Effective communication Lesson 2: Interpersonal and intrapersonal communication skills Lesson 3: Telephones, emails, directories Lesson 4: Report writing, Lesson 5: Memorandums Lesson 6: Incident reports
13	SUMMATIVE ASSESSMENT				

GRADE 9 COMMUNICATION AND COMPUTER TECHNOLOGY YEARLY CONTENT OVERVIEW

Week	Communication and Computer Technology	Content Standard	Benchmark	Topic	Lesson Title
1	Communication Technology Data Communication and Network CS: 9.4.2 BMs: 9.4.1.1, 9.4.1.2, ,	CS 4.1 Investigate and analyse communication technology utilising multimedia and the practices and systems in designing, installing, configuring and managing networks.	9.4.1.1 Define the elements of data communication system.	Data Communication Systems	Lesson 1: Introduction to Data Communication Systems Lesson 2: Elements of Data Communication systems
			9.4.1.2 Describe the functions of the different components of a computer network.	Computer Networks	Lesson 1: Introduction to Computer Networks Lesson 2: Functions of Computer Network Components
2	Communication Technology Data Communication and Network CS: 9.4.1 BMs: 9.4.1.3, 9.4.1.4,	CS 4.1 Investigate and analyse communication technology utilising multimedia and the practices and systems in designing, installing, configuring and managing networks.	9.4.1.3 Define the OSI (Open Systems Interconnect) model and how it functions.	OSI Model	Lesson 1: Introduction OSI Model Lesson 2: Functions of the OSI Model
			9.4.1.4 Explore the use of technical terminology, basic scientific concepts, and mathematical concepts used in communications technology and apply them to the creation of media products.	Communication Technology Terminologies Basic Scientific and Mathematical Concepts in creating media products	Lesson 1: Communication Technology Terminologies Lesson 2: Application of Terminologies Lesson 3: Media Products.

3	<p>Communication Technology</p> <p>Data Communication and Network</p> <p>CS: 9.4.1</p> <p>BMs: 9.1.4 .5, 9.1.4 .6, 9.1.4 .7</p>	<p>CS 4.1 Investigate and analyse communication technology utilising multimedia and the practices and systems in designing, installing, configuring and managing networks.</p>	<p>9.4.1.5 Explore and articulate the core concepts, techniques, and skills required to produce a range of communications media products or services.</p>	Media Communication	<p>Lesson 1: Introduction to Media Communication</p> <p>Lesson 2: Techniques and Skills for application purposes</p>
			<p>9.4.1.6 Research and apply the design brief to design, configure and manage simple network.</p>	Design Brief-Simple Network	<p>Lesson 1: Introduction to Design Brief</p> <p>Lesson 2: Research and apply Design</p> <p>Lesson 3: Brief in simple Networking</p>
			<p>9.4.1.7 Explore the Authoring Software or Multimedia associate software</p>	Authoring Software Multimedia	<p>Lesson 1: Introduction to Multimedia, Authoring Software</p> <p>Lesson 2: Categories of Authoring Software</p> <p>Lesson 3: Features of Multimedia, Authoring Software</p>

4	<p>Communication Technology Computer Security and Safety</p> <p>CS: 9.4.2</p> <p>BMs: 9.4.2.1, 9.4.2.2,</p>	<p>CS 4.2 Investigate and analyse the ergonomics, social and ethical issues and the development of a monitoring and control system for both hardware, software and information security in society.</p>	<p>9.4.2.1 Investigate and demonstrate appropriate posture in using computer equipment</p>	<p>Postures in Computer Equipment Usage</p>	<p>Lesson 1: Introduction to Ergonomics</p> <p>Lesson 2: Correct Posture or Positions</p> <p>Lesson 3: Case Study - Posture</p>
			<p>9.4.2.2 Identify health hazards associated with the use of ICT and propose good ergonomic practices</p>	<p>Health and Safety in ICT</p>	<p>Lesson 1: Types Health Hazards associated with use of ICT</p> <p>Lesson 2: Good ergonomics practices to minimise Health hazards associated in ICT usage</p>
5	<p>Communication Technology Computer Security and Safety</p> <p>CS: 9.4.2</p> <p>BMs: 9.4.2.3, 9.4.2.4,</p>	<p>CS 4.2 Investigate and analyse the ergonomics, social and ethical issues and the development of a monitoring and control system for both hardware, software and information security in society</p>	<p>9.4.2.3 Identify effects of the widespread use of computers and associated technologies on society</p>	<p>Effects of Computer Usage</p>	<p>Lesson 1: Introduction to computer technology</p> <p>Lesson 2: Effects of Computer Technology Usage on society</p>
			<p>9.4.2.4 Evaluate the impact of past, current and emerging technologies on the</p> <p>Individual, society and environments.</p>	<p>Emerging Technological Impact</p>	<p>Lesson 1: The evolution of emerging technologies</p> <p>Lesson 2: Impact of emerging technologies on society and environment</p> <p>Lesson 3: Case-Study (Music)</p>

6	<p>Communication Technology Computer Security and Safety</p> <p>CS: 9.4.2</p> <p>BMs: 9.4.2.5,</p>	<p>CS 4.2 Investigate and analyse the ergonomics, social and ethical issues and the development of a monitoring and control system for both hardware, software and information security in society</p>	<p>9.4.2.5 Demonstrate an understanding of and apply safe work practices in communications technology activities</p>	<p>Safe Working Practices/ Habits</p>	<p>Lesson 1: Introduction to Work Place Safety</p> <p>Lesson 2: Safe Work Practices</p>
7	<p>Computer Technology</p> <p>Computer Architecture</p> <p>CS: 9.5.1</p> <p>BMs: 9.5.1.1, 9.5.1.2</p>	<p>CS 5.1 Explore and analyse computer fundamentals, the skills to manage and maintain; diagnose, troubleshoot and solve issues that encompass computer systems, networking, interfacing and programming as well as electronics and robotics and be aware of related environmental and societal issues.</p>	<p>9.5.1.1 Comprehend and explain the Computer System and types of computer.</p>	<p>Computer System</p>	<p>Lesson 1: Information-Processing- Cycle</p> <p>Lesson 2: Computer Hardware and Software</p> <p>Lesson 3: Types of Computer</p>
			<p>9.5.1.2 Explore generations of computer</p>	<p>History of Computers</p>	<p>Lesson 1: History of Computers</p> <p>Lesson 2: Generation of Computers</p> <p>Lesson 3: Classification of Computers</p>
8	<p>Computer Technology</p> <p>Computer Architecture</p> <p>CS: 9.5.1</p> <p>BMs: 9.5.1.3, 9.5.1.4</p>	<p>CS 5.1 Explore and analyse computer fundamentals, the skills to manage and maintain; diagnose, troubleshoot and solve issues that encompass computer systems, networking, interfacing and programming as well as electronics and robotics and be aware of related environmental and societal issues.</p>	<p>9.5.1.3 Investigate and describe the design brief of solving problems.</p>	<p>Design Brief</p>	<p>Lesson 1: Introduction to Design Brief</p> <p>Lesson 2: Stage Design Brief</p> <p>Lesson 3: Case Study of Design Brief</p>
			<p>9.5.1.4 Identify and describe the functions of, as well as important advances related to, electronic and computer components;</p>	<p>Computer Electronics</p>	<p>Lesson 1: Fundamentals of Computer Electronics</p> <p>Lesson 2: Functions of computer electronic components</p>

9	Computer Technology Computer Architecture CS: 9.5.1 BMs: 9.5.1.5, 9.5.1.6	CS 5.1 Explore and analyse computer fundamentals, the skills to manage and maintain; diagnose, troubleshoot and solve issues that encompass computer systems, networking, interfacing and programming as well as electronics and robotics and be aware of related environmental and societal issues.	9.5.1.5 Demonstrate a basic understanding of binary numbers and digital logic	Binary	Lesson 1: Introduction to Binary Numbers Lesson 2: Binary Numbers Lesson 3: Digital Logic Circuitry
			9.5.1.6 Explore and describe hardware and software troubleshooting principles	Troubleshooting	Lesson 1: Introduction to Computer Troubleshooting Lesson Lesson 2: Troubleshooting Lesson 3: Case Study of Troubleshooting
10	Computer Technology Computer Software CS: 9.5.2 BMs: 9.5.2.1, 9.5.2.2	CS 5.2 Investigate and analyse computer system and application software, programming, algorithm, web design and databases, and develop and apply the skills and knowledge in the various software.	9.5.2.1 Explore programming software and applications	Software Programming	Lesson 1: Introduction to Programming. Lesson 2: Types of Programming software and applications Lesson 3: Example of Software Programs and associated programming languages
			9.5.2.2 Demonstrate the understanding of Operating Systems/ Software and File Management	Operating System	Lesson 1: Introduction to Operating System Lesson 2: Categories of Operating Systems Software Lesson 3: File Management

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11	Computer Technology Computer Software CS: 9.5.2 BMs: 9.5.2.3, 9.5.2.4	CS 5.2 Investigate and analyse computer system and application software, programming, algorithm, web design and databases, and develop and apply the skills and knowledge in the various software.	9.5.2.3 Apply typing skills with speed (20wpm) and accuracy (80%)	Keyboarding	
			9.5.2.4 Create documents using Microsoft Office	Microsoft Office	Lesson 1: Introduction to Keyboard Lesson 2: Keyboard Techniques Lesson 3: Hands on Typing
12	Computer Technology Computer Software CS: 9.5.2 BMs: 9.5.2.5,	CS 5.2 Investigate and analyse computer system and application software, programming, algorithm, web design and databases, and develop and apply the skills and knowledge in the various software.	9.5.2.5 Explore the Authoring Software or Multimedia associate software	Authoring Software/ Multimedia	Lesson 1: Introduction to Microsoft Word Lesson 2: Introduction to Microsoft Excel Lesson 3: Introduction to Microsoft PowerPoint/ Publisher
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Step 6: Develop the Termly Programs

- ▶ Extract the terms content from the Yearly Overview to expand the content into the termly teaching program.
- ▶ Note that the TIA program is developed in 3-parts and 1 of the 3 parts is the program to be used all year around for the different lots of students rotating to take all 5 strands of TIA. Below is a proposed Template to develop a Teaching Program for a Term.(13 weeks)

Subject: _____ Grade _____ Term: _____ Year: _____

Week	Content Standards	Benchmark	Unit	Topic	Learning Objective	Knowledge	Skill	Attitude/ Values	Performance Standard
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Write the week number	Write the Coding only	Write the Coding only	Write the Unit number and Name	Write the Topic number and Name	By the end of this Topic, Students will be able to: Write the learning Objectives for the Topic	Write the essential knowledge to be learnt in this topic	Write the essential skill to be learnt in this topic	Write the essential attitude and values to be learnt in this topic	By the end of this Topic, students will be able to; Write the Performance Standard (if the Benchmark carries one)
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Note: A Performance Standard will only be included if the Benchmark has been nominated to carry a Performance Standard (Assessment). Otherwise, it is not very necessary for all Benchmarks to have a Performance Standard.

Step 7: Develop the Weekly Teaching Program (Proposed Template) and Daily Lesson Plan (SBC Template)

Template 1: Using Topics to develop Weekly Teaching Program

- You can use the Topics to develop the weekly teaching program
- Below is a proposed Template to develop a Teaching Program for a week

Subject: _____ **Grade:** ____ **Term:** _____ **Week:** ____ **Date:** _____ **Year:** _____

CS	BM	Unit	Topic	Learning Objective	Knowledge	Skill	Attitude/ Values	Suggested Learn Activities	Performance Standard
Write the Coding only	Write the Coding only	Write the Unit number and Name	Write the Topic number and Name	By the end of this Topic, Students will be able to: Write the learning Objectives for the Topic	Write the essential knowledge to be learnt in this topic	Write the essential skill to be learnt in this topic	Write the essential attitude and values to be learnt in this topic	List down the learning activities that will be done in this topic	By the end of this Topic, students will be able to; Write the Performance Standard (only if the Benchmark carries a performance standard)

Template 2: Using Lesson Titles to develop Weekly Teaching Program

- ▶ Use the unpacking process to derive lesson titles and lesson objectives to be able to expand your weekly teaching program.
- ▶ Below is a proposed Template to develop a Teaching Program for a week

Subject: _____ Grade: _____ Term: _____ Week: _____ Date: _____ Year: _____

CS	BM	Unit	Topic	Learning Objective	Knowledge	Skill	Attitude/ Values	Performance Standard	Lesson Number and Titles	Lesson Objectives
Write the Coding only	Write the Coding only	Write the Unit number and Name	Write the Topic number and Name	By the end of this Topic, Students will be able to: Write the learning Objectives for the Topic	Write the essential knowledge to be learnt in this topic	Write the essential skill to be learnt in this topic	Write the essential attitude and values to be learnt in this topic	By the end of this Topic, students will be able to; Write the Performance Standard (if the Benchmark carries one)	Lesson 1:	L1 Objectives
									Lesson 2:	L2 Objectives
									Lesson 3: Etc.	L3 Objectives

Timetabling of Technology and Industrial Arts

The teaching and learning of TIA can be organised in the manner of class rotational basis. There are three teachers who will be teaching the subject TIA.

- 1: The Home Economics Teacher,
- 2: The Practical Skills Teacher, and
3. The Maths /Science/Computing Teacher.

These three teachers will be timetabled to teach TIA during the term. Then the planning and programming will be organised in this same manner only each strand teacher will extract the strand program for teaching as these are subject specific content. This is to ensure that teachers are on contact throughout the terms and to maintain their teaching loads.

- **Sample 1st Rotational Program for the First 13 Weeks** (*Term 1 Week 1-10 and Term 2 Week 1-2*)

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Class	Strand	Content Teacher	These classes can be rotated so they all cover all the strands of TIA
Class 1 and Class 2	Food and Textile Technology	Home Economics Teacher	
Class 3 and 4	Construction Technology	Practical Skills Teacher	
Class 5 and Strand 6	Communication and Computer Technology	Computing ICT Teacher	

Sample 2nd Rotational Program for the Next 13 Weeks (Term 2 Week 4– Term 3 Week 6)

Class	Strand	Content Teacher	These classes can be rotated so they all cover all the strands of TIA
Class 1 and 2	Construction Technology	Practical Skills	
Class 3 and 4	Communication and Computer Technology	Computing ICT Teacher	
Class 5 and 6	Food and Textile Technology	Home Economics Teacher	

Sample 3rd Rotational Program for the Next 13 Weeks (Term 3 Week 7– Term 4 Week 9)

Class	Strand	Content Teacher	These classes can be rotated so they all cover all the strands of TIA
Class 1 and 2	Communication and Computer Technology Food and Textile Technology	Home Economics	
Class 3 and 4	Food and Textile Technology	Home Economics Teacher	
Class 5 and 6	Construction Technology	Practical Skills	

Step 8: Review, Evaluate and Re-plan the yearly, termly, weekly Programs.

This Process MUST BE DONE COLLABORATIVELY BY ALL WHO TEACH THE SUBJECT. IT MUST BE DONE PROGRESSIVELY

* *Notes to the Teachers;*

It is advised that all teachers assigned to teach Textile Technology in your school should study the organisation of the content by strand in the pages 142 to 177 of this Teachers Guide to guide you through the process steps for programming Textile Technology benchmarks with other strand benchmarks for the other 4 strand.

