Technology and Industrial Arts

Textile Technology

Junior High

Grade 10

Teacher Guide

Standards-Based

Department of Education

'FREE ISSUE
NOT FOR SALE'

Textile Technology

Grade 10

Teacher Guide

Standard Based

Department of Education

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Contents

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
SBA	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 five 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.

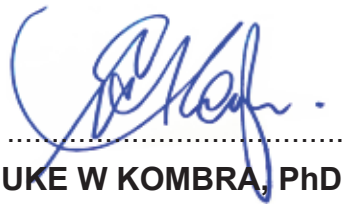
Textiles Technology embraces the historical and cultural diversity of creating various types of fibres and fabrics, textiles and clothing, absorbing key important aspects of safety, blending these into the modern designing and constructions of garments and fashions and other textile products to meet 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 instl 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 10 Technology and Industrial Arts: Textiles Technology Teacher Guide to be used in all high schools throughout Papua New Guinea.



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UKE W KOMBRA, PhD

Secretary for Education

INTRODUCTION

The strand Textiles 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 recognise 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 five 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 Textiles 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 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 10 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 10 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 teachers expectations for implementing the SBC curriculum, and therefore the effective implementation of Grade 10 Textiles Technology Strand in TIA 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 teachersto 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: Textile 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
- Behavioural 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 10 ***Textile Technology Strand*** Teacher Guide are closely aligned and complementary to 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 Outlines the ultimate aim and goals, and what to teach and why teach it	**Teacher Guide** Describes how to plan, teach, and assess students' performance
• 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	• 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 10 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 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**
• SBC Aims and Goals • Content Standard • Benchmarks • Evidence Outcomes	• Learning Objectives • Lesson Objectives • Essential Knowledge, Skills, Values and Attitude • Performance Standard

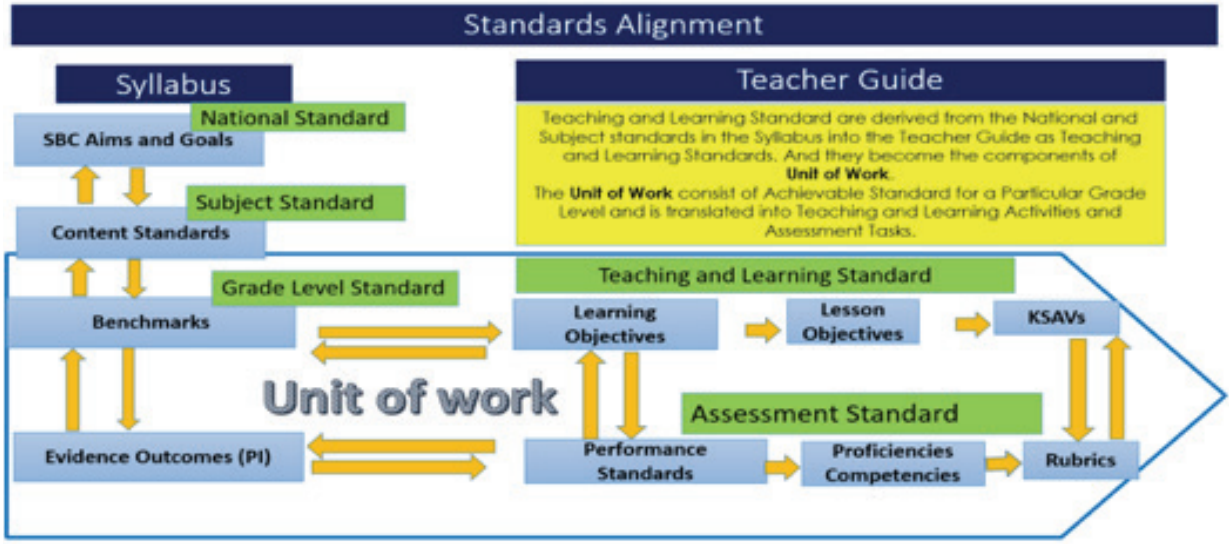
Standard Alignment

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 Standard 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 Unit of Work.

The Unit of Work (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; **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 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 the performance of PNG students 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 categorized 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.

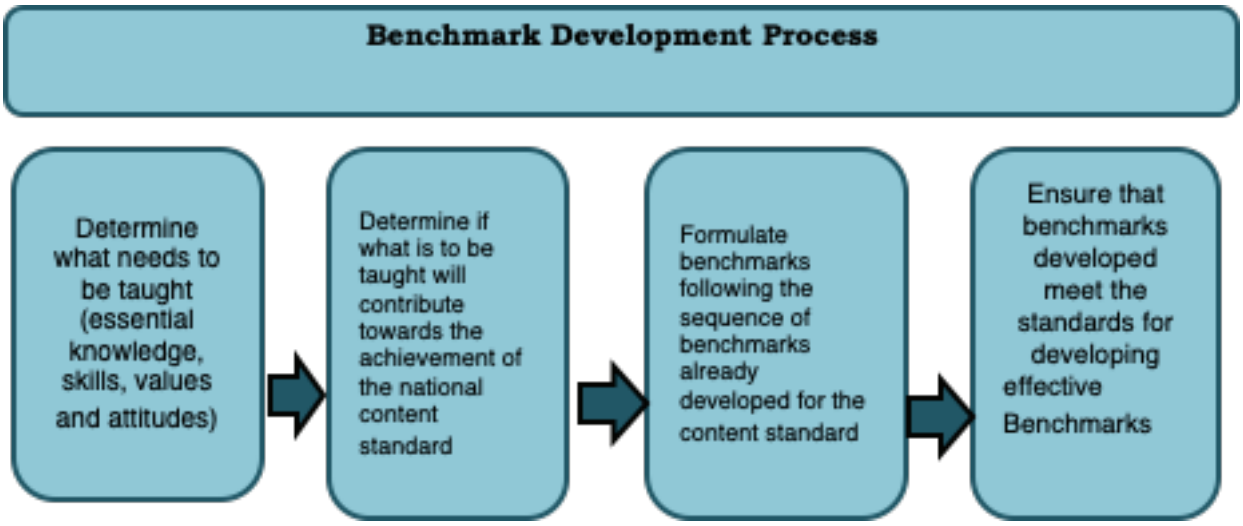
Development of Additional Benchmarks

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, 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 trailing and evaluating it, and
- Review and improve the solution.

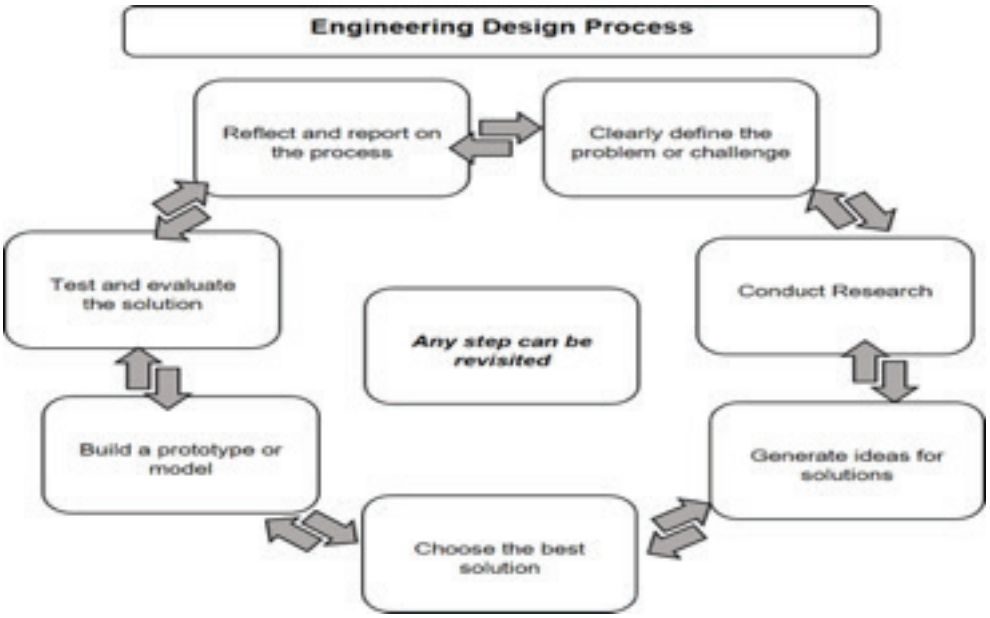
STEAM problem-solving processes go from simple and technical to advance and knowledge- based processes. However, regardless of the type of process used students should be provided opportunities to learn the essential principles and processes of problem solving and more significantly, to design and create 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.

This sequential engineering design process steps described above are 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 prioritized. In addition, concepts of other subjects needed for producing the product maybe 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 spentx 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 K50.00to make and the selling price is K75.00then 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

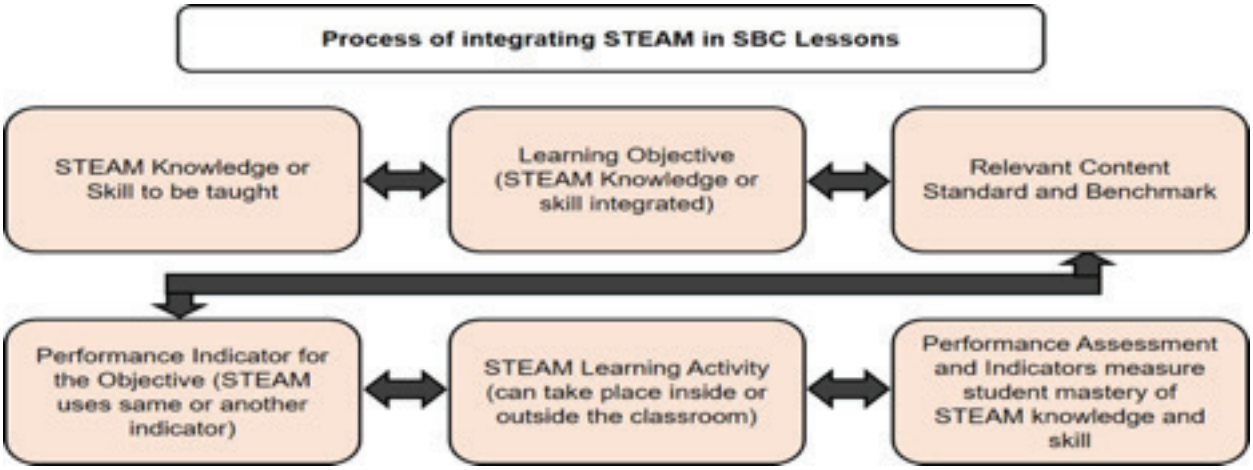
Effective STEAM lesson planning is the key to the achievement of the expected outcomes. STEAM Skills can be planned and taught using separate STEAM- based lesson plans or integrated into the standards- based lesson plans. To effectively do this, teachers should know how to write effective standards and 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 in 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 as 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 assesses 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;	
• Creativity • Branding • Communication skills • Technical expertise • Industry expertise • Critical thinking- • Information Technology skills • Innovation	• 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 strand., They include;	
• 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	• Textile construction Skills • Focus Communication skills (approachability, circumstantial awareness, diligence, efficiency, thoroughness • Multitasking skills • Attention to detail skills (multitasking , approachability, • Technical Skills for fashion designing • Decision making skills • Textile technology soft skills • logical thinking • collaboration • teamwork • Textile Design engineering • consumer Service • 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
• Sanctity of life	• Self-esteem
• Truth	• Self-reflection
• Aesthetics	• Self-discipline
• Honesty	• Self-cultivation
• Human	• Principal morality
• Dignity	• Self-determination
• Rationality	• Openness
• Creativity	• Independence
• Courage	• Simplicity
• Liberty	• Integrity
• Affectivity	• Enterprise
• Individuality	• Sensitivity
	• Modesty
	• Perseverance

2. Social Values

Core Values	Sustaining Values
• Equality • Kindness • Benevolence • Love • Freedom • Common good • Mutuality • Justice • Trust • Interdependence • Sustainability • Betterment of human kind • Empowerment	• 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

Types of Attitudes

Attitudes - Ways of thinking and behaving, points of view	
• Optimistic • Participatory • Critical • Creative • Appreciative • Empathetic • Caring and concern • Positive • Confident • Cooperative	• 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 their

Types of knowledge for Textile Technology

These are specific content knowledge for the subject. They include;	
• technical knowledge of fabric manufacturing, • yarn preparation, • textile dyeing and bleaching, • textile construction methods, • all the basics of fibre, warp, weft, weave etc.	• 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, (kalamkari,) screen printing, (stencilling), 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

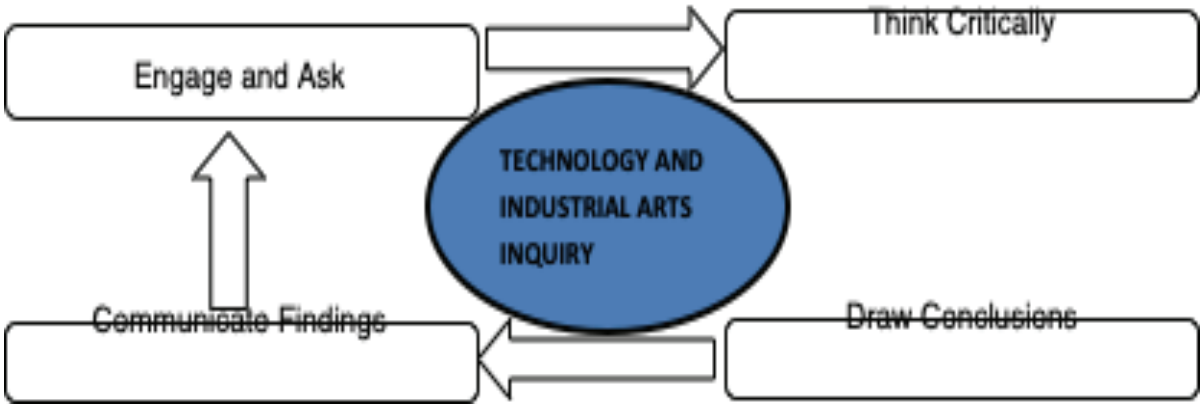
Technology & Industrial Arts Inquiry processes include: (Accept for the TG)
• Gathering information • Analysing information • Evaluating information • Making judgements • Taking actions • Instructional technology • Integration process • Project planning process • Organization of learning experiences

Technology & Industrial Arts - Inquiry Processes

Engage and Ask	How will I engage my students in the topic and prompt them to ask questions? • 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.
Think Critically	How will students access and analyse information about this topic? • 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.