The commended programming strategies for this strand are:

1. Programming by the strands according to the school terms in the order the strands appear in the syllabus. For grades 9 and 10, page xxxxxx. This would look this way:

Weeks	Term 1	Term2	Term3	Term4
1	Orientation	CONS TECU1 BM9.3.1.1, 9.3.1.2,	CONS TECU1 BM 9.3.4.1 9.3.4.2	COMM TEC U2 Bm 9.4.2.1, 9.4.2.2
2	TT U1- BM 9.1.1.1, 9.1.1.1.2&9.1.1.3	CONST TECU1 BM9.3.1.3, 9.3.1.4,	CONS TECU1 BM 9.3.4.3 9.3.4.4	COMM TEC U2 Bm 9.4.2.3, 9.4.2.4
3	TT U1- BM 9.1.1.4 9.1.1.1.5 &9.1.1.6	BM9.3.1.4, 9.3.1.5	CONS TECU1 BM 9.3.4.5	COMM TEC U2 Bm 9.4.2.5
4	TT U1- BM9.1.2.1, 9.1.2.2, 9.1.2.3,	BM 9.3.1.6	CONS TECU1 BM 9.3.5.1, 9.3.5.2	COMP TEC Bm 9.5.1.1, 9.5.1.2
5	TT U1- BM9.1.2.4, 9.1.2.5, 9.1.2.6,	CONST TECU1 BM9.3.2.1, 9.3.2.2	CONS TECU1 BM 9.3.5.3, 9.3.5.4	COMP TEC Bm 9.5.1.3, 9.5.1.4
6	FT U1- BM9.2.1.1, 9.2.1.2, 9.2.1.3,	CONST TECU1 BM9.3.2.3 9.3.2.4	CONS TECU1 BM 9.3.5.5, 9.3.5.6	COMP TEC Bm 9.5.1.5, 9.5.1.6
7	FT U1- BM9.2.1.4, 9.2.1.5, 9.2.1.6,	CONST TECU1 BM9.3.2.5 9.3.2.6,	CONS TECU1 BM 9.3.5.7	COMP TEC Bm 9.5.2.1 9.5.2.2.
8	FT U1- BM9.2.1.7, 9.2.2.1, 9.2.2.2,	CONST TECU1 BM 9.3.2.7	COMM TEC U1 Bm 9.4.1.1, 9.4.1.2, 9.4.1.3	COMP TEC Bm 9.5.2.3 9.5.2.4.
9	FT U1- BM9.2.2.3 9.2.2.4, 9.2.2.5,	CONST TECU1 BM 9.3.3.1, 9.3.3.2	COMM TEC U1 Bm 9.4.1.4, 9.4.1.5, 9.4.1.6	COMP TEC Bm 9.5.2.5 9.5.2.
10	FT U1- BM9.2.2.6, ASSESSMENT	CONST TECU1 BM 9.3.3.3, 9.3.3.4	COMM TEC U1 Bm 9.4.1.7	ASSESSMENT
11		ASSESSMENT	ASSESSMENT	

This program for a school year is just a suggestion; you could do a similar one for your class/grade. You can do a check in the sample before this suggestion, decide on the best option for your class/grade. You are also taking up performance assessment after every third or fourth bench is taught in each unit.

Unit:

Content Standard:

Benchmark:

Topic :

Lesson Topic:

Lesson Objective (s): By the end of the lesson, students will be able to;

-
-
-

Essential Questions:

-
-
-

Knowledge:

-
-

Skill(s):

-
.....
-
.....

Values:

-
.....
-
.....

Attitudes:

STANDARD BASED LESSON PLANNING

What are Standards-Based Lessons?

In a Standards-Based Lesson, the most important or key distinction is that, a student is expected to meet a defined standard for proficiency. When planning a lesson, the teacher ensures that the content and the methods of teaching the content enable students to learn both the skills and the concepts defined in the standard for that grade level and to demonstrate evidence of their learning.

Planning lessons that are built on standards and creating aligned assessments that measure student progress towards standards is the first step teachers must take to help their students reach success. A lesson plan is a step-by-step guide that provides a structure for an essential learning.

When planning a standards-based lesson, teacher instructions are very crucial for your lessons. How teachers instruct the students is what really points out an innovative teacher to an ordinary teacher. Teacher must engage and prepare motivating instructional activities that will provide the students with opportunities to demonstrate the benchmarks. For instance, teacher should at least identify 3-5 teaching strategies in a lesson; teacher lectures, ask questions, put students into groups for discussion and role play what was discussed.

Why is Standards-Based Lesson Planning Important?

There are many important benefits of having a clear and organised set of lesson plans. Good planning allows for more effective teaching and learning. The lesson plan is a guide and map for organising the materials and the teacher for the purpose of helping the students achieve the standards. Lesson plans also provide a record that allows good, reflective teachers to go back, analyse their own teaching (what went well, what didn't), and then improve on it in the future.

Standards-based lesson planning is vital because the content standards and benchmarks must be comparable, rigorous, and measurable and of course evidence based and be applicable in real life that we expect students to achieve. Therefore, teachers must plan effective lessons to teach students to meet these standards. As schools implement new standards, there will be much more evidence that teachers will use to support student learning to help them reach the highest levels of cognitive complexity. That is, students will be developing high-level cognitive skills.

Planning for under-achievers

Planning for under-achievers

Under achievers are students who fail or do not perform as expected. Underachievement may be caused by emotions (low self-esteem) and the environment (cultural influences, unsupportive family). There may be other factors, however as teachers your concern to ensure all students achieve a certain grade in their performance is normal. In the instance that you discover that one or a couple of your students are not performing to the expected level as their peers, you would need to do some fact finding of the causes and plan on how best to help this student/s improve their performances.

Helping underachievers

There are countless strategies you may choose from depending on your teaching experiences specifically to assist the under-achiever/s you have identified. It is good to bear in mind that underachievement varies between students. Not all students are in the same category of underachievement. Also it is important that underachieving students are addressed individually by focusing on the student's strengths.

Given here are suggested strategies teachers may adopt to assist underachievers in the classroom. They include:

- Examining the Problem Individually.
- Create a Teacher-Parent Collaboration.

Teachers and parents need to work together and pool their information and experience regarding the child. Teachers and parents begin by asking questions such as;

- In what areas has the child shown exceptional ability?
- What is the child's preferred learning styles?
- What insights do parents and teachers have about the child's strengths and problem areas?
- Help student to plan every activity in the classroom.
- Help students set realistic expectations.
- Encourage and promote the student's interests and passions.
- Help children set short and long-term academic goals.
- Talk with them about possible goals.
- Ensure that all students are challenged (but not frustrated) by classroom activities.

Always reinforce students.

Components of a Standards-Based Lesson Plan

The standard based lesson plan has the following components. It is a must that the lessons that the teachers are teaching be planned before actual delivery to the students. The lesson components include :

1. Content Standard
2. Benchmark
3. Topic
4. Lesson Number and Title
5. Essential Questions
6. Lesson Objective
7. Essential KSAV
8. Teaching and Learning
 - * Introduction
 - * Body- Modelling

- * Body –Guided Practice
- * Body -Independent practice

9. Conclusion

10. Resources

Examples of Standards-Based Lesson Plans

To help teachers plan effective lessons, there is a sample lesson for the strand provided here. Teachers are encouraged to study the layout of the different components of this lesson and follow its design in their lesson preparation and teaching of lessons. Planning a good lesson helps the teacher in maintaining a standard teaching pattern and does not let the class deviate from the topic.

SAMPLE LESSON 1

STRAND 1 TEXTILE TECHNOLOGY

CS1.1 Investigate the evolution, characteristics, designs and trends of fabrics and fabric designs, their construction, production, representation, regulation and marketing.

Benchmark 9.1.1.1 Compare and contrast social, economic, cultural technological changes to textiles, fashion and clothing

Topic 1: Impact of changes on textiles, fashion and clothing

Lesson 1: Exploring Textiles

Essential Questions:

- Where did textiles originate from?
- What are cultural technological changes to textiles?
- How does social or economic issues affect, textile products (fashion and clothing) today?

Lesson Objective (s): By the end of the lesson, students will be able to;

1. Make comparison to historical influences and changes in textile industries.
2. Draw up a timeline for one of the major changes/influences in textile industry history.

Essential KSAV

Knowledge:	Skills:	Values:	Attitudes:
Historical changes and influences in textile industries	Research different changes and influences and compare the amounts of impacts	Respect and accept the changes and influences that developed textile industries.	Being positive about textile products and the effects they have on an individual today.

Teacher	Students
Introduction (5 mins)	
<p>1. Show students pictures from magazines or the CB the most historical fashion dresses and the exact opposite of a latest of the latest fashions today</p> <p>2. Give guiding questions ;</p> <ul style="list-style-type: none"> • which country is this picture come from and in what century? • what influences do you think may have caused this change? Discuss gap between the two products (garments) 	<p>1.View the pictures and do a brainstorm of the 2 different pictures and list views under headings</p> <p>-historical fashion and latest fashion</p> <p>2.Students;</p> <ul style="list-style-type: none"> • predict the time of the historical fashion which part of the globe it may have come from. • Identify part of the globe the latest fashion is from, • what influenced the change

Body (time in minutes)(5 mins)	
Modelling	
<p>1. Relate to the traditional clothing (textile) the fore fathers had</p> <p>- show a picture or 2 of what the fore fathers wore before the arrival of missionaries</p> <p>- demonstrate female/male clothing worn then</p> <p>- what influenced the changes and why, what would you or someone do with them today?</p>	<p>Explain the fore fathers</p> <p>1. clothing, how they were worn by male/ females from ;</p> <ul style="list-style-type: none"> - Highlands region - Momase region - Islands region and - Southern region
Guided Practice of the body(10 mins)	
<p>2. Tell students to choose a country in the globe and research their history of the when, what and how the textile industry developed in their country.</p>	<p>Activity 1</p> <p>Do a research history of the when, what and how the textile industry developed in their country.</p> <p>Activity 2</p> <p>Draw a presumed timeline of the changes that may have caused the changes in the clothing of the fore fathers in this nation.</p>
Independent practice of the body(15)	

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<p>1. Give students an outline of how to lay out their researched work on the historical past of a chosen country's textile industry</p> <p>2. Give opportunity for individual group or in pair presentation.</p>	<p>Activity 1.</p> <p>Work in groups or individual prepare presentation of the researched work on the historical past of a country's textile industry – the content must include a timeline of the country's textile industry</p> <p>Activity 2. Focus discussions on the assigned questions and prepare presentation.</p>
<p>Conclusion(5)</p>	
<p>Invite students to share how they feel about the progress of textile industry .</p>	<p>Volunteers express their impression of a change or influence that has had an impact in textile industry.</p>

Resources

Ensure students have some or all of the listed resources:

- handouts of the notes in the teacher guide ,
- students researched information and websites they can access and
- some samples of clothing from the fore fathers times in the society.

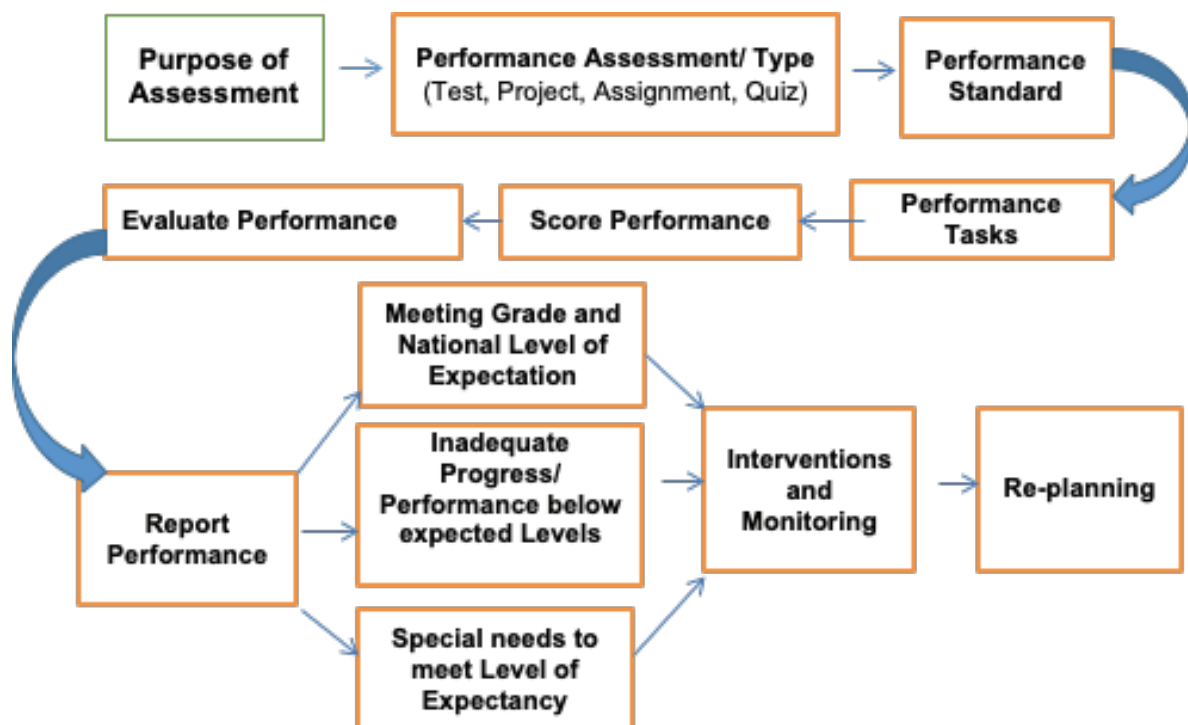
ASSESSMENT , REPORTING and MONITORING

What is Standards-Based Assessment (SBA)?

Standards-Based Assessment is an on-going and a systematic process of **assessing, evaluating, reporting** and **monitoring** students' performance and progression towards meeting grade and national level expectations. It is the measurement of students' proficiency on a learning objective of a content standard and progression towards the attainment of that content standard and benchmark.

Standards-Based Assessment Cycle

The Standards-Based Assessment Cycle begins with the purpose to assess learning. Teachers must always clearly define the purpose and expectations of the assessment tasks or activities before starting the assessment. The cycle consist the delivery of the assessment, scoring of performance, monitoring or learning, evaluating learning and performance, reporting of achievement and underachievement, developing interventions for underachievers and advance learners and re-planning assessment as demonstrated below;



Purpose of Standards-Based Assessment

Standards-Based Assessment (SBA) serves different purposes. These include instruction and learning purposes. The primary purpose of SBA is to improve student learning so that all students can attain the expected level of proficiency or quality of learning.

Enabling purposes of SBA is to:

- measure students' proficiency on well-defined content standards, benchmarks and learning objectives.
- ascertain students' attainment or progress towards the attainment of specific component of a content standard.
- ascertain what each student knows and can do and what each student needs to learn to reach the expected level of proficiency.
- enable teachers to make informed decisions and plans about how and what they would do to assist weak students to make adequate progress towards meeting the expected level of proficiency.
- enable students to know what they can do and help them to develop and implement strategies to improve their learning and proficiency level.
- communicate to parents, guardians, and relevant stakeholders the performance and progress towards the attainment of content standards or its components. and
- compare students' performances and the performances of other students.