Draw Conclusion	How will students synthesise ideas to answer the questions posed based on sources used? • 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.
Communicate Findings	How will students demonstrate what they have learned and take action on that learning? • 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 10 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 support or essential questions through investigations, collaboration and use 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	
• 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	• 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	
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, organize 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 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 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 Evaluate ness 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

- Familiarize yourself with the Technology First aid
- 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 catalyst of change for a competitive PNG but also, comparable to the world standards as global citizens.

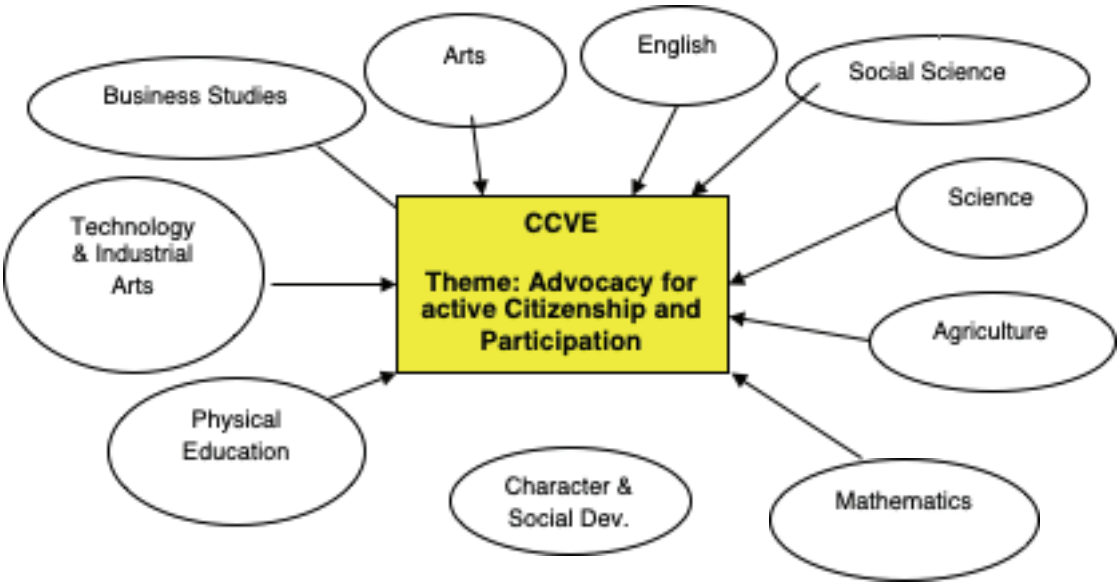
Engaging these three approaches in our curriculum will surely sharpen the knowledge and ability of each child, allowing them to see themselves as assets through their achievements and as agents of change contributing meaningfully to their country.

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 art-works 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
Character and Social Development		
English	**12.2.6.2**: Take advantage of technology's capacity to link to other information and to display information flexibly and dynamically. **12.5.4.2:** Give a clearly articulated, well-structured presentation on a complex topic.	How to display Citizenship information flexibly and dynamically with use of technology. Do a clearly articulated, well-structured presentation on active Citizenship
Mathematics	**12.4.4.3** Use appropriate technology to aid concept development as a tool for problem solving. (General Maths) **12.1.1.5** Apply quadratic equations to solve real-world situations and complex number problems. (Advance Math)	Application of quadratic equations to solve real-world situations as part of active citizenship Use appropriate technology as a tool for problem solving when they engage as active citizens in real life situations
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	**12.1.4.6.** Critique various national and global strategies, agenda, and actions for addressing climate change. (Geography) **12.2.4.2.** Examine the different ways the United Nations promote change and maintain stability in different regions of the world. (Political Science) **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)	Use of strategies to actively participate in addressing climate change Understanding of how UN maintains stability to be able to actively advocate for understanding of world peace Learn how common grounds of understanding and relationships minimizes differences in cultures, religions, and ethnic and ideological backgrounds and advocate for tolerance
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

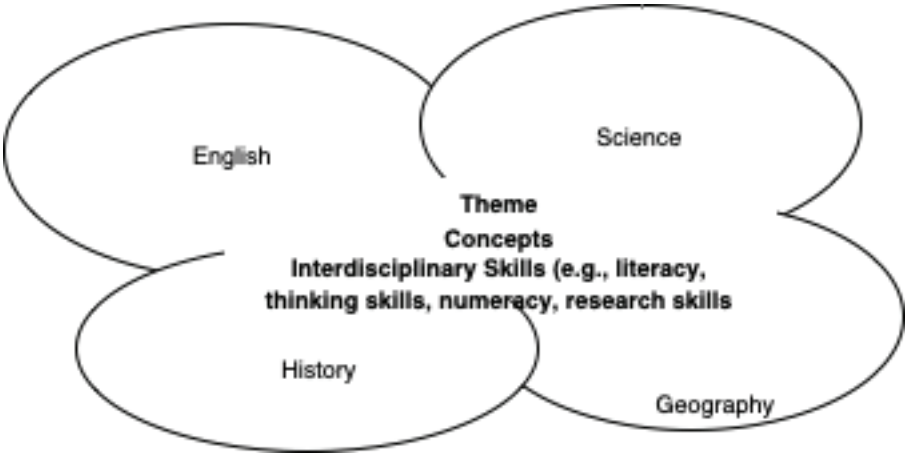
Planning for assessment will be a collaborative effort of all the subject teachers who wish their students to be part of the project with the CCVE subject Teacher as the overall coordinator of the Project and leading the Team. See the process of this assessment in the Assessment Section.

(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).

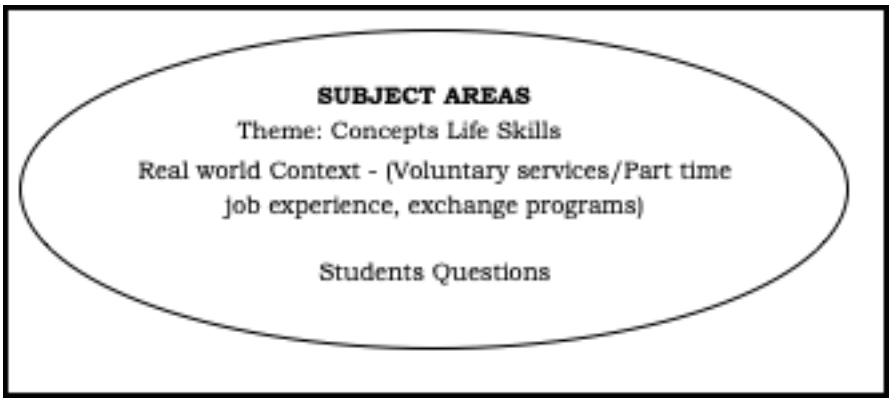
1. Teachers and students select a topic of study based on student interests, curriculum standards, and local resources.

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 for teaches 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 – T*extile Technology, Food Technology, Construction Technology, Communication Technology and Computer Technology*.

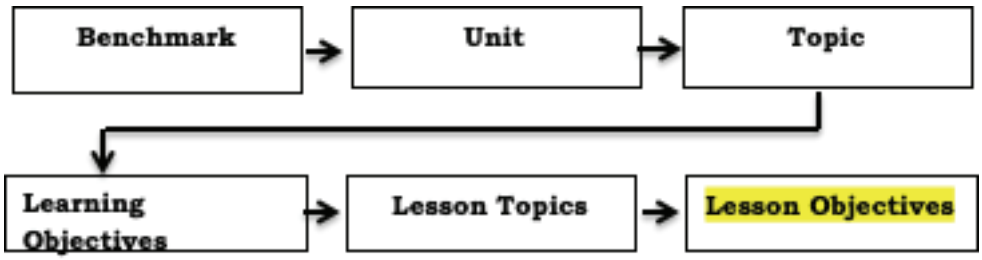
These strands embed the content that students are expected to learn and master at each grade and school level. National content standards are benchmarked at each grade level, which allows for essential KSAV's to be reinforced and expanded throughout the grades. Benchmarks show grade level expectations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

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
	2. **Computer Software**	5.2 Investigate and analyse computer systems and application, software, programing, algorithm, web design and databases, and develop and apply the skills and knowledge in the various software

Grade 10 Strand, Units and Topics

Strand 1: Textiles Technology

Unit 1: Fibres and Fabrics

Content Standard: CS1.1 Investigate the evolution, characteristics, designs and trends of fabrics and fabric designs, their construction, production, representation, regulation and marketing.

CS1.1 Investigate the evolution, characteristics, designs and trends of fabrics and fabric designs, their construction, production, representation, regulation and marketing.

Units	Benchmarks	Topics	Lesson Titles
Fibres and Fabrics	10.1.1.1 – Apply the knowledge and skills in drafting a pattern using appropriate tools, equipment and garment patterning techniques.	Pattern Drafting	1. What is pattern drafting? 2. Body measurements and Pattern Layout 3. Tools and equipment used in pattern drafting
	10.1.1.2 – Select an appropriate fibre and or fabric to produce a textile and clothing product.	Fabric Construction	1. What is fabric construction? 2. Woven fabrics 3. Knitted and matted fabrics
	10.1.1.3 – Discuss social, economic, cultural, environmental and technological factors influencing consumer selection of textiles and garments.	Factors influencing consumer selection of textiles and garments	1. Social and economic factors 2. Cultural and environmental factors 3. Technological factors
	10.1.1.4 – Demonstrate adherence to safe practices and procedures for facilities, processes, tools and equipment	Safe practices and procedures	1. Safe practices and procedures in the sewing room. 2. Who should practice safety and when?
	10.1.1.5 – Apply the design brief to create textile solutions	Creating textile solutions using the design brief	1. What is a design brief? 2. Instructions and project planning 3. Project

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 10.1.1.1 Apply the knowledge and skills in drafting a pattern using appropriate tools, equipment and garment patterning techniques.

Topic 1: Pattern Drafting

Essential Questions:

1. What is your definition of pattern drafting?
2. What are some tools and equipment used in pattern drafting?
3. How is garment patterning important in pattern drafting?

Essential Knowledge, Skills and Values/Attitudes

Knowledge	Drafting a pattern, , using equipment, garment patterning techniques.
Skills	Apply and Using
Context	Historical Influence
Attitudes/Values	Patience, Care handling, accuracy and Attention to detail

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

Learning Objectives

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

- Explain how to apply knowledge and skills in pattern drafting and
- use appropriate tools, equipment and garment patterning techniques.

Content Background **-Pattern Drafting**

A pattern is a hard paper which is made by following each individual component for a style of garment. It is simple a template from which the parts of a garment are traced onto fabric before being cut out and assembled. It is one of the most important parts of garment construction.

There are different types of patterning techniques;

(a) Standardized paper pattern – Patterns prepared using standardized body measurements.

(b) Individualized paper pattern – The measurement of a particular person is taken and a pattern is prepared using this individual measurements. This pattern will not fit any other person.

(c) Final paper pattern – Once the individual is satisfied with the individual patterns, they are made into final paper patterns.

(d) Block paper pattern – Normally these are made with standard sizes with thick cardboard. These are mostly used in the garment industry.

(e) Commercial paper pattern – The paper pattern designs are available in ready made forms. They are enclosed in an envelope with an instruction sheet. The instruction sheet will provide information about fabric selection and preparation, marking cutting and steps for sewing. These patterns are made from tissue paper which is lightweight and easy to pack.

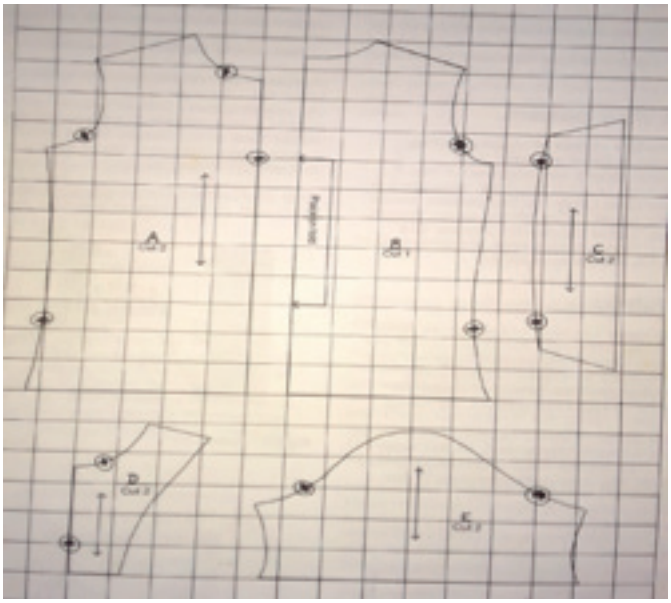
Pattern drafting is a very highly skilled technique which requires one's technical ability, sensitivity for design interpretation and a practical understanding of garment construction. Pattern making is a bridge function between design and production. Pattern drafting is defined as a technique or method of drawing patterns on paper with accuracy based on the body measurements. This is an efficient and economical method and can be manipulated to create the pattern for different styles.