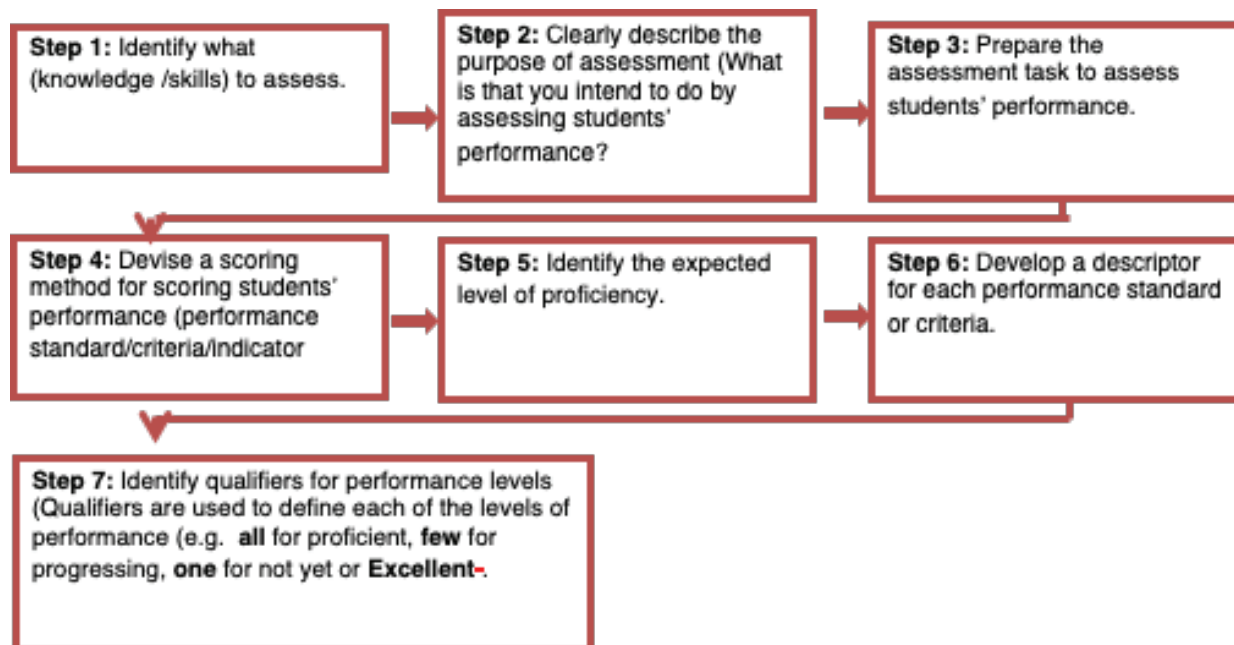
Principles of Standards-Based Assessment

The principle of SBA is for assessment to be;

- emphasizing on tasks that should encourage deeper learning,
- be an integral component of a course, unit or topic and not something to add on afterwards,
- a good assessment requires clarity of purpose, goals, standards and criteria,
- of practices that should use a range of measures allowing students to demonstrate what they know and can do,
- based on an understanding of how students learn,
- of practices that promote deeper understanding of learning processes by developing students' capacity for self-assessment,
- improving performance that involves feedback and reflection,
- on-going rather than episodic,
- given the required attention to outcomes and processes,
- be closely aligned and linked to learning objectives, benchmarks and content standards.

Standards-Based Assessment Process

Teachers are required to use the steps outlined below when planning assessment. These steps will guide you to develop effective assessments to improve student's learning as well as evaluating their progress towards meeting national and grade – level expectations.



Authentic Assessment

Authentic Assessments in Standards-based Assessment directly measure student's performance through "real life tasks" or "situations" that resemble "real life situations." Authentic assessment;

- Is performed in a real life context that approximates as much as possible, the use of a skill or concept in the real world,
- Is based on the development of a meaningful *product, performance or process*,
- Students develop and demonstrate the application of their knowledge, skills, values and attitudes in real life situations which promote and support the development of deeper levels of understanding,
- Is mostly associated with assessment as or while learning and assessment for learning but occasionally or contextually in summative learning,
- includes assessment activities such as demonstrations, debates, field work, simulations, problem solving, project-based learning, Poster Presentations, Research, Laboratory work, Reflections, Problem-based activities, Role Play, Report/Essay, Field experience, Field report, Recounts etc.

Advantages of Authentic Activities

- Empower students to take ownership in their learning
- Appreciates Learning experience
- enables and encourages the Learning experiences to be used as a basis of learning

- Meaningful, relevant, practical
- Assess the actual learning experience which means; you do not need to “teach” and then assess, rather you assess actual learning experience while it is actually happening

Authentic Assessment Criteria

In standards-based Assessment, teachers are encouraged to step out of their traditional assessment and explore authentic assessment. The criteria in authentic assessment;

- Looks at students actively engaged in completing a task that represents the achievement of a learning objective or standard,
- Takes place in real life situations,
- Asks students to apply their knowledge, skills, values and attitudes in real life situations,
- Students are given the criteria against which they are being assessed.

A Comparison of Authentic and Traditional Assessment

Authentic Assessments	Traditional Assessments
<ul style="list-style-type: none"> • Portfolios, demonstrations, field work, case studies, assignments, lab reports • Students take an active role in process • Qualitative • Interpretive • Focuses on performance, process and product • High level thinking • Use of rubric • Use of criterion levels evaluation • Part of teaching and learning Process • Shows mastery and learning performance • Generally extends over time 	<ul style="list-style-type: none"> • Multiple choice tests, true-false, fill in the blanks, sentence completion, matching, diagram completions • External –(teacher driven – assessing performance of teacher rather than the student) • Teacher-centered (what is appropriate and convenient for the teacher and what teacher thinks is good for students and decides what should be and should not be learnt) • Quantitative (driven to collect marks) • Objective • End product (only looking for the end product and not concerned about the performance and process) • Standardized or norm referenced • Isolated facts • Low level content • Generally occurs in “one setting

Standards-Based Assessment Types

In standards-Based Assessment, there are three broad assessments types. These are assessment as/in learning, assessment for learning and assessment of learning. The deliberations are as follows:

1. Formative Assessment

Formative assessment includes 'assessment *for* and *as*' and is conducted during the teaching and learning of activities of a topic.

Purposes of assessment for Learning

- On-going assessment that allows teachers to monitor students on a day-to-day basis.
- Provide continuous feedback and evidence to the teachers that should enable them to identify gaps and issues with their teaching, and improve their classroom teaching practice.
- Helps students to continuously evaluate, reflect on, and improve their learning.

Purposes of assessment as Learning

- Occurs when students reflect on and monitor their progress to inform their future learning goals.
- Helps students to continuously evaluate, reflect, and improve their own learning.
- Helps students to understand the purpose of their learning and clarify learning goals.

2. Summative Assessment

Summative assessment focuses on 'assessment *of learning*' and is conducted after or at the conclusion of teaching and learning of activities or a topic.

Purposes of assessment of Learning

- Help teachers to determine what each student has achieved and how much progress he/she has made towards meeting national and grade-level expectations.
- Help teachers to determine what each student has achieved at the end of a learning sequence or a unit.
- Enable teachers to ascertain each student's development against the unit or topic objectives and to set future directions for learning.
- Help students to evaluate, reflect on, and prepare for next stage of learning.

Performance Assessment

Performance assessment is a form of testing that requires students to perform a task rather than select an answer from a ready-made list. For example, a student may be asked to explain historical events, generate scientific hypotheses, solve math problems, converse in a foreign language, or conduct research on an assigned topic. Teachers, then judge the quality of the student's work based on an agreed-upon set of criteria. It is an assessment which requires students to demonstrate that they have mastered specific skills and competencies by performing or producing something.

Types of performance assessment

Enlisted for your convenience are types of performance assessment teachers may like to select and use to assess the students' performance..

i. Products-Oriented

This refers to concrete tangible items that students create through either the visual, written or auditory media such as;

- Creating a health/physical activity poster
- Video a class game or performance and write a broadcast commentary
- Write a speech to be given at a school council meeting advocating for increased time for health and physical education in the curriculum
- Write the skill cues for a series of skill photo's
- Create a brochure to be handed out to parents during education week
- Develop an interview for a favourite sportsperson
- Write a review of a dance performance
- Essays
- Projects

ii. Process-Oriented Tasks

It shows the thinking processes and learning strategies students use as they work such as;

- Survival scenarios
- Problem solving initiative/adventure/ activities
- Decision making such as scenario's related to health issues
- Event tasks such as creating a game, choreographing a dance/gymnastics routine, creating an obstacle course
- Game play analysis
- Peer assessment of skills or performances
- Self-assessment activities
- Goal setting, deciding a strategy and monitoring progress towards achievement

iii. Performances-Oriented

It deals with observable affective or psycho-motor behaviours put into action such as;

- Skills check during game play
- Role plays
- Officiating a game
- Debates
- Performing dance/gymnastics routines
- Teaching a skill/game/dance to peers

Performance Standards

Performance standards are measurement standards that are observed through evidence outcomes and performance indicators. Evidence Outcomes and Performance Indicators are used to measure students' performances, proficiency, competency, progression and achievement of the desired grade or level of expectation.

Performance Standards are concrete statements of how well students must learn what is set out in the content standards and benchmarks, often called the "be able to do" or "what students should know and be able to do." Performance standards indicate the quality that specifies how competent a students' demonstration or performance must be. They include explanations of how well students must demonstrate the content, explaining "how good is good enough."

Performance standards:

- measure students' performance and proficiency (using performance indicators) in the use of a specific knowledge, skill, value, or attitude in real life or related situations.
- provide the basis (performance indicators) for evaluating, reporting and monitoring students' level of proficiency in use of a specific knowledge, skills, value, or attitude.
- are used to plan for individual instruction to help students not yet meeting expectations (desired level of mastery and proficiency) to make adequate progress towards the full attainment of benchmarks and content standards.
- are used as the basis for measuring students' progress towards meeting grade-level benchmarks and content standards.
- A stem statement for Performance Standards will begin with...."Students will be able to....."
- A stem statement for Performance Indicator will begin with"Students can be able to....."

Assessment Strategies

It is important for teachers to know that, assessment is administered in different ways. Assessment does not mean a test only. There are many different ways to find out about student's strengths and weaknesses. Relying on only one method of assessing will not reflect student's achievement.

Provided in the appendices is a list of suggested strategies you can use to assess student's performances. These strategies are applicable in all the standards-based assessment types.

Teachers can choose from these assessment strategies and plan suitable assessment activities for their students:

Strategy	Description
Analogies	Students create an analogy between something they are familiar with and the new information they have learned. When asking students to explain the analogy, it will show the depth of their understanding of a topic.
Classroom Presentations	A classroom presentation is an assessment strategy that requires students to verbalize their knowledge, select and present samples of finished work, and organize their thoughts about a topic in order to present a summary of their learning. It may provide the basis for assessment upon completion of a student's project or essay.
Conferences	A conference is a formal or informal meeting between the teacher and a student for the purpose of exchanging information or sharing ideas. A conference might be held to explore the student's thinking and suggest next steps; assess the student's level of understanding of a particular concept or procedure; and review, clarify, and extend what the student has already completed
Discussions	Having a class discussion on a unit of study provides teachers with valuable information about what the students know about the subject. Focus the discussions on higher level thinking skills and allow students to reflect their learning before the discussion commences.
Essays	An essay is a writing sample in which a student constructs a response to a question, topic, or brief statement, and supplies supporting details or arguments. The essay allows the teacher to assess the student's understanding and/or ability to analyse and synthesize information.
Exhibitions/ Demonstrations	An exhibition/demonstration is a performance in a public setting, during which a student explains and applies a process, procedure, etc., in concrete ways to show individual achievement of specific skills and knowledge.
Interviews	An interview is a face-to-face conversation in which teacher and student use inquiry to share their knowledge and understanding of a topic or problem, and can be used by the teacher to explore the student's thinking; assess the student's level of understanding of a concept or procedure and gather information, obtain clarification, determine positions, and probe for motivations.
Learning Logs	A learning log is an ongoing, visible record kept by a student and recording what he or she is doing or thinking while working on a particular task or assignment. It can be used to assess student progress and growth over time.

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Observation	Observation is a process of systematically viewing and recording students while they work, for the purpose of making programming and instruction decisions. Observation can take place at any time and in any setting. It provides information on students' strengths and weaknesses, learning styles, interests, and attitudes.
Peer Assessment	Assessment by peers is a powerful way to gather information about students and their understanding. Students can use set criteria to assess the work of their classmates.
Performance Tasks	During a performance task, students create, produce, perform, or present works on "real world" issues. The performance task may be used to assess a skill or proficiency, and provides useful information on the process as well as the product.
Portfolios	A portfolio is a collection of samples of a student's work, and is focused, selective, reflective, and collaborative. It offers a visual demonstration of a student's achievement, capabilities, strengths, weaknesses, knowledge, and specific skills, over time and in a variety of contexts.
Questions And Answers (Oral)	In the question-and-answer strategy, the teacher poses a question and the student answers verbally, rather than in writing. This strategy helps the teacher to determine whether students understand what is being, or has been, presented, and helps students to extend their thinking, generate ideas, or solve problems.
Quizzes, Tests, Examinations	A quiz, test, or examination requires students to respond to prompts in order to demonstrate their knowledge (orally or in writing) or their skills (e.g., through performance). Quizzes are usually short; examinations are usually longer. Quizzes, tests, or examinations can be adapted for exceptional students and for re-teaching and retesting.
Questionnaires	Questionnaires can be used for a variety of purposes. When used as a formative assessment strategy, they provide teachers with information on student learning that they can use to plan further instruction.
Response Journals	A response journal is a student's personal record containing written, reflective responses to material he or she is reading, viewing, listening to, or discussing. The response journal can be used as an assessment tool in all subject areas.
Selected Responses	Strictly speaking a part of quizzes, tests, and examinations, selected responses require students to identify the one correct answer. The strategy can take the form of multiple-choice or true/false formats. Selected response is a commonly used formal procedure for gathering objective evidence about student learning, specifically in memory, recall, and comprehension.
Student Self-Assessments	Self-assessment is a process by which the student gathers information about, and reflects on, his or her own learning. It is the student's own assessment of personal progress in terms of knowledge, skills, processes, or attitudes. Self-assessment leads students to a greater awareness and understanding of themselves as learners.

Assessment Strategies and Action Verbs

The table below gives teachers some action verbs that can be used in the application of a particular assessment strategy he or she choose to use in assessing the students' performance

Action Verbs to Assessment Strategies		
Cognitive Learning	Action Verbs	Assessment Strategies
Knowledge □ to recall or remember facts without necessarily understanding them	Arrange, define, duplicate, label, memorise, name, order, recognise, relate, recall, reproduce, list, tell, describe, identify, show, label, collect, examine, tabulate, quote	<ul style="list-style-type: none"> • Prior knowledge inventory, misconception/preconception check • Focused listing, empty outlines • Pre□post test, quiz, quick poll
Comprehension – to understand and interpret learned information	Classify, describe, discuss, explain, express, interpret, contrast, predict, associate, distinguish, estimate, differentiate, discuss, extend, translate, review, restate, locate, recognise, report	<ul style="list-style-type: none"> • Minute paper, muddiest (or clearest) point • Observe & evaluate a student artifact or performance task using a rubric • Directed paraphrasing • Pre□post test, quiz • Interviews
Application – to put ideas and concepts to work in solving problems	Apply, choose, demonstrate, dramatise, employ, illustrate, interpret, operate, practice, schedule, sketch, solve, use, calculate, complete, show, examine, modify, relate, change, experiment, discover	<ul style="list-style-type: none"> • Observe and evaluate a student artefact, performance, or task using a rubric • Directed paraphrasing, real□ world application (apply learning in a new context) • Test, quiz • Job/internship evaluate, skill ratings
Analysis – to break information into its components to see inter-relationships and ideas	Analyse, appraise, calculate, categorise, compare, contrast, criticize, differentiate, discriminate, distinguish, examine, experiment, question, test, separate, order, connect, classify, arrange, divide, infer	<ul style="list-style-type: none"> • Pro and con grid, categorising grid, compare and contrast, concept maps • Observe and evaluate a student artifact, performance, or task using a rubric • Journaling • Job/internship evaluation, skill ratings
Evaluation – to judge the value of information based on established criteria	Appraise, argue, assess, attach, defend, judge, predict, rate, support, evaluate, recommend, convince, judge, conclude, compare, summarise	<ul style="list-style-type: none"> • Reflection component of a portfolio or experience • Journaling • Peer evaluation

Affective Learning	appreciate, accept, attempt, challenge, defend, dispute, join, judge, praise, question, share, support	<ul style="list-style-type: none"> • Reflection component of a portfolio or experience • Journaling • Observe and evaluate group work • Surveys, interviews, focus groups
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Scoring Methods for Performance Assessment

Assessment can be scored during or after the students have completed the assessment task. However, it is best done during a lesson- using a checklist, rating scales & rubrics.

A rubric is a coherent set of criteria for students' work that includes descriptions of levels of performance quality on the criteria. Rubrics have two major aspects: coherent sets of criteria and descriptions of levels of performance. Rubrics include;

- (1) Descriptions of the of task
- (2) The scales to be used
- (3) The dimensions of the task
- (4) The description of each dimension on the scale

A Rubric

- is a scoring guide that helps teachers evaluate student performance, based on a range of criteria.
- A rubric lists the criteria, or characteristics, that student work should exhibit and describes specific quality levels for those criteria.
- Rubrics are a great way to improve communication, learning, and grading fairness.
- Knowing how to create and use rubrics gives you a better understanding of assessment and another option for assessing student performance.
- are descriptive and not evaluative.
- Of course, rubrics can be used to evaluate, but the operating principle is to match the performance to the description rather than "judge" it.
- Thus rubrics are as good or bad as the criteria selected and the descriptions of the levels of performance under each.
- Effective rubrics have appropriate criteria and well-written descriptions of performance.

Purpose of Rubrics

Like any other evaluation tool, rubrics are useful for certain purposes and not for others. *The main purpose of rubrics is to assess performances.* For some performances, you observe the student in the process of doing something, like using an electric drill or discussing an issue.

For other performances, you observe the product that is the result of the student's work, like a finished bookshelf or a written report.

1. Support authentic assessment

While traditional tests measure how well students recall content, rubrics measure how well students can apply knowledge to authentic contexts or real-world tasks.

2. Clearly communicate expectations

Because rubrics define student "quality" in terms of objective criteria and standards, they clearly communicate how instructors will evaluate student performance.

3. Improve performance

Rubrics lead to better student performance. When students understand assignments and expectations before they begin, they are more likely to fulfil them. They know what specific criteria and standards of excellence will be used to rate their performance.

4. To inspire fairness

Because rubrics have detailed assessment information, students don't feel that grades are assigned subjectively or arbitrarily. Also, when you have more than one grader, a rubric allows all graders to apply the same criteria in the same way.

Although rubrics have many benefits and make grading faster and easier a good rubric takes time, effort and patience to construct. You'll probably need to change (change, not add to) your grading and assessment methods, based on what you believe about learning assessment. Rubrics are best for critical assessments, major projects, and other assignments that require a multi-dimensional performance evaluation. The trick is to know what type of rubric to create for your situation.

Reasons for Creating Rubrics/Marking schemes

Rubrics or marking schemes are created for;

1. Categories to assess-different components or elements that will assess

- Factual information
- Application
- Analysis
- Writing Skills

2. Criterion for assessment

- Accuracy
- Completeness
- Length or number of examples
- Supported with research
- Range of answer
- Description and support

3. Levels or points 3-5 levels

- Exemplary, Proficient, acceptable, not acceptable
- Excellent, good, fair, poor
- 10 points, 5 points, 1 point

Parts of a Rubric

- A rubric is a matrix of criteria and their descriptors.
- The left side of a rubric matrix lists the **criteria (performance standards)** for the expected product or performance.
- Across the top of the rubric matrix is the **rating scale** that provides a set of values for rating the quality of performance for each criterion.
- **Descriptors** under the rating scale provide examples or concrete indicators for each level of performance.
- The dimensions of the task that **qualifies** the achievement

Criteria	Performance Standards (Descriptors)
BEYOND	Beyond Standard (s) -Advanced in Performance and Understanding
	<p>Consistently demonstrates advanced conceptual mathematical understandings</p> <p>Consistently generates tasks that make connections between and among mathematical ideas</p> <p>Consistently applies strategies to unique situations</p> <p>Consistently demonstrated confidence to approach tasks beyond the proficiency level for grade</p> <p>Consistently initiates mathematical investigations</p>
CONSISTENT	Meet Standard (s)-Proficient in Performance and Understanding
	<p>Consistently demonstrates understanding of mathematical standards and cluster at the grade level</p> <p>Consistently demonstrated conceptual understanding</p> <p>Consistently applies multiple strategies flexibly in various situations</p> <p>Understands and fluently applies procedures with understanding</p> <p>Consistently demonstrates perseverance and precision</p> <p>Constructs logical mathematical arguments of thinking and reasoning</p> <p>Uses mathematical language correctly and appropriately</p>

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INCONSISTENT	Progressing-Not Yet Proficient in Performance and Understanding
	Inconsistently uses tools appropriately and strategically
	Demonstrates inconsistent understanding of key mathematical ideas at grade level
	Demonstrates inconsistent conceptual understanding of key mathematical ideas at grade level
	Inconsistent in understanding and application of grade level appropriate strategies
	Depends upon assistance of teacher and/or peers to understand and complete tasks
	Needs additional time to complete tasks
SELDOM	Not Yet -Limited Performance and Understanding
	Exhibits minimal understanding of key mathematic ideas at grade level
	Rarely demonstrates conceptual understanding
	Seldom provides precise response
	Seldom use appropriate strategies
	Consistently requires assistance and alternative instruction
	Use tools inappropriately to model mathematics

Types of Rubrics

1. Analytic Rubric

Analytic rubrics describe work on each criterion separately. For most classroom purposes, analytic rubrics are best. Focusing on the criteria one at a time is better for instruction and better for formative assessment because students can see what aspects of their work need what kind of attention.

Focusing on the criteria one at a time is good for any summative assessment (grading) that will also be used to make decisions about the future—for example, decisions about how to follow up on a unit or decisions about how to teach something next year.

Template for Analytic Rubrics

Criteria	Beginning	Developing	Accomplished	Exemplary	Score
Criteria 1	Description reflecting beginning	Description reflecting movement toward mastery level of performance	Description reflecting achievement of mastery level of performance	Description reflecting of highest level of performance	
Criteria 2	Description reflecting beginning level performance	Description reflecting movement toward mastery level of performance	Description reflecting achievement of mastery level of performance	Description reflecting of highest level of performance	
Criteria 3	Description reflecting beginning level performance	Description reflecting movement toward mastery level of performance	Description reflecting achievement of mastery level of performance	Description reflecting of highest level of performance	
Criteria 4	Description reflecting beginning level performance	Description reflecting movement toward mastery level of performance	Description reflecting achievement of mastery level of performance	Description reflecting of highest level of performance	

Sample Analytic

Rubric

Performance Standard/Criteria	Advanced	Proficient	Progressing	Not Yet
Identify reasons for developing caring relationships	Identify and explain all the reasons for developing caring relationships	Identify all the reasons for developing caring relationships	Identify only a few of the reasons for developing caring relationships	Identify only one reason for developing caring relationships
Explain the reasons for developing caring relationships	Explain all the reasons for developing caring relationships and provide an in-depth justification for some of the reasons	Explain all the reasons for developing caring relationships	Explain only a few of the reasons for developing caring relationships	Explain only one reason for developing caring relationships

Holistic Rubrics

Holistic rubrics describe the work by applying all the criteria at the same time and enabling an overall judgment about the quality of the work. Holistic rubrics are based on criteria for good work and on observation of how the work meets those criteria.

One classroom purpose for which holistic rubrics are better than analytic rubrics is the situation in which students will not see the results of a final summative assessment and you will not really use the information for anything except a grade. Some high school final examinations fall into this category. Grading with rubrics is faster when there is only one decision to make, rather than a separate decision for each criterion.

Decide on type of rubric to be used (Holistic or Analytic)

1. When to use Holistic Rubric

- There is no single correct answer/response to a task
- The focus has no the overall quality, proficiency, or understanding of a specific content or skills.
- You are assessing large numbers (eg. 150 portfolios)

Holistic Rubric						
Score	5	4	3	2	1	0
Description	Demonstrate <u>complete</u> understanding of the problem. <u>All</u> requirements of task are <u>included in response.</u>	Demonstrate <u>considerate</u> understanding of the problem. <u>All</u> requirements of task are <u>included.</u>	Demonstrate <u>partial</u> understanding of the problem. <u>Most</u> requirements of task are <u>included.</u>	Demonstrate <u>little</u> understanding of the problem. <u>Many</u> requirements of task are <u>missing.</u>	Demonstrate <u>no</u> understanding of the problem.	<u>No</u> response/ <u>not</u> attempted task

2. When to use Analytic Rubric

- Several subjects are assessing the student work.
- Description promote consistent scoring.
- Stakeholders will be examining the rubric scores.
- Substantial feedback to students or the subjects is desired.
- Outlines of specific strengths/weaknesses are anticipated.

Analytic Rubric				
Criteria	4	3	2	1
Criteria # 1	Description reflecting highest level of performance.	Description reflecting mastery level of performance.	Description reflecting movement towards mastery level of performance.	Description reflecting beginning level of performance.
Criteria # 2	Description reflecting highest level of performance.	Description reflecting mastery level of performance.	Description reflecting movement towards mastery level of performance.	Description reflecting beginning level of performance.
Criteria # 3	Description reflecting highest level of performance.	Description reflecting mastery level of performance.	Description reflecting movement towards mastery level of performance.	Description reflecting beginning level of performance.
Criteria # 4	Description reflecting highest level of performance.	Description reflecting mastery level of performance.	Description reflecting movement towards mastery level of performance.	Description reflecting beginning level of performance.

Scoring of Performance for Formative Assessment

(Assessment as/while learning and Assessment for learning)

1. Scoring Assessment using Rating Scale

Rating Scales are a type of checklists that judge the degree to which a criteria is met. They generally have a scale of between 1-6 options.

Types of Rating Scales

A. Frequency Rating Scales

A frequency rating scale scores how often a task is done to meet criteria.

Sample Rating Scale Descriptive Words

1. Words that describe the skill of **selecting 'the right' information** at varying levels of quality

Excellent	Proficient	Adequate	Limited
pertinent	relevant	suitable	trivial
insightful	meaningful	appropriate	superficial
significant	relevant	predictable	vague

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perceptive	thoughtful	basic	questionable
precise	logical	partially correct	confusing
purposeful	focused	appropriate	irrelevant

2. Words that describe the skill of ***selecting 'enough' information*** at varying levels of quality.

Excellent	Proficient	Adequate	Limited
comprehensive	thorough	cursory	superficial
in-depth	sufficient	partial	incomplete
rich & detailed	specific	simplistic	undeveloped
extensive	substantial	partial	sketchy

3. Words that describe the skill of ***evaluating product or connecting insights to personal experience*** at varying levels of quality

Excellent	Proficient	Adequate	Limited
insightful	thoughtful	predictable	trivial
Astute	relevant	appropriate	unfocused
perceptive	thoughtful	routine	trivial
intuitive	logical	rudimentary	unsubstantiated
innovative	credible	predictable	trite
compelling	meaningful	obvious	tenuous

4. Words that describe the skill of ***designing or constructing*** at varying levels of quality

Excellent	Proficient	Adequate	Limited
efficient	practical	viable	unworkable
innovative	effective	workable	ineffective

5. Words that describe the skill of ***organising or formatting information*** at varying levels of quality

Excellent	Proficient	Adequate	Limited
skillful	systematic	simplistic	haphazard
purposeful	logical	methodical	disorganized

6. Words that describe the skill of ***analyzing information or data*** at varying levels of quality

Excellent	Proficient	Adequate	Limited
accurate	logical	partially accurate	flawed
insightful	logical	simplistic	unsupported
astute	credible	plausible	inaccurate
precise	relevant	basic	irrelevant

7. Words that describe the skill of **presenting or communicating information or selecting appropriate visuals** at varying levels of quality

Excellent	Proficient	Adequate	Limited
vivid	interesting	simplistic	lacks appeal
compelling	effective	predictable	does little to sustain interest
enhances	supports	partially supports	interferes with
engaging	interesting	straightforward	ineffective
skillful	effective	appropriate	inappropriate
intriguing	interesting	predictable	ineffective

Sample Scoring using Rating Scale to assess “Collaboration”

Criteria	Frequency			
	Always = 4	Sometimes = 3	Rarely = 2	Never - 1
1. Embraces everyone’s abilities and encourages participation	Always Embraces everyone’s abilities and encourages participation	Sometimes Embraces everyone’s abilities and encourages participation	Rarely Embraces everyone’s abilities and encourages participation	Never Embraces everyone’s abilities and encourages participation
2. Ensures everyone is tasked to and activity	Always Ensures everyone is tasked to and activity	Sometimes Ensures everyone is tasked to and activity	Rarely Ensures everyone is tasked to and activity	Never Ensures everyone is tasked to and activity
3. Encourages everyone to achieve together	Always Encourages everyone to achieve together	Sometimes Encourages everyone to achieve together	Rarely Encourages everyone to achieve together	Never Encourages everyone to achieve together

2. Scoring assessment using a Checklist

Check lists are one of the easiest methods of scoring assessment tasks. The criteria i.e. skills, cues or tasks are considered separately according to whether they have been accomplished.

Types of Checklists include

- Yes/No
- Tick/Cross
- Circling
- Narrow scale, e.g. Sometimes, rarely, never
- Colouring
- Symbols (signifiers), e.g. pictures, facials, artifacts, signs, drawings, concept maps)

Sample Scoring using Yes/No Checklist Scale to assess “Collaboration”

No	Criteria	Write Yes (score 2) or No (score 1)
1	<i>Embraces everyone's' abilities and encourages participation</i>	
2	<i>Ensures everyone is tasked to an activity</i>	
3	<i>Encourages everyone to achieve together</i>	

Sample Scoring using Tick/Cross Checklist Scale to assess “Collaboration”

No	Criteria	Place a tick(score 2) or and X (score 1)
1	<i>Embraces everyone's' abilities and encourages participation</i>	
2	<i>Ensures everyone is tasked to an activity</i>	
3	<i>Encourages everyone to achieve together</i>	

Assessment Components and Task Weighting

The Assessment components and Task Weighting is intended for a Termly Assessment Schedule. It anticipated that the assessment components with their weightings may be changed by the teachers' Business Studies Termly Teaching Programs accordingly but the total scores allocated for the THEORY ASSESSMENT COMPONENTS (TAC) of 40 Marks and PRACTICAL ASSESSMENT COMPONENTS (PAC) 60 Marks should remain as it is the determined as the required 40/60 Moderation Components (i.e. 100 marks) for Business Studies Assessments per Assessment Period.

THEORY ASSESSMENT COMPONENTS (TAC) (40 Marks)	TOTAL SCORE/100	PRACTICAL ASSESSMENT COMPONENTS (PAC) (60 Marks)	TOTAL SCORE/100
		Project Portfolio No. 1	10
		STEAM Project Portfolio No. 1	10
Test No. 1	15	Project No. 1	25
		STEAM Project No. 1	25
Assignment No. 1	10		
Test No. 2	15		
TOTAL THEORY SCORE	____/40	TOTAL PRACTICAL SCORE	____/60
TOTAL SCORES OF TAC + PAC = TOTAL SCORES OUT OF 100	_____/100		

SAMPLE SUBJECT ASSESSMENT STRUCTURE

The internal assessment for the Technology and Industrial Arts/ subject is based on the Grade 9 & 10 and Grade 11 and 12 Technology and Industrial Arts Syllabus.