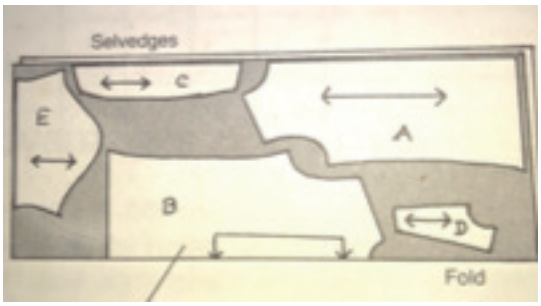
Basic principles of pattern drafting

- To achieve an accurate and precise pattern draft, appropriate tools and equipment should be used.
- Patterns must be created larger than actual body measurement to permit free body movements, ease of action and comfort in wearing.
- For a symmetric garment (the right and left sides of the body panel are similar), the paper could be made only for half front and half back.

Pattern Layout

Pattern layout is the placement of a pattern on the fabric, in an economical manner that is without wasting fabric. All the patterns should be arranged properly following the grain of the fabric.

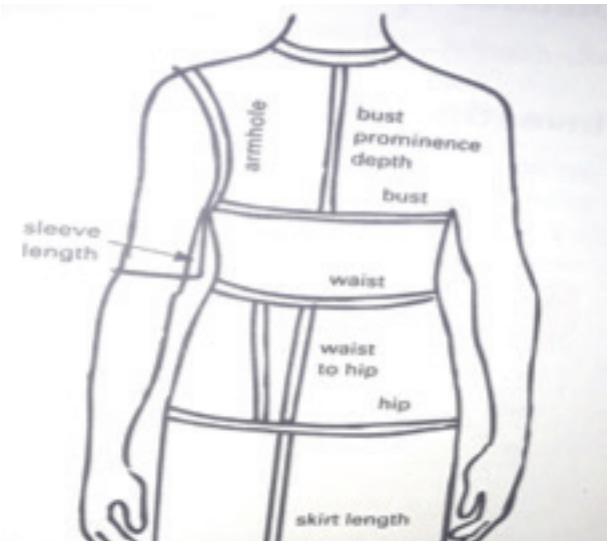




↑How to layout pattern pieces economically on the fabric.

←Pattern pieces for a shirt on squared paper

How to layout pattern pieces economically on the fabric.



BODY MEASUREMENTS

It is essential to take accurate body measurements especially when making patterns for clothes. You will need a tape measure which because of its flexibility of measuring around the curves of the body, something a ruler cannot do. The measurements that are required will depend on the kind of garment you are making, for example you will need different measurements for a blouse than trousers. To get the most accurate measurements, it is always wise to get someone else to take your measurements. Always make sure the tape measure is firm against the body but not too tight.

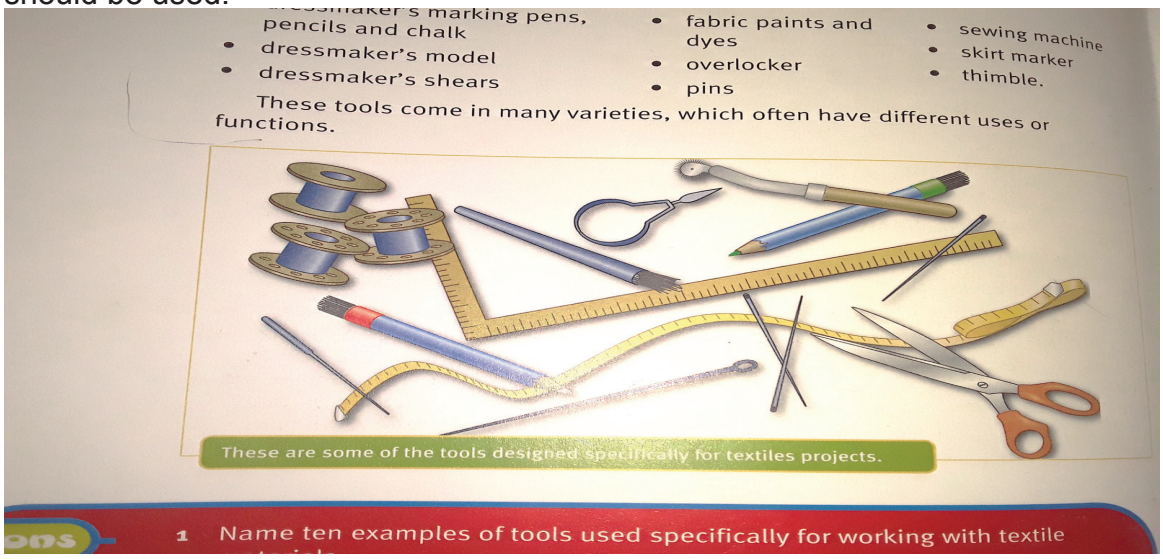
Measuring body parts

Here are common measurements for pattern drafting;

1. *Neck* – Measure around the neck midway between the chin and the base of the neck.
2. *Bust* – Keep the tape measure level as you measure around the fullest part of the bust. Add 3-5cm to this measurement before drafting the bodice.
3. *Depth of bust/chest prominence* – Measure from the front base of the neck to level with where the chest or breasts protrude the most.
4. *Breast separation* – The distance between the two breast nipples.
5. *Underarm* – From the armpit to the waist level.
6. *Shoulder* – From the side of the neck to the end of the shoulder.
7. *From length of bodice* – From the base of the neck at the front to the waist.
8. *Back length of bodice* – From the nape of the neck at the back to the waist.
9. *Waist* – Around the smallest part of your natural waist line.
10. *Armhole* – Over the shoulder and around the arm.
11. *Sleeve length* – From the armpit to the required sleeve length.
12. *Hip* – Around the fullest part of the hip, keeping the tape measure level.
13. *Waist to hip* – Record the measurement from the waist to where the hip measurement was taken.
14. *Body rise* – Person should be seated on the chair. Measure from the side waist to the surface of the chair.
15. *Skirt length* – From the waist from to the required skirt length.
16. *Pants length* – From the side waist to the required pants length.

Pattern Drafting Tools and Equipment

To achieve an accurate and precise pattern draft, appropriate tools and equipment should be used.



Some of these tools can be used for pattern drafting

Tools help you to work with raw materials and manipulate them into final products. They are usually designed for specific tasks and to achieve particular results. Some tools can be used for a variety of different products and materials. For example a scissors can be used to cut cardboard, paper, thread or fabric.

In order to make a pattern, you will need;

1. **A large sheet of clean paper** (newspaper is readily available in many homes).
2. **Drawing tools** such as; a pencil, a pencil sharpener and an eraser.
3. **Measuring tools**; a ruler (is needed for drawing lines), a tape measure (is used for measuring distances), a T-square or a set square (is used to draw lines at right angles) and a flexible or French curves (is used for measuring armholes and neck lines).
4. **Cutting tools;** a scissors (needed for cutting out the pattern after it has been drafted).
5. **Tracing wheels** (used for tracing markings on the sewing patterns onto the fabric without the use of tracing paper).
6. **Tacking pins** (used to hold the pattern and fabric together for cutting).

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 pattern drafting and pattern layout?

Teaching Strategies

Teacher introduces pattern drafting and pattern layout. He or she also should stress on the importance of drafting a pattern and economically laying out the pattern on a fabric for cutting making reference of examples of simple patterns that can be drafted.

Learning Strategies

Discover different types of basic or simple patterns that is used in pattern drafting and how to lay out a pattern for cutting.

Activity 1

Draw a picture of the shirt you (students) are wearing. If all the stitching were to fall out, how many fabric pieces would you have? Decide on the number of pattern pieces that were used to make this shirt. List and name the pieces.

Activity 2

Draw the patterns of these shirt parts in your exercise book labelling them correctly.

Activity 3

In groups design an outfit for one person using newspaper.

Resources

Norman P, Salley K (2010) Outcomes Edition for PNG – Book 1 Grade 9/10, Oxford University Press Melbourne (page 201,202)

Norman P, (1988) Home Economics for PNG – Book 3, Pearson Education, Melbourne (page 71, 72

Lesson 2: Body Measurements

Teaching Strategies

Introduce and explain how to take body measurements and pattern layout. Engage students to take body measurements stressing on the importance of accuracy especially in order to make patterns for clothes.

Learning Strategies

Discover how to measure body parts and the common measurements needed for measuring the body parts and draft different patterns of clothing..

Activity 1

Brainstorming activity on discussing some ways of how to measure body parts, record the measurements of persons correct before the dress or outfit is sewn.

Activity 2

Draw a table containing the list of body measurements, then in pairs take and record body measurements.

Activity 3

Compare measurements with those of some who is similar in size.

Resources

Norman P, Salley K (2010) Outcomes Edition for PNG – Book 1 Grade 9/10, Oxford University Press Melbourne (page 203)

Lesson 3: Tools and Equipment used in Pattern Drafting

Teaching Strategies

Teacher introduces the different types of pattern drafting tools and equipment and explain their specific functions.

Learning Strategies

Identify types of pattern drafting tools and equipment and explain their specific functions.

Activity 1

List all tools and equipment used for drafting a pattern and categorised or group them

Activity 2

In pairs, discuss designs for a sewing bag for storing basic sewing items for sewing lessons. Sketch the pattern, include all measurements.

Activity 3

Correctly and economically layout the pattern on a piece of fabric, cut and construct sewing bag.

Resources

Norman P, Salley K (2010) Outcomes Edition for PNG – Book 1 Grade 9/10, Oxford University Press Melbourne (page 205,206)

Sullivan C, (2004) High Textile - Stage 4, Reed International Books Australia, Melbourne (page 32-37)

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 10.1.1.2 Select an appropriate fibre and or fabric to produce a textile clothing product.

Topic 2: Fabric Construction

Essential Questions:

1. Why fabric construction?
2. What are the types of fabric construction methods?
3. How is a fibre transformed into a fabric?

Knowledge	Appropriate fibre and fabric for a textile or clothing product
Skills	Select and Produce
Context	From evolution
Attitudes/Values	Acceptance of different types of clothing , Care handling, Creativity, Imagination and Decision Making

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

Learning Objectives

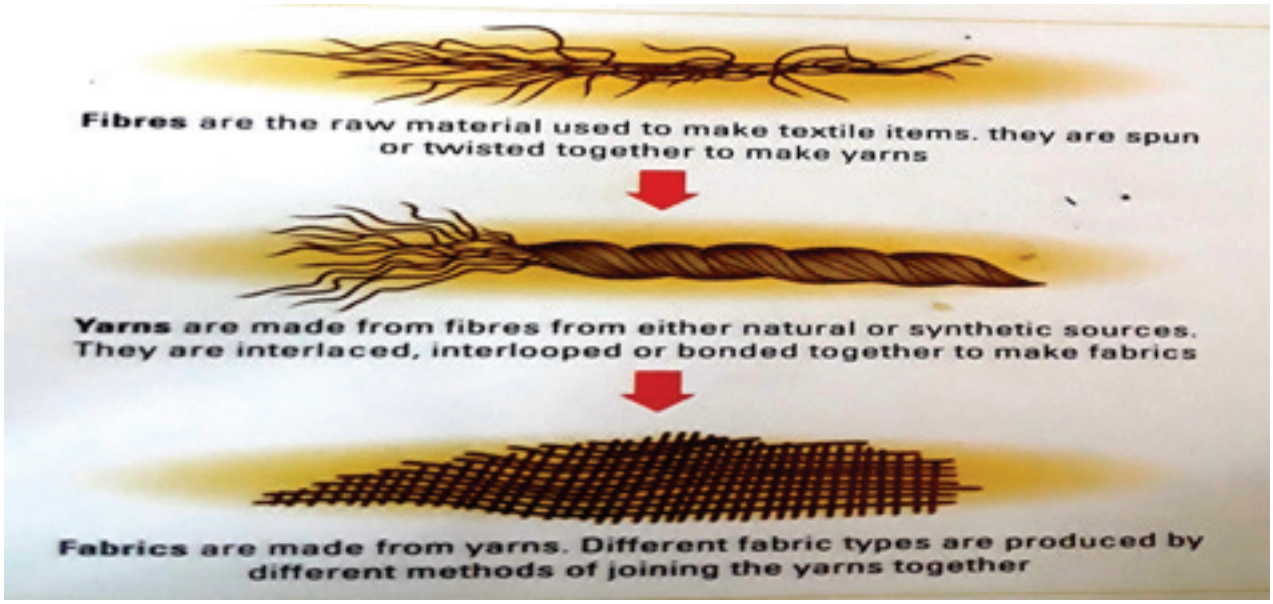
By the end of this topic, the students will be able to;

1. Differentiate between the different types of fibres and fabrics
2. Produce a textile and clothing product

Content Background **Fabric Construction**

Fabric construction involves the conversion of yarns, and sometimes fibres into a fabric having characteristics determined by the materials and methods employed. Fabrics are categorized according to their method of construction.

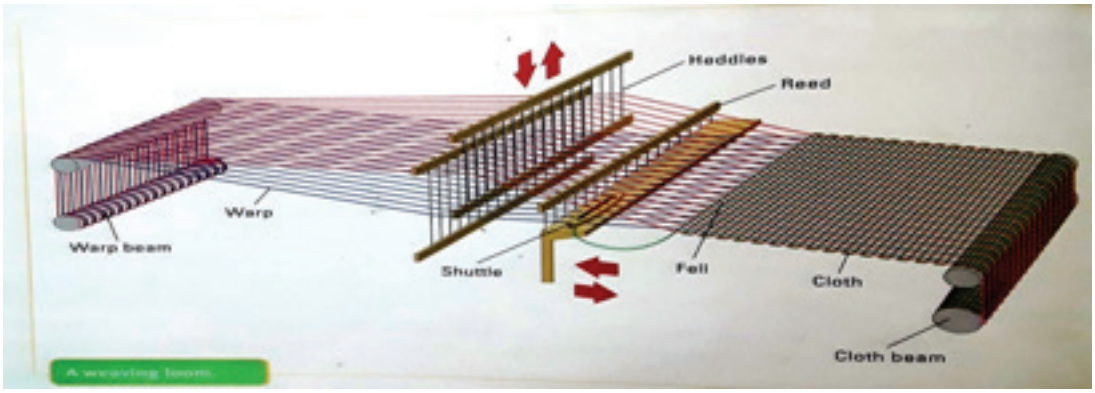
Fabric is made from yarns which in turn are made from fibres.



Fibres and yarns are interlaced (woven), interloped (knitted) or bonded together (nonwoven) to make fabrics. Each method of joining the yarns or fibres together creates a different type of fabric.

Different fabric types are available for use in design projects. They include;

1. Woven fabrics,
2. Knitted fabrics and
3. Matted or Non-woven fabrics.



Woven Fabrics

Woven fabrics are produced by the process of weaving. Weaving is the interlacing of two or more yarns using a machine called a loom. Generally woven fabrics a strong fabrics. To weave yarns together the loom is set up yarns running lengthwise from the top to the bottom of the loom. This are called warp yarns. A second yarn is then threaded from side to side, over and underneath the warp yarns, to make fabric. This is called the weft yarn.

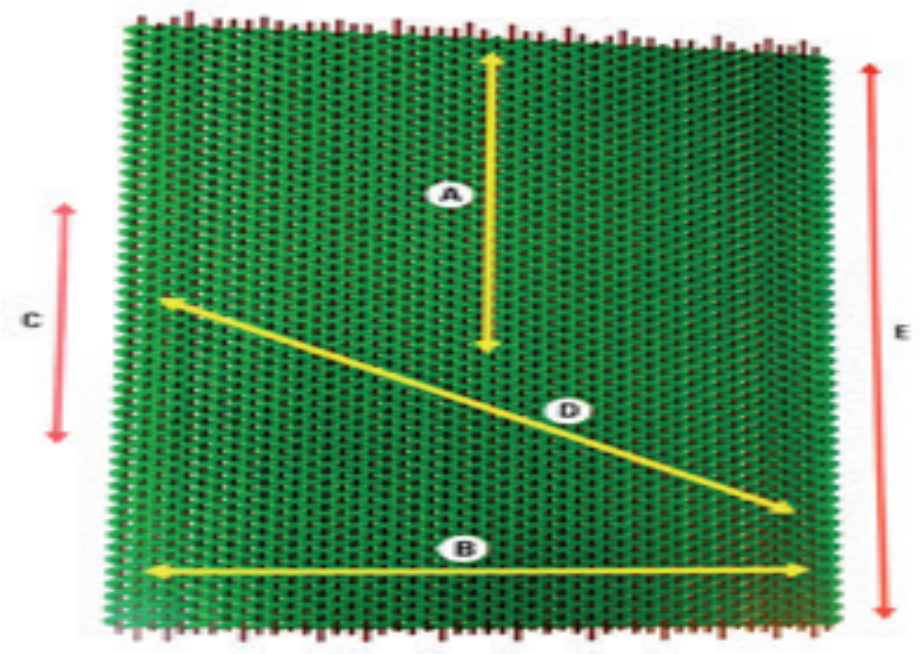
A - Warp: lengthwise yarns, parallel to selvedge

B – Filling: crosswise yarns, perpendicular to the selvedge

C – Selvedge: closely woven fabric edges; will not fray

D – Bias: extendible diagonal of a fabric

E – Lengthwise fold



Types of Weaves

Plain weave

Twill weaves

Basket weave

Knitted Fabrics

Knitting is the process used to make fabric by looping together yarns with the set of needles. There are two main types of knitting are weft knitting and warp knitting.

Weft knitting

Warp knitting

Matted Or Non-Woven Fabrics

In knitted or woven fabrics fibres are first twisted or spun together to make yarn, then the yarn is woven or knitted to make fabric. Non-woven fabrics, however, are produced directly from fibres. The fabric is neither nor woven together.

Instead, non-woven fabrics are made by bonding – gluing, heating or stitching - fibres together. Because fibres do not need to be spun or twisted to make this type of fabric, non-woven fabrics can be made from very small lengths of fibre.

←An example of a non-woven fabric

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 Fabric Construction?

Teaching Strategies

The teacher is to deliver teacher guided questions to establish in the students a starting point and guide them into achieving the objective in the identified lesson topics. Introduce the common terms and discuss how they relate to each other.

Learning Strategies

Students are given the opportunity to explore by working closely with other students to differentiate between common terms in the topic to familiarise themselves.

Activity 1

Cut a 15cm long strand of knitting wool. Gently untangle the strand of wool to see how small the fibres are. Get 2 of these small fibres and paste it in your exercise book. Label it as FIBRE.

Activity 2

Cut another 15cm long strand of knitting wool. Paste this also in your exercise book and label it as YARN. This is a yarn because a number of fibre were bonded together to form it and also because it is stronger.

Activity 3

Using a knitting hook and some wool, knit a small mobile case, a placemat, etc. which will represent a FABRIC.

Resources

High Tech TEXTILES Stage 4 by Cathryn Sullivan

Lesson 2: Woven Fabrics

Teaching Strategies

Teacher takes students through the process of weaving and how it is done making special mention of the loom and how this special machine helps in the creation of woven fabrics.

Learning Strategies

Students will learn how the loom works and also identify the different kinds of weaves and their properties. They also get to practice weaving different kinds of weaves.

Activity 1

Using two different coloured papers, measure and cut 1cm long strips of paper. You will need at least three sets of each coloured strips of paper. Make a plain weave and paste in your exercise book. Label it as PLAIN weave.

Activity 2

Make a twill weave and paste in your exercise book. Label it as TWILL weave.

Activity 3

Make a basket weave and paste in your exercise book. Label it as BASKET weave.

Resources

High Tech TEXTILES Stage 4 by Cathryn Sullivan

Lesson 3: Knitted and Matted Fabrics

Teaching Strategies

Teacher will define matting (non-woven) and knitting. Differentiate between the weft and the warp knitting processes

Learning Strategies

Students are to explore the different kinds of knitting and matting processes.

Activity 1

Explain the difference between knitted fabrics and woven fabrics.

Activity 2

Name three examples of knitted fabrics.

Activity 3

Compare and contrast weft knitting to warp knitting.

Resources

High Tech TEXTILES Stage 4 by Cathryn Sullivan

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 10.1.1.3 **Discuss social, economic, cultural, environmental and technological factors influencing consumer selection of textiles and garments.**

Topic 3: Consumer selection of textiles and garments.

Essential Questions:

1. Why is it important to consider consumer selection?
2. What can businesses do to find out what consumers desire?
3. How do social, economic, cultural, environmental and technological factors influence consumer selection in textile and garments?

Concepts: Consumer selection of textiles and garments

Knowledge	Consumer selection of textiles and garments.
Skills	Discuss
Context	Social, economic, cultural, environmental
Attitudes/Values	Influential behaviours and critical assessment and Respect

Essential Skill: Discuss

Value: Critical Assessment and Respect

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

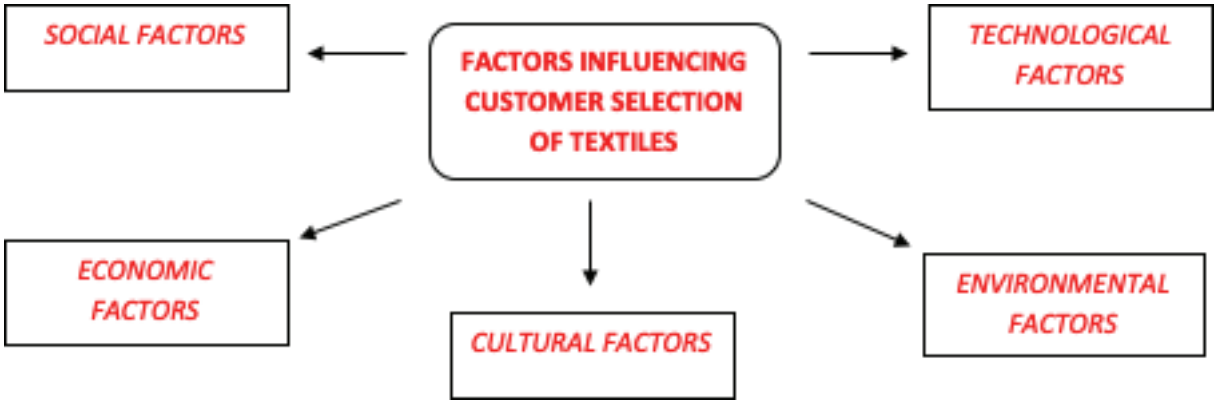
Learning Objectives

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

- Describe the significance of consumer selection of textile and garments
- Discuss and list factors in relation to social, economic, cultural, environmental and technological

Content Background **CONSUMER SELECTION**

A consumer is a person who exchanges money for goods and services. In today's world, consumers exchange a great deal of money for textile goods such as clothing and even textile services like dry cleaning. Throughout time, textile products have been used extensively by people in their everyday lives. For clothing, comfort, decoration, protection, leisure and safety, textile products have always and will always be in demand. So what are some factors that affect a consumer's selection of textiles?



SOCIAL FACTORS

Social factors are the facts and influences that influence an individual's personality, attitudes and lifestyle. Social factors affect consumer behaviour significantly. Every individual has someone around that can influence their buying decisions. The important social factors that can have an impact socially on a customer's selection of textile and garments would be; reference groups, family, role and status.

ECONOMICAL FACTORS

A consumer's budget greatly influences their choice of textile products. For some people, money is no object so they are able to buy expensive textile goods such as silk sheets and linen suits. For others money is quite difficult to come by so they must budget for the things they want or need. On a more economic scale factors such as inflation, unemployment, interest rates and consumer confidence can have an impact on the level of demand for consumer goods.

CULTURAL FACTORS

Culture as we all know can be simply defined as 'a way of life.' It is established by the way in which a particular group of people live. A person's culture is made up of the customs, traditions and beliefs of the society or group to which they may belong. One's culture is also determined by their religion and/or religious beliefs.
One's culture plays a very important role in their selection of textile products.

Many cultural groups are identified by the clothes they select and wear, for example;

(a) Muslim women cover their bodies and veil their faces

(b) Jewish men cover their heads during times of prayer

(c) European women wear black to mourn loved ones

(d) Indian women wear saris

(e) Scottish men wear kilts on special occasions

(f) Papua New Guinean widows wear black for some time after husbands pass away,

ENVIRONMENTAL FACTORS

The environment in which a person lives in also affects their selection of textile products and garments.

(a) The Climate – People who live in very hot and humid places would normally wear loose- fitting clothes in order to keep themselves cool, light-coloured garments in an effort to keep as cool as possible. On the other hand, those in colder places would normally lean towards bulky and thicker clothes to keep warm in the freezing climate.

(b) The Location – If you are camping near the water on a hot summer's night, you may choose to sleep under a nylon mosquito net to avoid getting bitten. Or you may choose to take an umbrella with you on a picnic to keep the sun off you and your food.

TECHNOLOGICAL FACTORS

Technological factors also affect consumer selection of textile products and garments. For example, the scarcity of certain materials and technology such as overlocker sewing machine can influence a Papua New Guinea woman's selection of 'meri blouse' because she may want the trimmed edges of her blouse neatened.

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: Social and Economic Factors

Teaching Strategies

Introduce students the different kinds of factors that influence the selection of a consumer when buying goods and services. Encourage the students to reflect back to their homes and communities to find examples of such situations to better understand the concept.

Learning Strategies

Work in pairs or in small groups to identify examples of factors influencing customer selection of textiles reflecting back to their homes and communities.

Activity 1

Give three examples of how SOCIAL FACTORS influence customer selection of textiles.

Activity 2

Give three examples of how ECONOMIC FACTORS influence customer selection of textiles.

Resources

Ridgewell T (1998), Textiles and Design, Addison Longman Australia, Pty Ltd, South Melbourne (pages 132-137)

Lesson 2: Cultural and Environmental Factors

Teaching Strategies

Introduce students the different kinds of factors that influence the selection of a consumer when buying goods and services. Encourage the students to reflect back to their homes and communities to find examples of such situations to better understand the concept.

Learning Strategies

Work in pairs or in small groups to identify examples of factors influencing customer selection of textiles reflecting back to their homes and communities.

Activity 1

Give three examples of how CULTURAL FACTORS influence customer selection of textiles.

Activity 2

Give three examples of how ENVIRONMENTAL FACTORS influence customer selection of textiles.

Activity 3

Do a concept map to show your interpretation of the key factors that have an impact on textile industries at the global or regional levels.