The final assessment should be based on a range and balance of assessment strategies and instruments. Assessment must be both normative and criterion.

Component	Weighting	Tasks	Assessment Referencing
Practical Work in response to design brief (Moderation and Projects included here?)	60 % (of mandatory total)	Development and application of design ideas, safe and skillful use of materials, tools and equipment to make a product and the identified processes	Criterion Referencing Rubrics?
Design folio with outcomes of research, investigations and planning	20 % (of mandatory total)	Folio showing results of investigation in response to design brief, rough notes or sketches of design ideas, timelines, final drawings or plans, processes used to make the product and evaluation reports	Criterion Referencing Rubrics?
Tests	20 %(of mandatory total)	Theory and also applications in theory	Normative
Marks	100 %	A combination of design folios, practical applications, moderations and tests.	

Sample Assessment

SBC embraces standards and as such, standards must also drive the administration of assessments to students. It is important that every student must be given the outline of the Assessment that has been planned for the term.

Each Term will include 6 pieces (can have any number from 4-6) of assessment. Assessment is weighted accordingly.

Assessment Type	Description	Weighting
Topic Tests x 2	Students will be given two topic tests based on the content learnt in the term. 1 will be given mid-term and 1 at end-term. The test will be comprised of 10 multiple choice questions and 5 short written answers.	1 = 15 marks 1=10 marks
Portfolio	Individual Students will be assessed on creating a portfolio	10 marks
Moderation	In groups of four - five, students work to critically engage with one another in the required design process. Students will address criteria provided in class and prepare and deliver a 5-10 minute presentation addressing the criteria.	30 marks
Project (Application)	In groups of three to four, students work to critically engage with one another in the assigned project. Students will address criteria provided in class and prepare and deliver a 5-10 minute presentation addressing the criteria.	20 marks
Participation	2 marks will be allocated each day for attendance. Another 3 marks will be awarded for active participation.	5 marks

STEAM Assessment

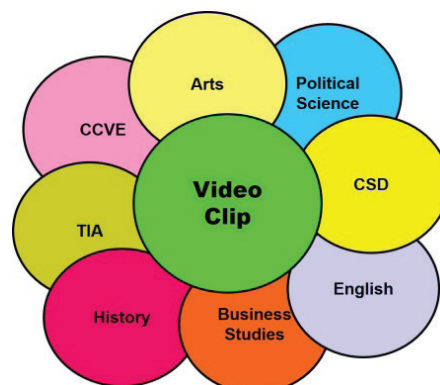
Steps in Developing a STEAM Activity

1. Identify the Real/Authentic Situations that can be solved through the STEAM Activity.
2. Select a well-defined a Benchmark in your subject area that will carry the STEAM Activity.
3. Identify related subject areas with their concepts to be used solve the Authentic Situation.
4. Note down the Main parts of the Unit Of Work for the STEAM Activity.
5. Write a Description of the Authentic Situation for the STEAM Activity based on the identified Authentic situation.
6. Write down the Task Descriptions for the STEAM Activity in order to approach the Authentic situation.
7. Develop the Rubric to Assess the STEAM Activity.

1. Authentic Situation identified for this STEAM Activity

- Students spending too much time using their smart mobile phones on Facebook, WhatsApp and surfing the internet rather than their school work.
- Students still bringing their smart mobile phones to school despite the school rules telling them not to.
- Most schools need to fully utilise their School Rules, Mottos, Missions and Visions which determines the way they want to shape our students' Knowledge, Attitudes and Values, during and after, they leave the school at end of Grade 10 and Grade 12.
- Our schools in our country have been labelled as 'a very good school to a very bad school' due school student fightings and vandalism of school properties.
- Stakeholders of the schools are blaming the school management for the school students behaviour problems and parents are transferring their students out of schools to others school in the country.

2. Select a well-defined Benchmark in your subject area that will carry/drive the STEAM Activity and its associated Big Idea (product, project etc.)



Sample:

SUBJECT: Technology and Industrial Arts

BENCHMARK 9.1.5.1. Analyse the impact of information technology on society.

BIG IDEA/PRODUCT: Video Clip

3. Identify other related subject areas with the appropriate concepts to solve the Authentic Situation(s)

- Identify related subject areas with their concepts/Knowledge, Skills, Attitudes and Values to be used to solve the Steam Authentic Situation

SUBJECTS	BENCHMARKS	BIG IDEA/PRODUCT	KNOWLEDGE	SKILLS	ATTITUDES	VALUES
1. Arts (Theatre Arts)	9.2.2.2		Video script	Script Writing		
2. Christian Civic Value Education (CCVE)	9.3.1.3		School Rules, Motto, Vision, Mission	Examine Civic values	Responsibility	Ownership, Love
3. Character Social Development (CSD)	9.1.5.1, 9.1.5.2, 9.1.5.3, 9.1.5.4, 9.1.5.5		School Rules, Motto, Vision, Mission	Asses experiences and mistakes	Caring, Positivity	Respect
4. English	9.2.2.1		Descriptive Writing	Descriptive Writing	Neatness	
5. Social Science (History)	9.2.2.3, 9.2.2.4		School history	Discuss school culture		Ownership
6. Social Science (Political Science)	9.3.3.1, 9.3.3.2		National development aspirations/demands of citizens	Anticipative skills		
7. Technology Industrial Arts (TIA)	9.4.1.4, 9.4.1.5, 9.4.1.6		Range of communications media products	Creative media communication	Alertness	
8. Business Studies	9.2.5.6.	Video clip	Media rich projects	Shooting with mobile	Creativity	Innovative

There must be an anchor subject benchmark for any STEAM assessment.

4. Descriptions of the Steam Authentic Situation

- Paragraph 1 describes the problem/situation
- Paragraph 2 describes the solution to the problem/situation and who will be responsible to take up the task.
- Paragraph 3 would mention any rewards/awards for an adequate solution to the problem/situation as a booster to create a competitive competition and a promoter of critical thinking amongst the students so that they can come out with the best products.

5. Write down the Task Descriptions for the STEAM Activity

- Plan and write a short write-up for your video-clip.
- Use the notes to make a 2-minute video clip to advertise and market your school to the public.
- The short video clip must embrace the school rules, motto, and mission and vision statements.

- It must also contain messages of new and competent management.
- This video clip has to have the potential to positively change the image of the school.
- This 2-minute video clip must be captivating and totally convincing to attract students to want to enrol at your school.
- This clip must not be more than 2 minutes. (maximum time limit)
- Present your video clip to be assessed.
- Submit both your write-up (on a chart) together with your video clip.

6. Developing Rubrics to Assess the Steam Video Clips

1. Decide on type of rubric to be used (Holistic or Analytic)
 2. Decide what point scale rubric to use (always use 3, 4 or 5 point-scale) and rating scales to use (descriptive words or numerals)
 3. Plan the layout to develop the rubric
 4. Decide what to assess from the Category of Tasks Description
 5. Identify and list the Category of Tasks Description for the Criteria
 6. Reword the Tasks Descriptions to create Criteria
- Plan and write a short write-up for your video-clip. (**The write up of the video**)
 - Use the notes to make a 2-minute video clip to advertise and market your school to the public. (**The development of the video**)
 - The short video clip must embrace the school rules, motto, and mission and vision statements. (**The content of the video**)
 - It must also contain messages of new and competent management. (**The content of the video**)
 - This clip must not be more than 2 minutes. (maximum time limit) (**The presentation of the video**)
 - Submit both your write-up (on a chart) together with your video clip. (**The product**)
7. List down the criteria against the Task Descriptions in a table.
 8. Unpack the Task Descriptions and Identify the essential KSAV that can be assessed.
 9. Reword the Task Descriptions with the inclusion of KSAVs into a Descriptor statement for each criteria. and distribute into each Competency Level/ Level of Achievement.
 10. Determine appropriate variance of Qualifiers for each Descriptors of each Achievement Level.
 11. Determine the appropriate Descriptive Words or Number for Point Scales of the intended rubric.
 12. Completed rubric sample: Video clip Assessment Rubric.
 13. Consider the Applications of the Steam Rubric.

1. Identify and list down categories of tasks

Category	Task Description
The write up of the video	Plan and write a short write-up for your video-clip.
The development of the video	Use the notes to Make a 2-minute video clip to advertise and market your school to the public.
The content of the video	<ul style="list-style-type: none"> • The short video clip must embrace the school rules, motto, and mission and vision statements. • It must also contain messages of new and competent management. • This video clip has to have the potential to positively change the image of the school • This 2-minute video clip must be captivating and totally convincing to attract students to want to enroll at your school.
The Presentation of the video	<ul style="list-style-type: none"> • This clip must not be more than 2 minutes (maximum time limit) • Present your video clip to be assessed
The product	Submit both your write-up (on a chart) together with your video clip.

2. Unpack the Task Descriptions and Identify the essential KSAV that can be assessed

Category	Task Description	Essential KSAVs
The write up of the video script	Plan and write a short write-up for your video-clip.	Skill : Procedural Writing
The development of the video	Use the notes to Make a 2-minute video clip to advertise and market your school to the public.	Values and attitudes: <ul style="list-style-type: none"> • Teamwork and cooperation • Creativity Knowledge: Know about the school

The content of the video	<ul style="list-style-type: none"> The short video clip must embrace the school rules, motto, and mission and vision statements. It must also contain messages of new and competent management. This video clip has to have the potential to positively change the image of the school This 2-minute video clip must be captivating and totally convincing to attract students to want to enroll at your school. 	<p>Knowledge:</p> <p>Adequate content about the school</p> <p>Skill: convincing and persuasive</p> <p>Values and attitude:</p> <p>Encouraging and luring</p>
The Presentation of the video	<ul style="list-style-type: none"> This clip must not be more than 2 minutes (maximum time limit) Present your video clip to be assessed 	<p>Skill:</p> <ul style="list-style-type: none"> Time management delivery skills (posture, language) and communication skills social skills (relativity and connectivity) <p>Values and attitude: confidence</p>
The product	Submit both your write-up (on a chart) together with your video clip.	EKSAVs in the Write up and Presentation :

3. Reword the Task Descriptions with the inclusion of KSAVs into a Descriptor statement for each criteria and distribute into each Competency Level/Level of Achievement

4. Determine the appropriate Descriptive Words or Number for Point Scales of the intended rubric.

Criteria:	Advanced	Progressing	Novice	Mark
The write up of the video script	<p>Skill: Procedural Writing</p> <p>Organized paper of video script writing procedures</p>	Organised paper of video script writing procedures	Organised paper of video script writing procedures	/3

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<p>The development of the video</p>	<p>Values and attitudes:</p> <ul style="list-style-type: none"> • Teamwork and cooperation • Creativity <p>Knowledge: Know about the school</p> <p>The video corresponds to the 2-minutes script and illustrates teamwork</p>	<p>The video corresponds to the 2-minutes script and illustrates teamwork</p>	<p>The video corresponds to the 2-minutes script and illustrates teamwork</p>	<p>/3</p>
<p>Content of the video</p>	<p>Knowledge:</p> <p>Adequate content about the school</p> <p>Skill: convincing and persuasive</p> <p>Values and attitude:</p> <p>Encouraging and luring</p> <p>The short video clip embraces the core ideas of school rules, motto, and mission and vision statements.</p>	<p>The short video clip embraces the core ideas of school rules, motto, and mission and vision statements.</p>	<p>The short video clip embraces the core ideas of school rules, motto, and mission and vision statements.</p>	<p>/3</p>
<p>Presentation of the video</p>	<p>Skill:</p> <ul style="list-style-type: none"> • Time management • delivery skills (posture, language) and • communication skills • social skills (relativity and connectivity) <p>Values and attitude: confidence</p> <p>The video clip captures essence of vital messages of the new and competent management with potentials to positively change the image of the school and captivating and convincing to attract students to want to enrol at the school.</p>	<p>The video clip captures essence of vital messages of the new and competent management with potentials to positively change the image of the school and captivating and convincing to attract students to want to enrol at the school.</p>	<p>The video clip captures essence of vital messages of the new and competent management with potentials to positively change the image of the school and captivating and convincing to attract students to want to enrol at the school.</p>	<p>/3</p>

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The product	EKSAVs in the Write up and Presentation: Video clip submitted at the assessment deadline for presentations	Video clip submitted at the assessment deadline for presentations	Video clip submitted at the assessment deadline for presentations	/3
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5. Completed rubric sample: Video clip Assessment Rubric

Criteria	Achieved	Progressing	Novice	Marks
Video Script Write up	Innovative and well organised paper with clarity of video <u>script</u> writing procedures	Well organised paper with clarity of video <u>script</u> writing procedures	Organised paper with some clarity of video <u>script</u> writing procedures	/3
Video Development	Appropriately considered details for the video are well corresponded to the 2-minutes script and illustrates a well-coordinated teamwork	Considered details for the video are mostly corresponded to the 2-minutes script and illustrates a coordinated teamwork	Some details considered for the video are partially corresponded to the 2-minutes script and illustrates a less coordinated teamwork	/3
Video Clip Content	• The short video clip fully embraces the core ideas of school rules, motto, and mission and vision statements.	• The short video clip mostly embraces the core ideas of school rules, motto, and mission and vision statements.	• The short video clip somewhat embraces the core ideas of school rules, motto, and mission and vision statements.	/3

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<p>Video Presentation</p>	<ul style="list-style-type: none"> The video clip fully captures essence of vital messages of the new and competent management with necessary potentials to positively change the image of the school and really captivating and totally convincing to attract students to want to enrol at the school. 	<ul style="list-style-type: none"> The video clip mostly captures the essence of vital messages of the new and competent management with most potentials to positively change the image of the school and mostly captivating and partially convincing to attract students to want to enrol at the school. 	<ul style="list-style-type: none"> The video clip some-what captures the essence of vital messages of the new and competent management with some potentials to positively change the image of the school and almost captivating and less convincing to attract students to want to enrol at the school. 	<p>/3</p>
<p>Video Clip Submission Time</p>	<ul style="list-style-type: none"> Video clip submitted well before the assessment deadline for presentations 	<ul style="list-style-type: none"> Video clip submitted just before the assessment deadline for presentations 	<ul style="list-style-type: none"> Video clip submitted within the assessment time for presentations 	<p>/3</p>

1. How to Score using the rubric Scoring Rubrics

Criteria	Achieved 3	Progressing 2	Novice 4	Scoring
Video Script Write up -	Innovative and well organised paper with clarity of video <u>script</u> writing procedures	Well organised paper with clarity of video <u>script</u> writing procedures	Organised paper with some clarity of video <u>script</u> writing procedures	2/3
Video Development	Appropriately considered details for the video are well corresponded to the 2-minutes script and illustrates a well-co-ordinated teamwork	Considered details for the video are mostly corresponded to the 2-minutes script and illustrates a co-ordinated teamwork	Some details considered for the video are partially corresponded to the 2-minutes script and illustrates a less co-ordinated teamwork	1/3
Video Clip Content	• The short video clip fully embraces the core ideas of school rules, motto, and mission and vision statements.	• The short video clip mostly embraces the core ideas of school rules, motto, and mission and vision statements.	• The short video clip somewhat embraces the core ideas of school rules, motto, and mission and vision statements.	3/3

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<p>Video Presentation</p>	<ul style="list-style-type: none"> • The video clip fully captures essence of vital messages of the new and competent management with necessary potentials to positively change the image of the school and really captivating and totally convincing to attract students to want to enrol at the school. 	<ul style="list-style-type: none"> • The video clip mostly captures the essence of vital messages of the new and competent management with most potentials to positively change the image of the school and mostly captivating and partially convincing to attract students to want to enrol at the school. 	<ul style="list-style-type: none"> • The video clip some-what captures the essence of vital messages of the new and competent management with some potentials to positively change the image of the school and almost captivating and less convincing to attract students to want to enrol at the school. 	<p>3/3</p>
<p>Video Clip Submission Time</p>	<ul style="list-style-type: none"> • Video clip submitted well before the assessment deadline for presentations 	<ul style="list-style-type: none"> • Video clip submitted just before the assessment deadline for presentations 	<ul style="list-style-type: none"> • Video clip submitted within the assessment time for presentations 	<p>2/3</p>
<p>11/15</p>				

2. How to Grade using the rubric

Grading Rubrics

Score Range	Grade	Qualifier (Proficiency)	Descriptor	Percentage
13 – 15	A	Advanced	Description reflecting <u>high-est</u> level of performance.	76 - 100%
9 – 12	B	Achieved	Description reflecting <u>mas-tery</u> level of performance.	46 - 75%
5 – 8	C	Progressing	Description reflecting <u>move-ment towards</u> mastery level of performance.	26 - 45%
0 – 4	D	Novice	Description reflecting <u>beginning</u> level of performance.	0 - 25%

3. How to Report using the rubric

a) Reporting an individual student's performance on the task

Assessment Task Report					
Assessment Task:		Video Development Project			
Name:	Grade:		Class:	Score and Grade:	/15
Criteria	Achieved A	Progressing B	Novice C		
Video Script Write up	Innovative and well organised paper with clarity of video <u>script</u> writing procedures	Well organised paper with clarity of video <u>script</u> writing procedures	Organised paper with some clarity of video <u>script</u> writing procedures		
Video Development	Appropriately considered details for the video are well corresponded to the 2-minutes script and illustrates a well-coordinated teamwork	Considered details for the video are mostly corresponded to the 2-minutes script and illustrates a coordinated teamwork	Some details considered for the video are partially corresponded to the 2-minutes script and illustrates a less coordinated teamwork		

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Video Clip Content	<ul style="list-style-type: none"> The short video clip fully embraces the core ideas of school rules, motto, and mission and vision statements. 	<ul style="list-style-type: none"> The short video clip mostly embraces the core ideas of school rules, motto, and mission and vision statements. 	<ul style="list-style-type: none"> The short video clip somewhat embraces the core ideas of school rules, motto, and mission and vision statements.
Video Presentation	<ul style="list-style-type: none"> The video clip fully captures essence of vital messages of the new and competent management with necessary potentials to positively change the image of the school and really captivating and totally convincing to attract students to want to enrol at the school. 	<ul style="list-style-type: none"> The video clip mostly captures the essence of vital messages of the new and competent management with most potentials to positively change the image of the school and mostly captivating and partially convincing to attract students to want to enrol at the school. 	<ul style="list-style-type: none"> The video clip somewhat captures the essence of vital messages of the new and competent management with some potentials to positively change the image of the school and almost captivating and less convincing to attract students to want to enrol at the school.
Video Clip Submission Time	<ul style="list-style-type: none"> Video clip submitted well before the assessment deadline for presentations 	<ul style="list-style-type: none"> Video clip submitted just before the assessment deadline for presentations 	<ul style="list-style-type: none"> Video clip submitted within the assessment time for presentations

Note: The shaded is the student's proficiency score for each task.

Related links to this Business Studies Benchmark in Business Studies with other subject areas:

Subjects	Reference Benchmark Codes
1. Arts (Theatre Arts)	9.2.2.2
2. Christian Civic Value Education (CCVE)	9.3.1.3
3. Character Social Development (CSD)	9.1.5.1, 9.1.5.2, 9.1.5.3, 9.1.5.4, 9.1.5.5
4. English	9.2.2.1
5. Social Science (History)	9.2.2.3, 9.2.2.4
6. Social Science (Political Science)	9.3.3.1, 9.3.3.2
7. Technology Industrial Arts (TIA)	9.4.1.4, 9.4.1.5, 9.4.1.6

The anchor subject in this sample STEAM assessment is **Business Studies**.

GLOSSARY

No	Words	Definitions
	Apparel	Clothing- that are worn
	Acid wash	of, relating to, or being a fabric or a garment that has been treated with a bleach solution to produce a streaked or discolored appearance.
	Antibacterial flourish	
	Anti-microbial	A substance that kills microorganisms such as bacteria or mold, or stops them from growing and causing disease.
	Anti –shrinkage treatment	The finishing process by which the cotton knitted fabrics are made not to shrink is known as “Anti-Shrink Treatment”. Different type of knitted fabrics such as single jersey, interlock and flat back rib were treated with Resil CLS using pad-dry-cure technique.
	Air jet- finish	Air-jet spinning is also known as Vortex or fasciated yarn spinning.
	Anti-pill finish	The resistance of fabric to form little balls on the surface due to abrasion during wear. This could be a natural feature of the fabric or due to application of a special finish to prevent pilling.
	Appliqued quilt	Applique is a needlework technique in which one or more pieces of fabric are attached to a larger background fabric to create pictures or patterns. The fabric can be attached by hand, machine or fused.
	Brushing	Brushing is a finishing process used to raise the surface fibres of a fabric. The fabric undergoes a mechanical brushing process in which fine, metal brushes carefully rub the fabric to produce fine fibres from the woven yarns, creating extra softness on the surface of the fabric.
	Bead reamer	A bead reamer is a pointed, round needle file that is used to either smooth the edges of the drill-hole in a bead, or to enlarge or straighten the hole itself.
	Bead spinner	A bead spinner is a tool that makes bead working faster and more efficient. It normally consists of two main parts: a base (the stand) and an upper chamber (the bowl) which spins. It also includes a needle with a slight curve to the tip. This helps draw up the beads and ensures they flow onto the thread
	Beading Loom	A bead loom is a tool used to weave beads together
	Bead board	bead·board 'bēd-, bōrd. : paneling that features decorative beading (see beading sense 1a) and that is used typically on walls (as for wainscoting) and ceilings. The porch has a beadboard ceiling, paddle fan and recessed lighting, creating a comfortable retreat.
	belt	a strip of leather or other material worn, typically round the waist, to support or hold in clothes or to carry weapons.
	Beetling	Beetling is a process applied to linen fabrics and to cotton fabrics made to resemble linen ...
	Bleaching	cause (a material such as cloth, paper, or hair) to become white or much lighter by a chemical process or by exposure to sunlight.

	Calendaring	Mechanical finishing process in which fabric is passed between two rollers (one metal and one cotton fabric) under heavy pressure to create a variety of flattened looks and textures. Examples include chaised, moiré, and friction.
	chemical	Definition of Textile chemicals. The processes of conversion of natural and manmade textile fibres according to end uses & attractive qualities as per need of customer where involving the uses of a large number of organic and inorganic chemicals known as textile chemicals
	Chemical finish	Chemical finishing can be defined as the use of chemicals to achieve a desired fabric property. Chemical finishing, also referred to as 'wet' finishing,
	Clothing	Clothing (also known as clothes, garments, dress, apparel, or attire) is any item worn on the body. Typically, clothing is made of fabrics or textiles, but over time it has included garments made from animal skin and other thin sheets of materials and natural products found in the environment, put together.
	Coloring	Dyeing can be described as the uniform application of colorant(s) to a coloring medium. The coloring of textiles may involve mass pigmenting (involving compounding), dyeing, and printing processes.
	Cotton	-soft white fibrous substance which surrounds the seeds of the cotton plant and is made into textile fibre and thread for sewing. - Cotton fabric is one of the most commonly used types of fabrics in the world. This textile is chemically organic,
	construction	-Fabric construction is defined as the warp and weft yarn density in a fabric sheet. -the process, art, or manner of constructing. 3. : something built or put together : structure.
	Construction process	Fabric construction involves the conversion of yarns, and sometimes fibres, into a fabric having characteristics determined by the materials and methods employed. Most fabrics are presently produced by some method of interlacing, such as weaving or knitting.
	Darn a socks	To darn a sock is to repair a hole in it using needle and thread.
	Patch holes	If you patch something that has a hole in it, you mend it by fastening a patch over the hole.
	Properties of textiles	Fibre length, strength, cohesiveness and flexibility are the four essential textile fibres properties. 1. Fibre Length: This is the most important property, along with its strength. Most natural textile fibres exist as staple fibres and their length varies considerably.
	zipper	a device consisting of two flexible strips of metal or plastic with interlocking projections closed or opened by pulling a slide along them, used to fasten garments, bags, and other items. "zipper bags"
	Sewing kit	A sewing kit is a small package containing items, such as needles and thread, that you need to sew something. Needles and thread are included in the sewing kit.

Dispositions of chemicals	hazardous chemicals have been detected in a wide range of textiles and clothing products. A large number of complex chemical ingredients are used to produce various textile products
diffusion	Diffusion is the process by which the colorant molecules penetrate the interior of the fibres. The scientific study of diffusion is a comparatively recent activity, and almost all work has been carried out with synthetic dyes.
durability	It is the ability of a material to exist for a long time without significant deterioration and, especially for fabrics, to resist wear through continual use and care.
fashion	Generally, fashion refers to the change in style of garment.
Fabrics	a cloth that has been woven, knitted, tufted, knotted, or bonded together using natural or synthetic threads, yarns,
Fibres	Textile fibres are natural or synthetic structures that can be spun into yarn and woven, knitted, or bonded into fabric.
Fiber-based artwork	Fiber art refers to fine art whose material consists of natural or synthetic fiber and other components, such as fabric or yarn. It focuses on the materials ...
Flex textile	Flex Textile is a thermo-adhesive material that is used for printing on fabrics for the most varied uses, especially in fashion. Flex has the ability to merge with the most varied types of fabric, from cotton to nylon and polyurethane (PU).
Folding	Fabric folding is the process of winding fabrics into clean, stretch-free folded form for easy packaging and transportation. It is the stage of fabric inspection that follows the defect mapping and cutting process.
Folding and cutting	all fabrics/materials are cut and folded similar to how you would fold a blanket. We do leave one edge free to make it easy to piece out smaller ...
Functional clothes	Functional clothing by definition is user-requirement specific and designed or engineered to meet the performance requirements of the user under extreme conditions.
Hems	Hems lie at the end of a piece of cloth, where the fabric has been folded and sewn into place to prevent the material from fraying or losing its shape. The process of hemming uses small, nearly invisible stitches to catch the fabric and hold it securely in place
Garment	A garment is a piece of cloth made of textile material(s) and it is stitched by means of a sewing machine. 'Garment' is the most common term used to name our clothes.8 Jan 2023
Innovation	Innovation in fiber and textiles affects everything from packaging to wearable electronics to aerospace materials to the clothes we wear.
Outputs	The fabric that is manufactured by the factory is the output.
Textile	-Textile is an umbrella term that includes various fiber-based materials, including fibers, yarns, filaments, threads, different fabric types, etc -Textiles are made from fibres, classified as either natural or manufactured. Fibres are twisted into yarns before being made into woven, knitted or bonded fabrics.

Technology	-Technology is the application of scientific knowledge to the practical aims of human life or, as it is sometimes phrased, to the change and manipulation of the human environment. - the application of scientific knowledge for practical purposes, especially in industry.
Textile construction	Basically, a constructed textile is a textile made by processes that involve connecting threads to form a larger fabric. These processes often involve specific tools and techniques. You can make constructed textiles in many ways, and examples of them have been found dating to prehistoric times.
Textile technology	Textile technology deals with the fabrication, manipulation, and assembly of fiber-shaped (i.e., line-shaped) materials. Textile techniques can not only be used to weave cloths from cotton fibers but also to hold wounded tissues together with surgical sutures.
Threads	A thread is a long strand of material, often composed of several filaments or fibres, used for joining, creating or decorating textiles. Thread can be made of many different materials including cotton, wool, linen, nylon, and silk. Metal threads, sometimes used in decorative textiles, can be made of fine wire.
Tools storage safety	Safety and health in textiles, clothing, leather and footwear. Contents ... Transport, storage and disposal of hazardous substances .
Natural polymer	Natural polymers are defined as materials that widely occur in nature or are extracted from plants or animals. Natural polymers are essential to daily life as our human forms are based on them.
Pierced quilt	Piecing is the term used to describe the act of assembling and stitching pieces of fabric together, by hand or machine, to make a quilt block.
Productivity	Productivity, in simple words, is the relationship between output and input. The output in garment factories can be pieces of finished garments.
Quilt	A quilt is a multi-layered textile, traditionally composed of two or more layers of fabric or fiber. Commonly three layers are used with a filler material. These layers traditionally include a woven cloth top, a layer of batting or wadding, and a woven back combined using the techniques of quilting.
seams	A seam is a method of binding two or more pieces of fabric together, usually using thread to form stitches.
Synthetic polymer	Synthetic polymers are those which are human-made polymers. Polymers are those which consist of repeated structural units known as monomers.
Wool	Wool is a type of fabric derived from the hairs of various animals. To make wool, producers harvest the hairs of animals and spin them into yarn.
Refractory and related fibres	Refractory ceramic fibres (RCFs) are amorphous man-made fibres produced from the melting of calcined kaolin clay or a combination of alumina and silica.24 Nov 2021
Raising	Raising is the technique whereby a surface effect is produced on the fabric that gives the fabric a brushed or napped appearance. It is achieved by teasing out the individual fibers from the yarns so that they stand proud of the surface [3].