Resources

Ridgewell T (1998), Textiles and Design, Addison Longman Australia, Pty Ltd, South Melbourne (pages 132-137)

Lesson 3: Technological Factors

Teaching Strategies

Introduce students the different kinds of factors that influence the selection of a consumer when buying goods and services. Encourage the students to reflect back to their homes and communities to find examples of such situations to better understand the concept.

Learning Strategies

Work in pairs or in small groups to identify examples of factors influencing customer selection of textiles reflecting back to their homes and communities.

Activity 1

Give three examples of how TECHNOLOGICAL FACTORS influence customer selection of textiles.

Activity 2

Name another factor influencing customer selection of textile not mentioned or covered in this topic and give three examples.

Resources

Ridgewell T (1998), Textiles and Design, Addison Longman Australia, Pty Ltd, South Melbourne (pages 132-137)

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 10.1.1.4 Demonstrate adherence to safe practices and procedures for facilities, processes, tools and equipment

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Topic 4: Safe Practices and Procedures

Essential Questions:

1. Why study safety?
2. How is safety practiced in a sewing facility?
3. Who should practice safety?
4. When is the right time to practice safety?

Concepts: Facilities, Processes, Tools and Equipment

Essential Knowledge Skills , attitudes and values

Knowledge	safe practices, processes, and procedures for facilities, tools and equipment
Skills	Demonstrate
Context	School environment
Attitudes/Values	Care Handling, Respect, Attentiveness and Responsible

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

Learning Objectives

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

- Demonstrate good knowledge of safe practices and procedures for facilities.
- Identify specific processes for the using drafting and pattern making tools. tools, and equipment.

Content Background SAFETY

There is a saying that goes, Think Safe, Act Safe, and Stay Safe! This simply means that safety is paramount. Safety should be everyone's business. The simple fact is that if we do not think and act safely we have accidents. Some accidents are minor and cause small inconveniences, such as pricking a finger with a tacking pin while others are more serious such as leaving an iron on and causing a fire.

In our everyday life, symbols, signs and common sense help keep us safe.
For example, a red light at a traffic light means STOP while a green light means GO.

If you ignore these simple road rules, you will most like crash into another oncoming vehicle. When designing and constructing textile products, like everything we do, it is important to 'think safe, act safe and stay safe.' It is all a matter of common sense.

WHO SHOULD PRACTICE SAFETY AND WHEN?

Safety is and must always be a concern in the sewing room where we use sharp objects such as needles, pins and scissors, and electrical equipment such as sewing machines and irons all the time. It is very important that safety must be emphasised at all times and students must act responsibly and work in a careful manner to create a safe environment for everyone.

Safety in a sewing room is important to minimise accidents.

- Be very careful when using sharp objects and always store them away after use.
- When using an iron, it is very important to always switch off the iron after use because it can cause a fire that will burn down the building.
- Do not play in the sewing room.
- Before you leave the sewing room, make sure all the equipment have been packed away in their correct places and all the power points have been switched off.
- Always clean up after the lesson. Keep the room clean and tidy at all times.
- Students should only enter the sewing room if a teacher is present.
- Carry and handle tools in a safe manner.
- Report all classroom hazard or disobedience of the safety practices to the teacher immediately.

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: Safe practices and procedures in the sewing room.

Teaching Strategies

Teacher will introduce what safety is to the students and stress on the importance of practicing safety in the sewing room. Teacher's past experiences of accidents in the sewing room due to negligence of safety practices can be told to help emphasise the importance of practicing safety at all time.

Learning Strategies

Students must be given the opportunity to find out the accidents that can happen in the sewing room if they do not practice safety and list ways in which these accidents can be avoided.

Activity 1

Brainstorm what rules are needed for sewing classes.

Activity 2

Explain to what extent these standards of behaviour are relevant to a home sewing situation?

Activity 3

Share your list you're your classmates.

Resources

Norman P, Salley K (2010) Outcomes Edition for PNG – Book 1 Grade 9/10, Oxford University Press Melbourne (page 158)

Ridgewell T (1998), Textiles and Design, Addison Longman Australia, Pty Ltd, South Melbourne (pages 120)

Lesson 2: Who should practice safety and when?

Teaching Strategies

Teacher will introduce what safety is to the students and stress on the importance of practicing safety in the sewing room. Teacher's past experiences of accidents in the sewing room due to negligence of safety practices can be told to help emphasise the importance of practicing safety at all time.

Learning Strategies

Students must be given the opportunity to find out the accidents that can happen in the sewing room if they do not practice safety and list ways in which these accidents can be avoided.

Activity 1

List 2 sewing tools available in the sewing kit at school and explain how to care for them.

Activity 2

Describe how you will store these items if you had all of them.

Activity 3

What are the properties, functions and costs of the various items?

Resources

Norman P, Salley K (2010) Outcomes Edition for PNG – Book 1 Grade 9/10, Oxford University Press Melbourne (page 158)

Ridgewell T (1998), Textiles and Design, Addison Longman Australia, Pty Ltd, South Melbourne (pages 120)

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 10.1.1.5 Apply the design brief to create textile solutions.

Topic 5: Creating Textile Solutions using the Design Brief

Essential Questions:

1. What is a design brief?
2. How can design brief be used in creating textile solution?
3. Why use a design brief?

Concepts: Design Brief

Essential Knowledge Skills, attitudes and values

Knowledge	Design brief and textile solutions
Skills	Application of design briefs
Context	Customer locality
Attitudes/Values	Appreciation of design briefs

Essential Skill: Apply and Create

Value: Appreciating, Valuing and Attention to Detail

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

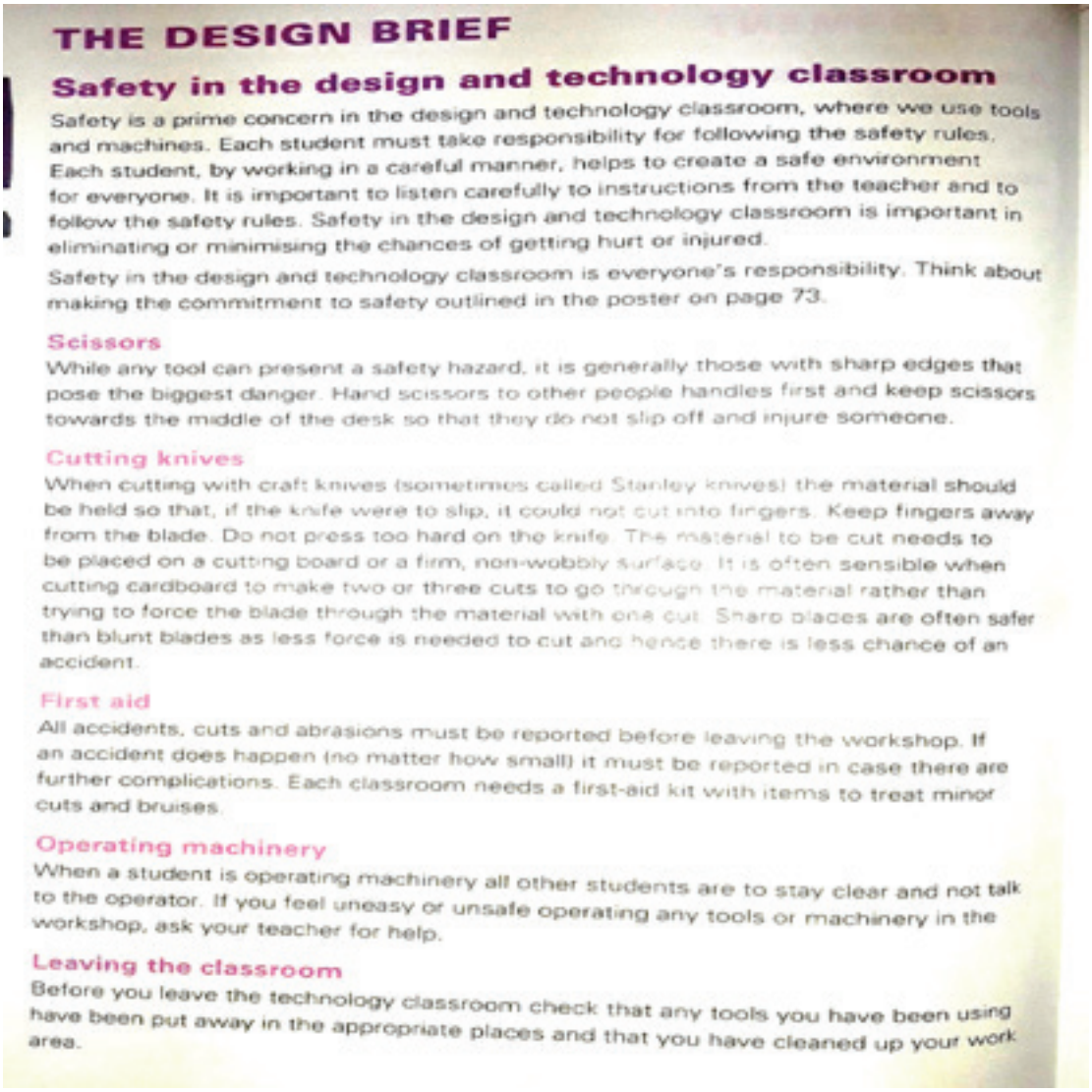
Learning Objectives

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

1. Explain what a design brief is
2. Demonstrate how the design brief can be used to create a textile solution

Content Background **THE DESIGN BRIEF**

Before the design process can begin, there must be a reason for it. A problem, need or opportunity should be identified and written down. The first part of the design brief is called the situation. This is the problem that needs to be solved. It may be something that bothers you or it may be a problem that the industry needs to address in order to help the environment or the people. In all of life's situations, you will always have problems that need to be solved.



THE DESIGN BRIEF

Safety in the design and technology classroom

Safety is a prime concern in the design and technology classroom, where we use tools and machines. Each student must take responsibility for following the safety rules. Each student, by working in a careful manner, helps to create a safe environment for everyone. It is important to listen carefully to instructions from the teacher and to follow the safety rules. Safety in the design and technology classroom is important in eliminating or minimising the chances of getting hurt or injured.

Safety in the design and technology classroom is everyone's responsibility. Think about making the commitment to safety outlined in the poster on page 73.

Scissors

While any tool can present a safety hazard, it is generally those with sharp edges that pose the biggest danger. Hand scissors to other people handles first and keep scissors towards the middle of the desk so that they do not slip off and injure someone.

Cutting knives

When cutting with craft knives (sometimes called Stanley knives) the material should be held so that, if the knife were to slip, it could not cut into fingers. Keep fingers away from the blade. Do not press too hard on the knife. The material to be cut needs to be placed on a cutting board or a firm, non-wobbly surface. It is often sensible when cutting cardboard to make two or three cuts to go through the material rather than trying to force the blade through the material with one cut. Sharp blades are often safer than blunt blades as less force is needed to cut and hence there is less chance of an accident.

First aid

All accidents, cuts and abrasions must be reported before leaving the workshop. If an accident does happen (no matter how small) it must be reported in case there are further complications. Each classroom needs a first-aid kit with items to treat minor cuts and bruises.

Operating machinery

When a student is operating machinery all other students are to stay clear and not talk to the operator. If you feel uneasy or unsafe operating any tools or machinery in the workshop, ask your teacher for help.

Leaving the classroom

Before you leave the technology classroom check that any tools you have been using have been put away in the appropriate places and that you have cleaned up your work area.

A sample Design Brief

Since we do not have unlimited knowledge, money, time and materials, we must also establish the limits on how we solve the problem. By analysing the situation, we are able to develop specifications and criteria for success which are then listed in the brief. This criterion is always prepared by the teacher to make sure that you cover certain knowledge and skills.

They give you a clear idea of where you are heading with the project and provide guidelines to evaluate your progress. If this is not done, there are bound to be misunderstandings and arguments about whether t good or not.

PROJECT PLANNING

The most important step in any creative process is the project plan. The success of the project largely depends on how thoroughly you plan it. Planning should be completed before you commence your project and involves a few simple steps.

The problem and design brief are intended to give you a clear understanding of exactly what you are being asked to do. Planning helps to make sure that the original problem is solved and the completed article functions as you intend it to.
Planning provides the opportunity for you to check that you have included all the design brief criteria in your design and helps you to minimise the number of frustrating mistakes.

Project Planning Steps

There are 5 steps to follow when planning a project as shown below.

PROJECT PLANNING

1. *IDEAS – Collect ideas from lots of sources.*
2. *SKETCHES – Draw rough sketches of possible designs.*
3. *DESIGN-MAKING – Conduct any investigations and tests that are necessary for the decision-making process.*
4. *DETAILED DESIGN – Present a detailed design of the project.*
5. *CHECK THE DESIGN BRIEF – Check the design brief and modify the design if necessary*

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 a Design Brief?

Teaching Strategies

Teacher will introduce and explain what a design brief is making special mention of how it works, why use it, and when to use it.

Learning Strategies

Students will discover about design brief, how it works, why use it, and when to use it

Activity 1

Copy the Safety Rules on page 73 of the Home Economics Book 1 Outcomes Edition into your exercise book and sign at the bottom in the space with today's date.

Activity 2

Think of your own particular classroom where you do Design and Technology activities. Decide what risks exist and what safety practices are needed to prevent injury.

Activity 3

Ask a health worker in your community about appropriate first-aid and safety equipment for a Design and Technology classroom.