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	Manufactured fibres	<p>-The fibers that belong to this category are either entirely produced from chemical or is a combination of chemical processing and raw material</p> <p>- Synthetic fibers or synthetic fibres are fibers made by humans through chemical synthesis, as opposed to natural fibers that are directly derived from living organisms, such as plants or fur from animals</p>
	Metal wire tools	Wire cloth is a woven (or nonwoven) sheet or web material with a series of openings across the surface. Wire cloth is also known as: Metal Fabric or Metal Cloth ...
	Natural fabric	Natural fabric is woven or knitted from fibres that occur in our natural world. All three sectors of nature; animal, vegetable and mineral produce fibres that can be used in fabric production.
	Medieval clothing	<p>-Various fabrics, such as taffeta, velvet, and damask were made from textiles like silk, cotton, and linen using specific weaving techniques.</p> <p>- Peasant men wore stockings or tunics, while women wore long gowns with sleeveless tunics and wimples to cover their hair. Sheepskin cloaks and woolen hats and mittens were worn in winter for protection from the cold and rain. Leather boots were covered with wooden patens to keep the feet dry.</p>
	Mechanical finishing process	<p>-Commonly used mechanical finishes include calendaring, compressive shrinkage / Sanforizing, raising, emerizing / sueding / peaching, shearing /</p> <p>-Mechanical finishing is a big and important industry,it encompasses many processes that alter the surface of a manufactured item to achieve a certain property: improve appearance, adhesion or wettability, solderability, corrosion resistance, tarnish resistance, chemical resistance, wear resistance, hardness, modify ..</p>
	yarn	<p>Yarn is a material made from staple fibre or continuous filaments used to make fabrics, sweaters, scarfs, and sewing garments.</p> <p>- A textile yarn is a continuous strand of staple or filament fibers arranged in a form suitable for weaving, knitting, or other form of fabric assembly.</p>
	Hair	<p>-The principal hair fiber used to produce textile fabrics is sheep's wool. In wild sheep, the wool is a short, soft under-layer protected</p> <p>- Haircloth is a stiff, unsupple fabric typically made from horse-hair and/or from the wooly hair of a camel.</p>
	Silk	<p>Silk is a very smooth, light fabric that's usually made of fibers from silkworm cocoons.</p> <p>- Silk is a natural fiber known for its luster, shine, strength, and durability, and it has a long trading history across the world</p>

Polyester	<p>-Polyester is a synthetic fabric that's usually derived from petroleum. This fabric is one of the world's most popular textiles, and it is used in thousands</p> <p>- Polyester is a manufactured synthetic fiber. It is a kind of plastic and is usually derived from petroleum.</p>
Rayon	<p>- a textile fibre or fabric made from regenerated cellulose (viscose).</p> <p>“clothing made of rayon”</p> <p>-Rayon is a fiber from regenerated cellulose, generally derived from wood pulp. Rayon is usually made from eucalyptus trees,</p>
Paper piercing quilt	Paper Piecing, refers to sewing fabrics to a paper foundation to stabilize the quilt block due to unusual geometric shapes, small pieces or odd angles on a bias.
Properties of fibres acid	All natural fibres are hygroscopic, which also makes them stronger when they are wet. - Thermal property: It is the heat resistancy of fibre, conductivity and melting point on which the fibre melts. - Chemical property: It is the effect of acids, alkalis, bleaches and normal laundering reagents on the fibre
Productivity	<p>In garment factory productivity is expressed in terms of number of garments produced per sewing machine per shift or per operator per shift.</p> <p>Productivity, in simple words, is the relationship between output and input.</p>
Characteristics of fibres and fabrics	<p>-Textile fibers are perhaps most obviously characterized by their fineness; they are long and very thin.</p> <p>- Durability, abrasion resistance, and UV light resistance is generally very good. A non-absorbent fibre, it will move very little in humid conditions. Not affected by acidic pollution or mildew. A strong and stable fibre.</p>
Design process	<p>-Textile design is the process of creating patterns or designs onto fabrics by way of weaving, knitting, or printing.</p> <p>-Textile design is the process of creating knitted, printed, and woven textiles.</p>
Denim	<p>Denim is a strong cotton fabric made using a twill weave, which creates a subtle diagonal ribbing pattern</p> <p>Denim is a sturdy cotton twill fabric woven with an indigo, gray, or mottled white yarn. Denim is perhaps one of the most well-known and commonly worn fabrics there is, from the classic blue jeans to jackets, dresses, overalls, and more.</p>
Design	<p>-Textile design is the process of planning and producing a fabric's appearance and structure. Textile designers dream up designs that are woven</p> <p>- Textile designing is a field that includes fashion design, carpet manufacturing and any other cloth-related field</p>

	Design sources	Textile design is the process of planning and producing a fabric's appearance and structure. Textile designers dream up designs that are woven or knitted into cloth or printed on fabric.
	Elements of design	<p>-The four basic ingredients or elements of design used in fashion are shape or silhouette, line, colour and texture.</p> <p>- The elements of design are the fundamental aspects of any visual design which include shape, color, space, form, line, value, and texture</p>
\	Principles of design	<p>The principles of design consist of: balance, proportion (also referred to as scale), emphasis, and rhythm.</p> <p>-The principles of design describe the ways that artists use the elements of art in a work of art. Balance is the distribution of the visual weight of objects, colors, texture, and space. If the design was a scale, these elements should be balanced to make a design feel stable.</p>
\	Fashion ideas	<p>-Clothing describes the material and the technical garment, devoid of any social meaning or connections; costume has come to mean fancy dress or masquerade wear</p> <p>-Fashion is a form of self-expression and autonomy at a particular period and place and in a specific context, of clothing, footwear, lifestyle, accessories, makeup, hairstyle, and body posture.</p>
\	Fashion design	<p>-Textile and Apparel Design, commonly referred to as Fashion Design, relates the physical properties of textiles to our human need for functional and fashionable clothing and home accessories.</p> <p>- fashion and textile design is about creating a cohesive and finished appearance that can convey sophistication, be it through clothing or interior design.</p>
\	Fabric fastening	<p>-In textile design, fastenings are the objects used to hold a garment together. While they can be permanent, they are generally built to fasten and unfasten the textile numerous times.</p> <p>-Fasteners are used to hold two pieces of a garment together some pieces lap one over the other, while others meet. Fasteners include snaps, hooks and eyes, self-gripping devices, buttons and buttonholes, and zippers.</p>
\	Draping	The process of positioning and pinning the fabric on a dress form is called draping. Draping can be used to create the basic pattern or to design organically by playing with the fabric on the form

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\	Composite garments	<p>-Composite fabrics are fabrics that include several structural elements that are combined into a single structure</p> <p>-Textile composite materials consist of a polymer matrix (thermoplastic or thermoset) combined with textile reinforcement. Materials of interest to the group include commingled glass/polypropylene fabrics.</p>
\	Tailoring	Tailoring is the art of designing, cutting, fitting, and finishing clothes. The word tailor comes from the French tailer, to cut, and appears in the English language during the fourteenth century
\	Shawl	A shawl is a simple item of clothing, loosely worn over the shoulders, upper body and arms, and sometimes also over the head. It is usually a rectangular or square piece of cloth, which is often folded to make a triangle, but can also be triangular in shape
\	Shearing	Shearing, in textile manufacturing, the cutting of the raised nap of a pile fabric to a uniform height to enhance appearance
\	Spinning wheel	Spinning wheel, early machine for turning fibre into thread or yarn, which was then woven into cloth on a loom. The spinning wheel was probably invented in India, though its origins are obscure.

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APPENDICES

Appendices 1: BLOOM'S TAXONOMY

LEVEL OF UNDERSTANDING	KEY VERBS
CREATING Can the student create a new product or point of view?	Construct, design, and develop, generate, hypothesise, invent, plan, produce, compose, create, make, perform, plan, produce, assemble, formulate,
EVALUATING Can the student justify a stand or decision?	Appraise, argue, assess, choose, conclude, critique, decide, defend, evaluate, judge, justify, predict, prioritise, provoke, rank, rate, select, support, monitor,
ANALYZING Can the student distinguish between the different parts?	Analysing, characterise, classify, compare, contrast, debate, criticise, deconstruct, deduce, differentiate, discriminate, distinguish, examine, organise, outline, relate, research, separate, experiment, question, test,
APPLYING Can the student use the information in a new way	Apply, change, choose, compute, dramatise, implement, interview, prepare, produce, role play, select, show, transfer, use, demonstrate, illustrate, interpret, operate, sketch, solve, write,
UNDERSTANDING Can the student comprehend ideas or concepts?	Classify, compare, exemplify, conclude, demonstrate, discuss, explain, identify, illustrate, interpret, paraphrase, predict, report, translate, describe, classify,
REMEMBERING Can the student recall or re-member the information?	Define, describe, draw, find, identify, label, list, match, name, quote, recall, recite, tell, write, duplicate, memorise, recall, repeat, reproduce, state,

Appendices 2 : 21ST CENTURY SKILLS

<p>WAYS OF THINKING</p>	<p>Creativity and innovation</p> <ul style="list-style-type: none"> • Think creatively • Work creatively with others • Implement innovations <p>Critical thinking, problem solving and decision making</p> <ul style="list-style-type: none"> • Reason effectively and evaluate evidence • Solve problems • Articulate findings <p>Learning to learn and meta-cognition</p> <ul style="list-style-type: none"> • Self-motivation • Positive appreciation of learning • Adaptability and flexibility
<p>WAYS OF WORKING</p>	<p>Communication</p> <ul style="list-style-type: none"> • Competency in written and oral language • Open minded and preparedness to listen • Sensitivity to cultural differences <p>Collaboration and teamwork</p> <ul style="list-style-type: none"> • Interact effectively with others • Work effectively in diverse teams • Prioritise, plan and manage projects
<p>TOOLS FOR WORKING</p>	<p>Information literacy</p> <ul style="list-style-type: none"> • Access and evaluate information • Use and manage information • Apply technology effectively <p>ICT literacy</p> <ul style="list-style-type: none"> • Open to new ideas, information, tools and ways of thinking • Use ICT accurately, creatively, ethically and legally • Be aware of cultural and social differences • Apply technology appropriately and effectively

LIVING IN THE WORLD	<p>Citizenship – global and local</p> <ul style="list-style-type: none"> • Awareness and understanding of rights and responsibilities as a global citizen • Preparedness to participate in community activities • Respect the values and privacy of others <p>Personal and social responsibility</p> <ul style="list-style-type: none"> • Communicate constructively in different social situations • Understand different viewpoints and perspectives <p>Life and career</p> <ul style="list-style-type: none"> • Adapt to change • Manage goals and time • Be a self-directed learner • Interact effectively with others
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Appendices 3 : TEACHING AND LEARNING STRATEGIES

STRATEGY	TEACHER	STUDENTS
<p>CASE STUDY</p> <p>Used to extend students' understanding of real life issues</p>	<p>Provide students with case studies related to the topic of the lesson and allow them to analyse and evaluate.</p>	<p>Study the case study and identify the problem addressed. They analyse the problem and suggest solutions supported by conceptual justifications and make presentations. This enriches the students' existing knowledge of the topic.</p>
<p>DEBATE</p> <p>A method used to increase students' interest, involvement and participation</p>	<p>Provide the topic or question of debate on current issues affecting a bigger population, clearly outlining the expectations of the debate. Explain the steps involved in debating and set a criteria/ standard to be achieved.</p>	<p>Conduct researches to gather supporting evidence about the selected topic and summarising the points.</p> <p>They are engaged in collaborative learning by delegating and sharing tasks to group members.</p> <p>When debating, they improve their communication skills.</p>

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<p>DISCUSSION</p> <p>The purpose of discussion is to educate students about the process of group thinking and collective decision.</p>	<p>The teacher opens a discussion on certain topic by asking essential questions.</p> <p>During the discussion, the teacher reinforces and emphasises on important points from students responses. Teacher guide the direction to motivate students to explore the topic in greater depth and the topic in more detail.</p> <p>Use how and why follow-up questions to guide the discussion toward the objective of helping students understand the subject and summarise main ideas.</p>	<p>Students ponder over the question and answer by providing ideas, experiences and examples.</p> <p>Students participate in the discussion by exchanging ideas with others.</p>
<p>GAMES AND SIMULATIONS</p> <p>Encourages motivation and creates a spirit of competition and challenge to enhance learning</p>	<p>Being creative and select appropriate games for the topic of the lesson. Give clear instructions and guidelines. The game selected must be fun and build a competitive spirit to score more than their peers to win small prizes.</p>	<p>Go into groups and organize.</p> <p>Follow the instructions and play to win</p>
<p>OBSERVATION</p> <p>Method used to allow students to work independently to discover why and how things happen as the way they are. It builds curiosity.</p>	<p>Give instructions and monitor every activity students do</p>	<p>Students possess instinct of curiosity and are curious to see the things for themselves and particularly those things which exist around them. A thing observed and a fact discovered by the child for himself becomes a part of mental life of the child. It is certainly more valuable to him than the same fact or facts learnt from the teacher or a book. Students</p> <ul style="list-style-type: none"> <input type="checkbox"/> Observe and ask essential questions <input type="checkbox"/> Record <input type="checkbox"/> Interpret

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<p>PEER TEACHING & LEARNING</p> <p><i>(power point presentations, pair learning)</i></p> <p>Students teach each other using different ways to learn from each other. It encourages; team work, develops confidence, feel free to ask questions, improves communication skills and most importantly develop the spirit of inquiry.</p>	<p>Distribute topics to groups to research and teach others in the classroom.</p> <p>Go through the basics of how to present their peer teaching.</p>	<p>Go into their established working groups.</p> <p>Develop a plan for the topic.</p> <p>Each group member is allocated a task to work on.</p> <p>Research and collect information about the topic allocated to the group. Outline the important points from the research and present their findings in class.</p>
<p>PERFORMANCE-RELATED TASKS</p> <p><i>(dramatization, song/ lyrics, wall magazines)</i></p> <p>Encourages creativity and take on the overarching ideas of the topic and are able to recall them at a later date</p>	<p>Students are given the opportunity to perform the using the main ideas of a topic.</p> <p>Provide the guidelines, expectations and the set criteria</p>	<p>Go into their established working groups.</p> <p>Being creative and create dramas, songs/lyrics or wall magazines in line with the topic.</p>
<p>PROJECT</p> <p><i>(individual/group)</i></p> <p>Helps students complete tasks individually or collectively</p>	<p>Teacher outline the steps and procedures of how to do and the criteria</p>	<p>Students are involved in investigations and finding solutions to problems to real life experiences. They carry out researches to analyses the causes and effects of problems to provide achievable solutions. Students carefully utilize the problem-solving approach to complete projects.</p>
<p>USE MEDIA & TECHNOLOGY to teach and generate engagement <u>depending on the age of the students</u></p>	<p>Show a full movie, an animated one, a few episodes form documentaries, you tube movies and others depending on the lesson.</p> <p>Provide questions for students to answer before viewing</p>	<p>Viewing can provoke questions, debates, critical thinking, emotion and reaction.</p> <p>After viewing, students engage in critical thinking and debate</p>

Appendices 4: *Samples of Student Response System Applications*

These are web based apps that work with a multitude of devices and operating systems. Here are the 4 best student response systems that interface with multiple devices.

1. Kahoot

Kahoot is a utility that allows teachers to create quizzes and surveys, and then send them to students. Teachers may allow students an unlimited amount of time to respond to questions, or they may set a time limit on each questions. Points are awarded to students both for correct answers and for responding quickly with those correct responses. Teachers can track students as they make progress.

2. Socrative

Socrative works excellently both for students working on their own or for students who are collaborating with one another. Socrative offers several different ways for instructors to engage their students. There are space races in which students can compete in teams or as individuals to answer questions as quickly and accurately as possible. Polls allow instructors to receive student feedback.

3. Infuse Learning

Infuse learning is (was!) an excellent student response system for teachers who must support students with a variety of learning styles. With infusion a teacher can create questions, quizzes and writing prompts and send them to students who are participating in virtual classrooms or in an online learning program. What makes Infuse Learning unique is that it allows the teacher to give the student multiple response options.

4. Verso

This is a free utility that teachers can use to create virtual classrooms. Verso works with the teacher's Google Drive account. This means that links, files, videos, images, and documents from the instructor's Google Drive can be added to the Verso classroom for students to access. Students who enter the classroom will be shown new items that have been added to the classroom since their last visit.

<https://www.emergingedtech.com/2015/09/top-5-multi-platform-student-response-systems/>

Appendices 5: *Assessment Strategies*

1. Reflective writing

Give your students journals and ask them to reflect on the day's lesson by writing about what they learned as well as what they found challenging. Encourage them to explain how they might apply the lesson or skill they learned in real life. You can then review their entries to determine your students' level of understanding and identify areas to focus on.

2. Choral responses

A choral response is a quick and easy way to assess your students' understanding of a concept they just learned. Ask the entire class a question, and evaluate their level of understanding based on the number and type of responses you receive. This exercise also encourages all students to participate in the question-and-answer process.

3. Presentations

Have students give short presentations to you or the class sharing what they have learned about a particular topic. You could also ask them to summarize the lesson's most important concepts. Rather than grading the presentations, use them as an assessment tool to determine students' level of understanding.

4. Four corners

Four corners is an engaging assessment strategy that gets students moving around the room. Label each corner of the room with a different level of comprehension: strongly agree, agree, disagree and strongly disagree. State facts or details about the current lesson, and ask them to stand in the corner of the room that represents their response. Encourage students to explain why they chose a certain response so that you can make decisions about future lessons.

5. Lists

Midway through a lesson, pause and ask your students to list a certain number of things they've learned. Review their lists to determine if students are at the appropriate level of understanding. You can also use these lists to identify misunderstandings and areas you need to focus on more.

6. One-minute response

Ask your class a question about a topic, and give them one minute to write a response. Encourage them to focus on their ideas and information rather than correct spelling, grammar and writing conventions. Alternatively, you can ask your students to write a one-sentence summary of what they have learned about that topic. Look for detail and understanding in their responses

7. Think-pair-share

Think-pair-share is useful for encouraging students to think critically about a topic and allowing you to check for understanding. Prompt students with questions about topics like what they learned from a lesson or how they connect with what you discussed in class today. Pair them with another student, and have them discuss their ideas. Re-convene as a group, and call on different pairs to ask them to share their thoughts.

8. Socratic seminar

Hosting a Socratic seminar empowers students to facilitate their own discussions to develop their ideas further. Students ask each other questions about a certain topic, text or starting question. This prompts more questions and comments to enhance

their understanding of the main topic.

9. ABC brainstorming

ABC brainstorming challenges students to create a list of all the letters in the alphabet and write down something that begins with each letter that relates to the unit. This can be an effective individual, pair or group activity. Reviewing these lists may help you learn what students understand and what requires more attention, allowing you to modify your lesson plans as needed.

10. 3-2-1

This is another technique to encourage students to reflect on the lessons. It's particularly useful to check for understanding at the end of or near the end of lessons. While the format may vary, this strategy typically involves asking students to write down:

Three things they learned

Two things they want to learn more about

One question they have about

11. Concept maps

Concept maps are useful for helping students visualize what they understand about a topic. Students can create individual concept maps, or this may be an activity you complete as an entire class. Start with the main topic or idea in the middle of the paper, then draw lines out to circles that discuss information related to it. Depending on the subject and the age of the students, you may also ask them to draw lines connecting similar ideas.

12. 30-second share

During a 30-second share, each student discusses something they learned during the lesson. Things like what the student discusses, what language they use and how their response connects to the learning targets can help you assess their understanding.

13. Graffiti wall

Creating a graffiti wall is another assessment strategy that may be useful for working with visual learners. Cover one of your classroom walls with a large piece of paper, and invite students to write or draw on it to show what they learned about a topic. Using this activity allows you to identify what students understand and what may require additional lessons for them to master. Consider completing this activity during the middle of a unit and leaving the wall up for them to continue to add to as they learn more.

Reference sources: <https://www.indeed.com/career-advice/career-development/assessment-strategies>

Appendices 6: LESSON PLAN TEMPLATE

Benchmark:

Topic :

Lesson Topic:

Lesson Objective (s): By the end of the lesson, students will be able to;

-
-
-

Essential Questions:

-
-
-

Knowledge:

-
-

Skill(s):

-
-

Values:

-
...
-
...

Attitudes:

-
...
-
...

Appendices 7: A Sample Scoring Rubric

Criteria	Achieved 3	Progressing 2	Novice 1	Scoring
Collecting Data for Electronic Stock Taking System (ESTS)	Well organized paper with clarity identifying, classifying and enumerating the different items.	Organized paper with some clarity identifying, classifying and enumerating the different items	Poorly organized paper that lacked clarity identifying, classifying and enumerating the different items.	2/3
Development of ESTS	Collaboratively organise and categorise data of different items. Illustrate the most likeable way the Data can displayed in the MS Excel Application format.	Display some collaboration to organise and categorise data of different items. Illustrate a likeable way the Data can displayed in the MS Excel Application format.	Display very little collaboration to organise and categorise data of different items. Illustrate a way the Data can displayed in the MS Excel Application format.	1/3
Content and Formulae Functions in ESTS	Typed accurately all the appropriate contents for each columns and typed in the all correct formulae function symbols for the 'SUMrange function' and 'SUMIF function' in all their correct MS Excel cell references	Typed most contents in their appropriate columns and typed in most of the correct formulae function symbols for the 'SUMrange function' and 'SUMIF function' in some of their MS Excel cell references	Typed very few contents in their appropriate columns and typed in very few formulae function symbols for the 'SUMrange function' and 'SUMIF function' in very few of their MS Excel cell references	3/3
Presentation of ESTS	Displayed time consciousness with adequate delivery skills (posture, language), expected communication skills and social skill (relativity and connectivity)	Mostly time consciousness with some adequate delivery skills (posture, language), some expected communication skills and some social skill (relativity and connectivity) displayed	Very little time consciousness with little adequate delivery skills (posture, language), little expected communication skills and little social skill (relativity and connectivity) displayed	3/3
Portfolio of ESTS Developments and MS Excel ESTS – The Product	A comprehensive portfolio with all the Steps in planning, designing and developing the ESTS with a complete and functional MS Excel of the ESTS.	A portfolio with most of the Steps in planning, designing and developing the ESTS with a complete and malfunctioned MS Excel of ESTS.	A portfolio with very few of the Steps in planning, designing and developing the ESTS with an incomplete and malfunctioned MS Excel of ESTS.	3/3
				12/15

Annotation 1
A statement (descriptors) describing the expected the level of competency for each prescribed criteria

Annotation 2
Rating scales includes either numerical or descriptive labels

Annotation 3
Indicators or qualifiers ensures that the levels reflect variance in quality

Annotation 4
Shaded descriptors indicating Student's Marks for the corresponding criteria

Appendices 8: Steps in Developing a Rubric

1. List the Main parts of the Unit Of Work for the Rubric.
2. Derive the purpose of Assessing the TASK in the Topic (Benchmark).
3. List the Lesson Title and Objective of the assessment task.
4. Organise how the Assessment Task would be done: Individually or in Groups .
5. Derive the Performance Standard from the Benchmark.
6. Describe the Minor Tasks under the Main Task Description.
7. Rephrase the Minor Tasks to create the Categories.
8. List Task Descriptions and Categorise them.
9. Unpack the Essential KSAV to be assessed from Task Descriptions.
10. Design the Rubric type and decide the point-scale rubric for the assessment task.
11. Re-word the Task Descriptions including KSAVs and create the Descriptors.
12. Use Appropriate Qualifiers for Descriptors for each Achievement Level.

Appendices 9: Assessment Plan

Note: Your Assessment Plan must include the National Department of Education Observable events, Commemorated events and Official Public Holidays or any calendar dates that may disrupt schooling, to help you plan your termly assessment plans.

Assessment Performance Records for Term to give grading

Student's performance in any assessments must be recorded to obtain a final score to be able to give a grading.

Subject/Strand: _____ Grade/Class: _____ Term _____

NO	Name	Project 20 marks	Test 1 15 marks	Test 2 10 marks	Portfolio 10 marks	Moderation 30 marks	Participation 5 marks	Total Raw Score
1	Gill							/ 100
2	Jill							/ 100
3	Zill							/ 100
4	Bill							/ 100
Etc.								/ 100

Appendices 10: Performance Assessment Template

Subject: _____

Strand: _____

Unit: _____

Content Standard: _____

Benchmark: _____

Topic: _____

Learning Objective: _____

Purpose of Assessment: _____

Assessment Strategy: _____

Duration: _____

Time/Date of Administration: _____

Due Date/Time: _____

Performance Standard: _____

Performance Tasks

Performance Assessment Criteria: _____

Assessment Scoring: _____

Scoring Tool: _____

Appendices 11: Project Rubric

Category	Advanced	Satisfactory	Partial Credit	Unacceptable
	9-10 points	7-8 points	1-6 points	0 points
Quality/ Workmanship	Maximum effort was put forth to complete the project in a professional manner. Project demonstrates a high degree of quality and attention to detail. Workmanship is excellent.	Some effort was made to complete the project to a level that was sufficient for grading, but does not meet a professional level of quality or appearance. Workmanship is of acceptable quality.	Minimal effort was made to complete the project and the quality and workmanship is sub-par, but still meets the minimal standard.	Little or no effort was made to produce a quality project. Project obviously does not meet minimal standards.
Creativity/ Design	Project reflects many fundamental elements of design and creativity. Project demonstrates an advanced understanding of creative thinking and attention to aesthetics and presentation.	Project reflects some of the elements of design and creativity, but lacks attention to aesthetics and presentation.	Project was completed, but does not reflect the acceptable levels of design and creativity. Effort was minimal and project is mediocre at best.	Project was not completed on time or reflects little or no effort to complete assignment at an acceptable level.
Functionality	Project meets or exceeds the design requirements of purpose and functionality. All elements of the design have been met and the project does what it was designed to do.	Project meets some of the design requirements of purpose and functionality. Not all elements of the design have been met, but the project does what it was designed to do.	Project is somewhat functional, but reflects minimal effort. It is intermittent and doesn't always do what it was designed to do.	Project does not work and demonstrates a lack of effort or understanding of the basic elements of functionality and purpose.

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Design Process	Project reflects a clear understanding and application of design process including evidence of research, brainstorming, design and problem solving, prototyping and testing.	Project reflects some understanding and application of accepted design loop principles and sequence including evidence of research, brainstorming, design and problem solving, prototyping and testing.	Project reflects minimal understanding and application of design process.	Project does not show evidence that design process was used. Project does not meet accepted levels of design criteria.
Criteria/ Constraints	Project was completed with all constraints and criteria met or exceeded. Reflects attention to detail and quality.	Project was completed with some of the constraints and criteria met. Reflects some attention to detail, but quality is minimal.	Project was completed with a few of the constraints and criteria met. Reflects minimal effort and lacks detail or quality.	Project was not completed and does not reflect the adherence to the constraints or criteria.
Time Management	Project completed and turned in on time. Student worked diligently when project time was available. Student was on task most of the time.	Project was completed, but had notable errors. Student utilized project time somewhat efficiently, but spent time socializing. Student was on task 70% - 80% of the time.	Project was not turned in on time and/or complete. The student was on task less than 60% of the time.	Project was not turned in on time and was not completed. Student wasted project time and at times was disruptive to others.
Resource Management	Always takes responsibility for use and care of all building components and resources. Always returns building components and materials to proper storage compartments.	Consistently takes responsibility for use and care of building components and resources. Somewhat consistent in returning building components to proper storage compartments.	Sometimes takes responsibility for use and care of building components and resources. Inconsistent in returning building components to proper storage compartments.	Does not take responsibility for the proper use and care of building components and resources. Is careless and does not practice proper storage and safety practices.

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Teamwork	Notable teamwork shown with a determination to participate/contribute to team success. Completed required individual tasks that contributed to the success of the team.	Teamwork was noted, but was sometimes off task or working on non-related tasks. Contributed to the success of the team, but could have been more engaged to complete tasks sooner.	Notable time off-task with minimal effort given for team success, or did the project alone without relying on others to do their share of the project.	Was not a team player. Either took over project completely, or did not engage in team direction or plans.
Writing/ Reflection	Writing/reflection is very well organized and explained. Student includes all details in design process. Document has almost no grammatical errors.	Writing/reflection is somewhat organized and explained. Student includes most details in design process. Document has very few grammatical errors.	Writing/reflection is not organized and explained. Student includes only a few details in design process. Document has many grammatical errors.	Writing/reflection is incomplete or not turned in. Student includes no details in design process. Document has many grammatical errors.
Presentation	Presentation was well organized and presented in a logical sequence. Presentation reflects a full knowledge of the topic with clear answers and explanations to questions asked.	Presentation was fairly organized and most information presented in a logical sequence. Answers to questions were vague or lacked clarity or accuracy.	Presentation was unorganized and lacked a logical sequence. Presentation reflected little attention to detail. Answers to questions were inaccurate and confusing.	Presentation was not acceptable and reflects a lack of organization or knowledge of the topic. Presentation shows little effort to meet expectations.

Appendices 12: FIBRES TO FABRICS

Along with food and shelter, clothing is also a basic need of our lives. Clothes protect us from external factors like heat, cold, and rain. We usually wear clothes based on climates, occasions, and also according to the present fashion trends. All these clothes are prepared from the Fibres.

What are Fibres?

Fibres are thin, long, flexible and hair or thread-like structures. The fibres are usually obtained from two main sources- Plants and Animals. These fibres called the **Natural Fibres**. Cotton, wool, silk are examples of Natural Fibres.

Also, read [Fibres](#)

Apart from the natural Fibres, there are **Synthetic Fibres** which are artificially synthesized by humans with the help of machines and technologies in the textile industries. These fibres are also called as the manmade fibres. Rayon Nylon and polyesters are examples of Synthetic Fibres.

Types of Natural Fibres

The natural fibres are of two types:

- **Plant Fibres**
- **Animal Fibres**

Also, read [Plant Fibres](#)

- **Plant Fibres** are obtained from plant sources such as cotton, jute, coconut fibre, etc.
- **Animal Fibres** are obtained from animals for eg., wool from sheep and silk from the silkworm.

What are Fabrics?

Fabrics are defined as the clothing material, which is made by weaving or knitting threads and is obtained from the yarn. They are made from tiny thread-like fibres. These fibres are twisted to make a yarn.

The characteristics of a fabric depend upon the type of fibre used and the treatment applied to them. Cotton voile, rayon, linen, satin, and denim are different types of fabrics.

Fabric Processing of a Fibre into Fabric

The complete process of making or producing Fabrics from fibres includes:

Extraction of fibres either from the plant or animal source.



A group of filament or staple fibres extracted are twisted together to form a yarn.



These yarn are twisted tightly and allowed to rotate on the different types of by the rollers, weaved and knitted by passing a different number of yarns together to produce Fabrics.

Finally, the fabrics are produced. These fabrics are treated with chemicals in the textile industries to make different types of clothing materials like cotton fabrics, woollen fabrics, silk fabrics, polyester fabrics etc. Later these fabrics are processed for bleaching to give a smooth, shiny look, colour dyeing to add colours to the fabric materials and screen printings to design the fabrics.

Process of Making Cotton Fabric

Cotton is picked up from the fields. The seeds are separated by combing. This process is known as ginning.



Ginned cotton is compressed to form bales. These bales are sent to the spinning mills.



The cotton bales are loosened and cleaned. This process is known as carding.



The cotton fibres are then converted into rope-like loose strands. The strands are twisted to make yarns. This process is known as the spinning of cotton yarns.



The yarns are then used to make fabrics by weaving and knitting.

Important Questions on Fibre to Fabrics.

- **What is fibre?**

Fibre is defined as a natural material, available as a raw in the form of the tiny, thread-like strands, which are converted into the yarn.

- **How many different types of fabrics are there?**

Fibres are classified into two types:

1. *Natural Fibres* – They are natural fibres, which are obtained from both plants and animals. Examples of Natural Fibre are silk, wool and cotton.
2. *Synthetic Fibres* — They are man-made fibres, which are produced artificially within the industries. They are also called as artificial or man-made Fibers. Example of Synthetic Fibres is Nylon, Rayon, etc.

- **How is cotton fibre is obtained?**

Cotton fibres are natural fibres, obtained from the seed coat of the cotton plant.

- **What are the examples of natural fibre?**

Cotton and Jute are examples of natural fibre.

- **What are the examples of synthetic fibre?**

Nylon and Polyester are examples of synthetic fibre.

This was a brief introduction to the Fibre to Fabrics. Stay tuned with BYJU'S to learn more in detail about the Fibres, Fabrics and other related topics @ [BYJU'S Biology](#)

APPENDIX 7: TIME ALLOCATION FOR JUNIOR AND SENIOR HIGH

**FREE ISSUE
NOT FOR SALE**