Resources

Norman P, Salley K (2010) Outcomes Edition for PNG – Book 1 Grade 9/10, Oxford University Press Melbourne (page 72)

Seppanen G (2004) Textiles and Sew On – An introduction to Textile Studies for Secondary Students, Oxford University Press, Australia (pages 156-157)

Lesson 2: Instructions and Project Planning

Teaching Strategies

Teacher will introduce and explain what project planning is stressing on the importance of planning before commencing on a project.

Learning Strategies

Students will in pairs or threes discover the five main steps to follow when planning a project.

Activity 1

In pairs discuss and list two factors affecting design.

Activity 2

Some designers believe that 'form follows function'. Use the Internet to research this statement and discuss what you think in small groups.

Activity 3

Resources

Sullivan C, (2004) High Textile - Stage 4, Reed International Books Australia, Melbourne (page 2)

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 10.1.2.4 Appraise appropriate technology to creatively document, communicate and present design and project work.

Topic 4: Using appropriate Technology to present Design and Project Work

Essential Questions:

1. What do we mean by appropriate technology in design and project work?
2. Why is it important to use appropriate technology?
3. What is documenting, communicating and presenting design and project work?

Essential Knowledge Skills, attitudes and values

Knowledge	Documentation of design and project work
Skills	Assess the strategies to document project work
Context	Modern technology
Attitudes/Values	Show confidence in using technology and appreciate others and own work.

Technology and Industrial Arts Application: Technology & Industrial Arts

Learning Objectives

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

1. Demonstrate knowledge of the usage of appropriate technology
2. Plan, document and communicate own design and project work to peers..

Content Background **APPROPRIATE TECHNOLOGY FOR TEXTILE PROJECTS**

Appropriate technology is small scale technology. It is simple enough that people can manage it directly and on a local level. Appropriate technology makes use of skills and technology that are available in a local community to supply basic human needs, such as gas and electricity, water, food, waste disposal or in our case provide textile projects.

Technology helps to make things easier for us as humans.

Technology includes the tools that we use in textile technology. Tools help us to work with raw materials and manipulate into finished products. They are usually designed for specific tasks and to achieve particular results. Some tools can be used for a variety of different products and materials. For example, a scissors may be used to cut cardboard, paper, thread or fabric. Other tools are specific to a product or function. For example a bobbin is specifically designed to hold thread in the bottom section of a sewing machine, and has no other function.

Some tools are related specifically to textile technology. They help you to work with textiles raw materials, such as threads, yarns and fabrics.

Tools specific to textile technology include:

Dressmaker's marker pens, pencils and chalk	Fabric paints and dyes	Sewing machine
Dressmaker's model	Over lockers	Skirt maker
Dressmaker's shears	Tacking pins	Thimble

These tools come in many varieties, which often have different uses or functions.

These are some of t he tools designed specifically for textile projects.

THE FUNCTIONS OF TEXTILE TOOLS

Generally the tools used in textile technology are grouped in the following way, according to what they are used for.

- Measuring tools
- Patterns and pattern-making tools
- Marking tools
- Cutting tools
- Joining, constructing and assembling tools
- Decorating tools

MEASURING TOOLS

Measuring is an important part of any textile project. Fabrics, threads and trims are usually purchased by the yards, meters or centimetres. You may ask for a certain length to be cut for you at from a roll, or you may decide to buy a roll or a packet that has the length indicated on it. When cutting out or constructing textile products, it is important to take great in measuring and checking all materials carefully before you cut anything. Making sure everything is the right size or length will help the project work the first time: it is too late to start over once you have cut the fabric, thread or trim.

The symbols you need to recognise for measuring textile items are:

- mm (millimetre/s)
- cm (centimetre/s)
- m (meter/s)

The main tools used to measure textile products are:

- Tape measure
- Skirt marker
- L- square ruler
- Sewing gauge
- Meter ruler
- Dressmaker’s model

PATTERNS AND PATTERN-MAKING TOOLS

To make textile items, there are many patterns and sets of instructions you may use. If you want to make a pair of short, for example, there are several ways to go about it: you may simply buy a paper pattern and make the shorts following the instructions exactly; you may design and create your own shorts pattern; or you may use a pattern, but adjust it to be different from a construction or a design point of view. There are also computer programs, such as 'Click & Sew', which will create patterns for you on the computer screen, based on any modifications you make to the design outlines.
The following tools are helpful in using and creating patterns for textile:

- Commercial sewing patterns
- Tissue paper
- Lead pencils
- Craft books
- Computers (using specific pattern making programs)

MARKING TOOLS

Marking tools are used in textiles to make marks on your fabric. When you use a pattern to construct an item, there are often important lines, dots and other indicators on the pattern that show you where to sew, as well as important points to join together or to remember. You need to mark these lines and points accurately onto the fabric while the pattern is still in place so you will know where to sew.
Tools commonly used for this task include:

- Dressmaker's carbon paper
- Dressmaker's marking (tracing) wheel
- Dressmaker's marking chalk

CUTTING TOOLS

When you work with textiles, you need to cut fabric, thread, trims, laces, ribbons, braids and other trim. Scissors are the tools to use, but there are different types to choose from, each suited to specific jobs: handles may be straight or bent; blades may be serrated or plain, long or short. Some scissors are even made specifically for left-handers! It is not important that you have all the different types of scissor: a good pair of dressmaker's scissors will do most jobs. However, if there are other types available to you, you may as well select the most appropriate ones for the task you are doing.

In industry, fabrics are not usually cut by hand with scissors. Rather, computerised machines are used to determine the exact size and shape of the fabric needed, and then to cut the fabric accordingly. Fabric I also cut in more than one layer at a time, making it a relatively fast process.
The main types of scissors suited to cutting textile materials include:

-Dressmaker's shears

- Embroidery scissors

-Pinking shears

JOINING, CONSTRUCTING AND ASSEMBLING TOOLS

When fabrics are cut to size and marked appropriately, they then need to be joined together to construct the product, They are usually pinned tother first, to hold the pieces in place so they may be sewn correctly. Once the fabric is pinned, needles and threads are used to either hand- or machine-sew the pieces together. An alternative to sewing is to use fabric glue. The edges may them be finished with pinking shears, a variety of sewing machine stitches, or an overlocker.
The most common joining and constructing tools used with textile materials include:

- Pins
- Sewing thread
- Iron
- Fabric glue
- Sewing machine
- Unpicker
- Needles
- Overlockers

DECORATING TOOLS

There are many ways of decorating a textile item. Hand- or machine-embroidery, applique', patchwork, quilting and fabric-painting is common decorative methods. Other options include attaching trims such as beads, buttons, braids, sequins, lace, ribbons, ruffles, tassels or piping to a textile item using a needle and a thread.

When you are decorating a textile item, tools you will commonly use include:

- Embroidery threads
- Thimbles and finger guards
- Fabric paints, pens, crayons and dyes

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 textiles and clothing.

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: Appropriate Technology for Textile Projects

Teaching Strategies

Teacher will define 'appropriate technology' and further elaborate on why it is important. Tools specific to textile technology will also be introduced to the students.

Learning Strategies

Discover appropriate technology and it importance as well as explore the different tools specifically made for textile technology.

Activity 1

Name ten examples of tools used specifically for working with textile projects and describe their correct functions.

Activity 2

Complete the following chart:

Textile tools I have used before	Textile tools I have not used

Activity 3

If you were to categorise a thimble, which group would it come under?

Resources

High Tech TEXTILES Stage 4 by Cathryn Sullivan, pp. 32 – 43

Lesson 2: Measuring tools, Marking tools, and Patterns and pattern-making tools

Teaching Strategies

Teacher guides the students through the different functions of textile tools categorising them under specific groups according to their uses.

Learning Strategies

Students discover the functions of textile tools and the different groups they are categorised under. They will also research different tools to see what they look like.

Activity 1

In pairs, list all the measuring tools and research them. In your exercise book, draw a picture of what it looks like or paste a picture if you are able to find one. Write its specific function down as well.

Activity 2

In pairs, list all the marking tools and research them. In your exercise book, draw a picture of what it looks like or paste a picture if you are able to find one. Write its specific function down as well.

Activity 3

In pairs, list all the patterns and pattern-making tools and research them. In your exercise book, draw a picture of what it looks like or paste a picture if you are able to find one. Write its specific function down as well.

Resources

High Tech TEXTILES Stage 4 by Cathryn Sullivan, pp. 32 – 43

Lesson 3: Cutting tools, Decorating tools, and Joining, constructing and assembling tools.

Teaching Strategies

Teacher guides the students through the different functions of textile tools categorising them under specific groups according to their uses.

Learning Strategies

Students discover the functions of textile tools and the different groups they are categorised under. They will also research different tools to see what they look like.

Activity 1

In pairs, list all the cutting tools and research them. In your exercise book, draw a picture of what it looks like or paste a picture if you are able to find one. Write its specific function down as well.

Activity 2

In pairs, list all the decorating tools and research them. In your exercise book, draw a picture of what it looks like or paste a picture if you are able to find one. Write its specific function down as well.

Activity 3

In pairs, list all the joining, constructing and assembling tools and research them. In your exercise book, draw a picture of what it looks like or paste a picture if you are able to find one. Write its specific function down as well.

Resources

High Tech TEXTILES Stage 4 by Cathryn Sullivan, pp. 32 - 43

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 (Proposed Template) 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 and Teacher 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 pause 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 240 minutes per week which means it has 6 periods/6 lessons a week: 1 block of 80 minutes (2periods) periods 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
9. teaching weeks which gives us 48

periods/48 lessons of actual teaching in a term (6 periods a week x 8 actual teaching weeks in a term)

10. 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 programed 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 utilized 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 acquired 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 10 Technology and Industrial Arts Content distribution for the Teaching Year

Program Strategy No. 1- Rotational Teaching

The Grade 10 TIA has been distributed according to the 3-parts in a 13 week rotation program.

Week	Textile Technology and Food Technology	Construction Technology	Communication and Computer Technology
1	**Textile Technology:** **Fibres and Fabrics:** Unit 1 Benchmarks 1 and 2	**Building Technology** **Unit 1 bm 1 and 2, 3**	**Communication Technology** **Data Communication and Network-**Unit 1 bm 1 and 2
2	**Textile Technology:** **Fibres and Fabrics:** Unit 1 Benchmarks 3 and 4	**Building Technology** **Unit 1 bm 4, 5, 6**	**Communication Technology** **Data Communication and Network-**Unit 1 bm 3 and 4
3	**Textile Technology:** **Fibres and Fabrics:** Unit 1 Benchmarks 5 and Unit 2 Benchmark 1	**Electrical Technology** Unit 1bm 1 and 2	**Communication Technology** **Data Communication and Network** Unit 1 bm 5 and
	Assessment	**Assessment**	**Assessment**
4	**Textile Technology:** **Textile and Clothing:** Unit 2 Benchmark 2 and 3	**Electrical Technology** Unit 1bm 3	**Communication Technology Computer Security and Safety** Unit 2 bm 1 and 2
5	**Textile Technology:** **Textile and Clothing:** Unit 2 Benchmark 4	**Plumbing Technology** **Unit 1 bm 1 and 2**	**Communication Technology Computer Security and Safety** Unit 2 Bm 3 and 4
6	**Food Technology:** **Food and Nutrition:** Unit1 Bm 1 and 2	**Plumbing Technology** Unit 1bm 3 and4	**Communication Technology** **Computer Security and Safety** Unit 2 bm 5
	Assessment	**Assessment**	**Assessment**

7	**Food Technology:** **Unit 1 Bm3 &4**	**Welding Technology** Unit 1 bm 1	**Computer Technology** **Computer Architecture** Unit 1 Bm 1 and 2
8	**Food Technology:** **Unit 1 Bm5 &**	**Welding Technology** Unit 1 bm 2 and 3	**Computer Technology** **Computer Architecture** Unit 1 bm 3 and 4
9	**Food Technology:** **Unit 2 bm 1and 2**	**Welding Technology** Unit 1 bm 4	**Computer Technology** **Computer Software-** Unit 2 bm 1 and 2
	Assessment	**Assessment**	**Assessment**
10	**Food Technology:** **Unit 2 bm 3and 4**	**Engineering Technology** Unit 1bm 1 and 2	**Computer Technology** **Computer Software** Unit 2 bm 3 and 4
11	**Food Technology:** Unit 2 Bm 5	**Engineering Technology** Unit 1 bm 3 and 4	**Computer Technology** **Computer Software** -Unit 2 bm 5
12	Food Technology: Reteach any benchmarks that need reteaching	Engineering Technology Unit 1 bm 5 and 6	Computer Technology Computer Software Reteach benchmarks that need reteaching
13	**Summative Assessment**		

Grade 10 Technology and Industrial Arts Content Standards and Benchmarks Overview as per Strands and Units have been organised by units and benchmarks for 39 weeks. These 39 weeks are divided into 13 teaching and assessing weeks. Assessment times are specified. Teachers are encouraged to check respective strand teacher guides to plan and program the lessons for weekly teaching. Refer to the expansion of units of work by benchmarks for Textile on pages Use your grade 9 and 10 syllabuses to affirm benchmarks and units accordingly

Step 5: Expand and plot the distributed content into the complete 13 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 Guides.Because the Teacher Guide is not available now, the Grade 9 content overview has been adopted and expanded in this facilitators and

in-service guide in the absence of the Grade 9 teacher guides to help you plan a Grade 9 Technology and industrial Art Teaching Program

- 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 their 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.

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 strand s of TIA. Below is a proposed Template to develop a Teaching Program for a Term.(13 weeks)

Subject: _____Grade _____Term:____ Year: _____

Week ..... Write the week number	**Content Standards** ..... Write the Coding only	**Benchmark** ..... Write the Coding only	**Unit** ..... Write the Unit number and Name	**Topic** ..... Write the Topic number and Name	**Learning Objective** ..... By the end of this Topic, Students will be able to: Write the learning Objectives for the Topic	**Knowledge** ..... Write the essential knowledge to be learnt in this topic	**Skill** ..... Write the essential skill to be **learnt in this topic**	**Attitude/ Values** ..... Write the essential attitude and values to be learnt in this topic	**Performance Standard** ..... By the end of this Topic, students will be able to; Write the Performance Standard (if the Benchmark carries one)

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**
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

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 organized 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 organized 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 (Term1Week 1-10 and Term 2 Week 1-2)

Class	Strand	Content Teacher	
Class 1 and Class 2	Food and Textile Technology	Home Economics Teacher	These classes can be rotated so they all cover all the strands of TIA
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	
Class 1 and 2	Construction Technology	Practical Skills	These classes can be rotated so they all cover all the strands of TIA
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	
Class 1 and 2	Communication and Computer Technology Food and Textile Technology	Home Economics	These classes can be rotated so they all cover all the strands of TIA
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 programing Textile Technology benchmarks with other strand benchmarks for the other 4 strand.
The commended programing strategies for this strand are:

1. Programing 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 TEC Building Technology Unit 1 bm 1 and 2,	CONST TEC Welding Technology Unit 1 bm 3	COMM TEC Data Communication and Network Unit 1 bm 5
2	Textile Technology: Fibres and Fabrics: Unit 1 Benchmarks 1 and 2	CONST TEC Building Technology Unit 1 bm,3 4,	CONST TEC Welding Technology Unit 1 bm 4	COMM TEC Computer Security and Safety Unit 2 bm 1 and 2
3	Textile Technology: Fibres and Fabrics: Unit 1 Benchmarks 3 and 4	CONST TEC Building Technology Unit 1 bm, 5, 6	CONST TEC Engineering Technolog Unit 1bm 1	COMM TEC Computer Security and Safety Unit 2 bm 3and 4
4	Textile Technology: Fibres and Fabrics: Unit 1 Benchmarks 5 and Unit 2 Bmark 1	CONST TEC Electrical Technology Unit 1bm 1 and 2	CONS CONS TEC Engineering Technol Unit 1 bm 2	COMM TEC Computer Security and Safety Unit 2 bm 5
5	Textile Technology: Textile and Clothing: Unit 2 Benchmark 2 & 3 4	CONST TECU1 Electrical Technology Unit 1bm 3	CONS TEC Engineering Technol Unit 1 bm 3	COMP TEC Computer Architecture Unit 1 Bm 1 and 2

6	Food Technology: Food and Nutrition: Unit1 Bm 1 and 2	CONST TEC Plumbing Technology Unit 1 bm 1 and 2	CONS TEC Engineering Technol Unit 1 bm 4	COMP TEC Computer Architecture Unit 1 Bm 3 and 4
7	Food Technology: Unit 1 Bm3 &4	CONST TEC Plumbing Technology Unit 1bm 3	CONS TEC Engineering Technol Unit 1 bm 5	COMP TEC Computer Architecture Unit 1 Bm 3 and 4
8	Food Technology: Unit 1 Bm5 & Unit 2 bm 1	CONST TEC Plumbing Technology Unit 1bm 4	CONS TEC Engineering Technol Unit 1 bm 6	COMP TEC Computer Software Unit 1 Bm 1 and 2
9	Food Technology: Unit 2 bm 2and 3	CONST TEC Welding Technology Unit 1 bm 1	COMM TEC Data Communication and Network-Unit 1 bm 1 and 2	COMP TEC Computer Software Unit 1 Bm 3 and 4 and 5
10	Food Technology: Unit 2 bm 4and 5	CONST TEC Welding Technology Unit 1 bm 2	COMM TEC Data Communication and Network-Unit 1 bm 3 and 4	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 decides on the best option for your class/grade. You are also conducting performance assessment after every third or fourth bench is taught in each unit.

Week	Textile Technology and Food Technology	Construction Technology	Communication and Computer Technology
1	Textile Technology: Fibres and Fabrics: Unit 1 Benchmarks 1 and 2	Building Technology Unit 1 bm 1 and 2, 3	Communication Technology Data Communication and Network-Unit 1 bm 1 and 2

2	Textile Technology: Fibres and Fabrics: Unit 1 Benchmarks 3 and 4	Building Technology Unit 1 bm 4, 5, 6	Communication Technology Data Communi-cation and Net-work-Unit 1 bm 3 and 4
3	Textile Technology: Fibres and Fabrics: Unit 1 Benchmarks 5 and Unit 2 Benchmark 1	Electrical Technology Unit 1bm 1 and 2	Communication Technology Data Communica-tion and Network Unit 1 bm 5
	Assessment	Assessment	Assessment
4	Textile Technology: Textile and Clothing: Unit 2 Benchmark 2 and 3	Electrical Technology Unit 1bm 3	Communication Technology Com-puter Security and Safety Unit 2 bm 1 and 2
5	Textile Technology: Textile and Clothing: Unit 2 Benchmark 4	Plumbing Technology Unit 1 bm 1 and 2	Communication Technology Com-puter Security and Safety Unit 2 Bm 3 and 4
6	Food Technology: Food and Nutrition: Unit1 Bm 1 and 2	Plumbing Technology Unit 1bm 3 and4	Communication Technology Computer Security and Safety Unit 2 bm 5
	Assessment	Assessment	Assessment
7	Food Technology: Unit 1 Bm3 &4	Welding Technology Unit 1 bm 1	Computer Technol-ogy Computer Architec-ture Unit 1 Bm 1 and 2
8	Food Technology: Unit 1 Bm5 &	Welding Technology Unit 1 bm 2 and 3	Computer Technol-ogy Computer Architec-ture Unit 1 bm 3 and 4
9	Food Technology: Unit 2 bm 1and 2	Welding Technology Unit 1 bm 4	Computer Technol-ogy Computer Software- Unit 2 bm 1 and 2
	Assessment	Assessment	Assessment
10	Food Technology: Unit 2 bm 3and 4	Engineering Technol-ogy Unit 1bm 1 and 2	Computer Technol-ogy Computer Software Unit 2 bm 3 and 4

11	Food Technology: Unit 2 Bm 5	Engineering Technology Unit 1 bm 3 and 4	Computer Technology Computer Software -Unit 2 bm 5
12	Food Technology: Reteach any benchmarks that need reteaching	Engineering Technology Unit 1 bm 3 and 4	Computer Technology Computer Software Reteach benchmarks that need reteaching
13	Summative Assessment		

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 teacher 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 organizing 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

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 teachers are teaching must 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

Standards-Based Lesson Planning

Planning a good lesson helps the teacher in maintaining a standard teaching pattern as a motivating factor to capture students' attention. To help teachers plan effective Textile Technology lessons, here is a grade 10 sample lesson from Unit 1 Fibres and Fabrics – Benchmark 10.1.1.1.
Teachers are encouraged to study the layout of the different components of these lessons and follow this design in their preparation and teaching of each lesson.

Sample of SBC Lesson Plan

Below displayed for your convenience is a sample of a Textile lesson specifally done for a grade ten class. Teachers are encouraged to use this as a guide and write up their own lesson plans using the given template.

Strand: 1 Textile technology

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

Bench mark 10.1.1.1 Apply the knowledge and skills in drafting a pattern using appropriate tools, equipment and garment patterning techniques.

Topic: **Pattern drafting**

Lesson Title: **What is pattern drafting and what tools and equipment used in pattern drafting**

Lesson objectives: By the end of the lesson, the students will be able to;

1. Explain pattern drafting and patterning techniques
2. Identify and explain the functions of tools and equipment used in pattern drafting
3. Demonstrate the appropriate use of pattern drafting tools and equipment
4. Draft a "Fitted Face Mask" template according to specification.

Essential questions

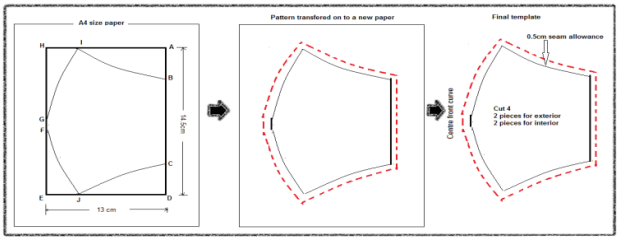
1. What is pattern drafting?
2. What are the different pattern drafting techniques?
3. What tools and equipment are use for pattern drafting?
4. How are these tools and equipment used in drafting?

Essential Knowledge, Skills Values and Attitudes

Knowledge	Identify pattern drafting tools, compare
Skills	Apply, draw and demonstrate
Values	Appreciate, neatness
Attitudes	Complete task on given time

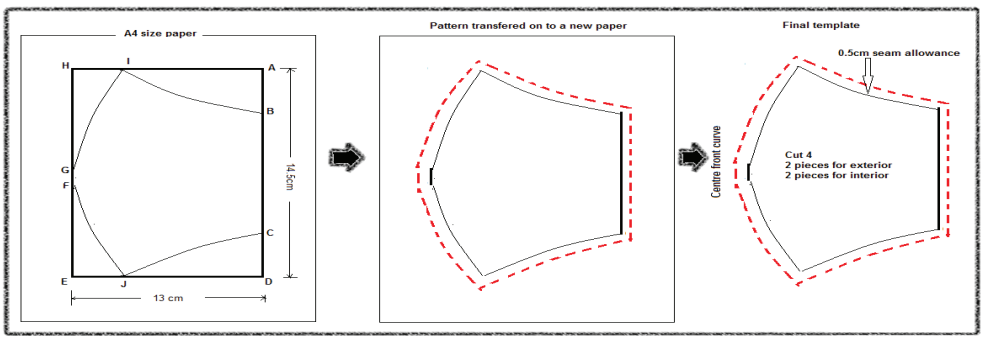
Teacher will ……..	**Students will**
Introduction 5minutes	
Greet students • Gage the attention of the student by showing them a sample of a face mask. • Then show the other design styles of face masks.(in picture form or actual samples)	**Listen attentively and respond** . Identify and explain the function and importance of the face mask Investigate and discuss on the number of fabric pieces needed, the material used and the designs.

Body	
Modeling 5minutes	
• Introduce the lesson topic 1.Explaining what pattern drafting and patterning techniques 2. Introduce the tools and equipment for pattern drafting 3 **If an answer is incorrect, teacher corrects it immediately**	1. Listen and ask questions when give the opportunity 2. Identify each tool and state their function.
Guided practice 5minutes	

• Ask three students to sketch three different design styles of face masks on the b/board • Pick out the one that is going to be drafted and tells the student. • Distribute materials for drafting to students	Observe with interest • Receive an A4 paper, sharp pencil, flexi curve/French curve and a 30cm ruler. • 
Independent Practice 20minutes	
• Engage student to do Activity 3.	1.Work in pairs or in groups to design and draft their individual fitted face mask 2.Complete the activity on designing their own face masks
Conclusion 5minutes	**Conclusion**
Recap by asking students i. What they have learnt in the lesson	• share their personal experiences with others

Note to the Teacher

Illustration of face mask pattern, ensure that the right typ of clothing and tools are used in this activity.



Instructions:

- AB and CD = 4.5cm
- EF and GH = 7cm
- HI and EJ = 3.5cm
- Connect points B, I, G, F, J and C with a nice curve line
- Cut along the lines that connect points, B, I, G, F, J and C.
- Transfer this template on to a new sheet of paper and label
- Allow o.5cm seam allowance

Teacher may use this template to engage students in drafting their face mask.

Assessment

The main purpose of assessment is to find out if students can use the skill of synthesis to create and manage a simple network. **Assessment should be linked to the performance indicator indicated in the lesson plan and the lesson objective.**

Performance Assessment

Students will research on the five different patterning techniques. They will give a 5minutes talk on a patterning technique. They will use visual aids to explain and demonstrate understanding of the terminology Pattern drafting and patterning techniques.

Performance Assessment Scoring

Assessment can be scored using a rubric (analytical rubric), checklists, or rating scales.

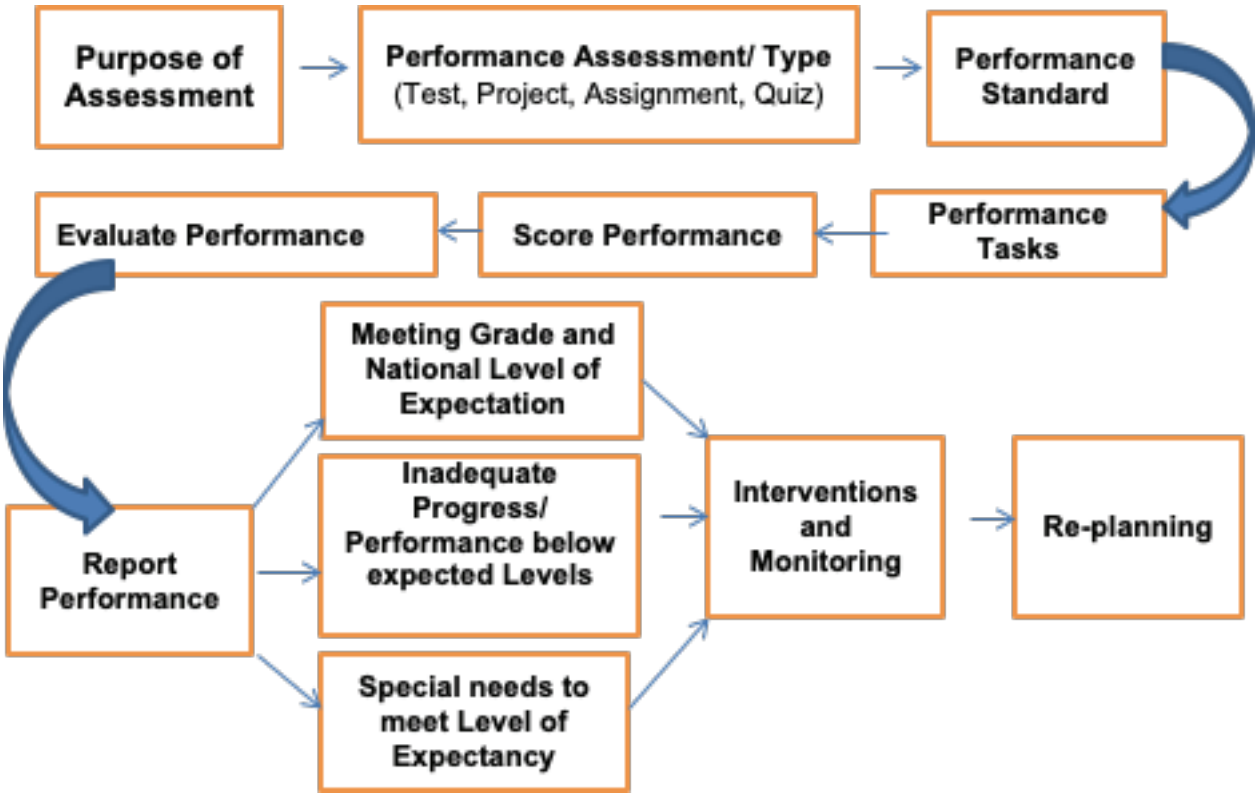
Performance Standard/ Criteria	Advanced A	Meet Standard B	Progressing C	Not Yet D
1.explain the patterning technique	Identify and explain illustration with better understanding	Identify and explain with clear understanding	Identify and explain with little knowledge of the patterning technique	Identify but could hardly explain the techniques
2. demonstrate Creativity and innovative	Imaginative and original ideas have been developed demonstrating creativity	Imaginative ideas demonstrating a degree of creativity	Design ideas show some degree of creativity	Ideas are lacking in imagination
3.making	Demonstrate better ability to produce quality and relevant visual aids	Demonstrate the ability to produce quality and relevant visual aids	Demonstrate limited ability to produce quality and relevant visual aids	Demonstrate in ability to produce a quality and relevant visual Aids

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 replanning 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;
- compare students' performances and the performances of other students.

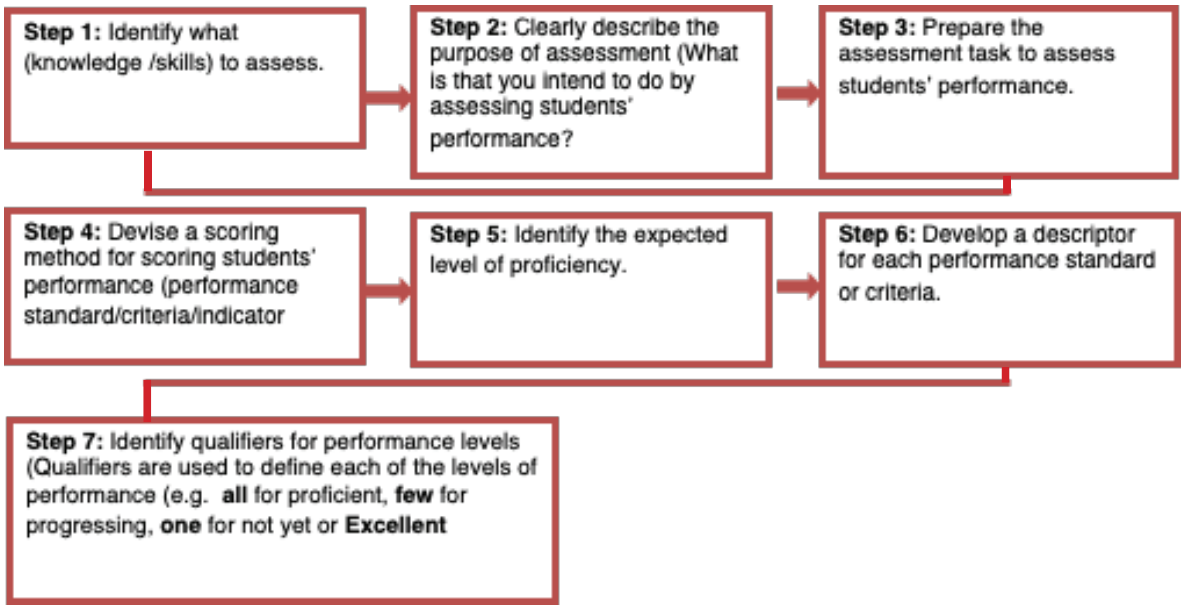
Principles of Standards-Based Assessment

The principle of SBA is for assessment to be;

- emphasing 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
• 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	• 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) • Standardised 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 assessments 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" of "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 verbalise 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.
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-Assess-ments	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	• Prior knowledge inventory, misconception/preconcep-tion check • Focused listing, empty out-lines • Pre-post test, quiz, quick poll
Comprehension – to understand and inter-pret learned informa-tion	Classify, describe, discuss, explain, express, interpret, contrast, predict, associate, distinguish, estimate, differentiate, discuss, extend, translate, review, restate, locate, recognise, report	• Minute paper, muddiest (or clearest) point • Observe &evaluate a stu-dent artifact or performance task using a rubric • Directed paraphrasing • Pre-post test, quiz • Interviews
Application – to put ideas and concepts to work in solving prob-lems	Apply, choose, demonstrate, dramatise, employ, illustrate, interpret, operate, practice, schedule, sketch, solve, use, calculate, complete, show, examine, modify, relate, change, experiment, discover	• Observe and evaluate a stu-dent 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 interrelationships and ideas	Analyse, appraise, calculate, categorise, compare, contrast, criticize, differentiate, discriminate, distinguish, examine, experiment, question, test, separate, order, connect, classify, arrange, divide, infer	• Pro and con grid, categorizing 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, summarize	• Reflection component of a portfolio or experience • Journaling • Peer evaluation
Affective Learning	appreciate, accept, attempt, challenge, defend, dispute, join, judge, praise, question, share, support	• Reflection component of a portfolio or experience • Journaling • Observe and evaluate group work • Surveys, interviews, focus groups

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*
	Consistently demonstrates advanced conceptual mathematical understandings Consistently generates tasks that make connections between and among mathematical ideas Consistently applies strategies to unique situations Consistently demonstrated confidence to approach tasks beyond the proficiency level for grade Consistently initiates mathematical investigations
CONSISTENT	Meet Standard (s)-*Proficient in Performance and Understanding*
	Consistently demonstrates understanding of mathematical standards and cluster at the grade level Consistently demonstrated conceptual understanding Consistently applies multiple strategies flexibly in various situations Understands and fluently applies procedures with understanding Consistently demonstrates perseverance and precision Constructs logical mathematical arguments of thinking and reasoning Uses mathematical language correctly and appropriately
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 Applies models of mathematical ideas inconsistently
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

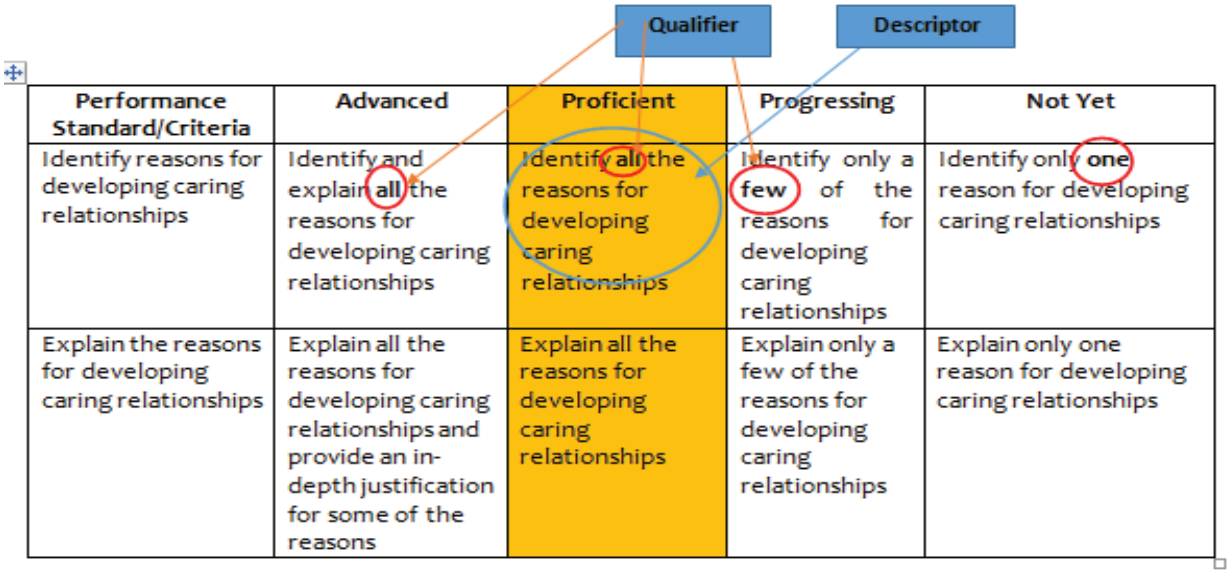
1. Analytic Rubric

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 **complete** understanding of the problem. **All** requirements of task are **included in response**.	Demonstrate **considerate** understanding of the problem. **All** requirements of task are **included**.	Demonstrate **partial** understanding of the problem. **Most** requirements of task are **included**.	Demonstrate **little** understanding of the problem. **Many** requirements of task are **missing**.	Demonstrate **no** understanding of the problem.	**No** response/ **not** 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
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

Words that describe the skill of ***organizing 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	*Embraces everyone's' abilities and encourages participation*	
2	*Ensures everyone is tasked to an activity*	
3	*Encourages everyone to achieve together*	

Sample Scoring using Tick/Cross Checklist Scale to assess "Collaboration"

No	***Criteria***	***Place a tick(score 2) or and X (score 1)***
1	*Embraces everyone's' abilities and encourages participation*	
2	*Ensures everyone is tasked to an activity*	
3	*Encourages everyone to achieve together*	

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 skilful 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……	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

Sample Termly Assessment Plan/Outline

Provided below is a sample Termly Assessment Plan. All the Assessments must be represented in the Assessment plan which must also be communicated to students. This means a copy of the Assessment Plan must be provided to students and their parents for accountability and transparency to teaching and learning.
You are encouraged to use it only as a guide to assist you plans your subject, grade, and classroom or school assessment.

Sample Termly Assessment Plan/Outline
Teaching Program

Term: One **Subject:** Textile **Grade:** 10

WEEKS	STRANDS	UNITS	C/STANDARDS	BENCHMARKS	Learning Objectives: By the end of the lesson the students be able to;	Topics	Knowledge	Skills	Attitude/ Values	Assessments

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	**Portfo-lio** 10 marks	**Modera-tion** 30 marks	**Partici-pation** 5 marks	**Total Raw Score**
1	Gill							/ 100
2	Jill							/ 100
3	Zill							/ 100
4	Bill							/ 100
Etc.								/ 100

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.

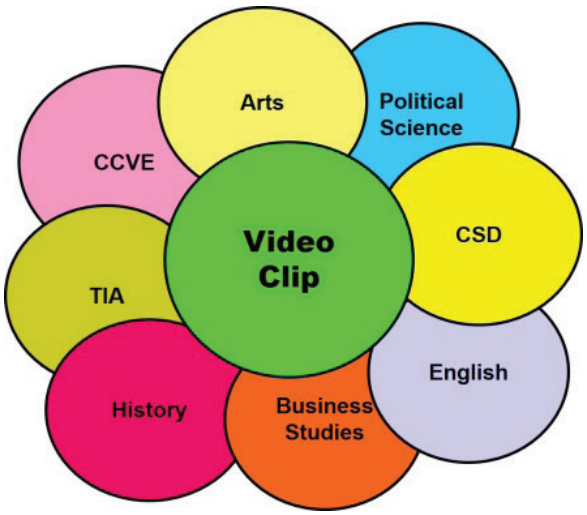
- Students still bringing their smart mobile phones to school despite the school rules telling them not to.

- 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 G10 and G12.

- 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.

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: BUSINESS STUDIES

BENCHMARK 9.2.5.1. Analyse the impact of information technology on society.

BIG IDEA/PRODUCT: Video Clip

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-miunte 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 down 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	• 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	• 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: • Teamwork and cooperation • Creativity Knowledge: Know about the school
The content of the video	• 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.	Knowledge: Adequate content about the school Skill: convincing and persuasive Values and attitude: Encouraging and luring
The Presentation of the video	• This clip must not be more than 2 minutes (maximum time limit) • Present your video clip to be assessed	Skill: • Time management • delivery skills (posture, language) and • communication skills • social skills (relativity and connectivity) Values and attitude: confidence
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	**Skill:** Procedural Writing Organized paper of video script writing procedure**s**	Organized paper of video script writing proce-dures	Organized paper of video script writing procedures	/3
The development of the video	Values and attitudes: • Teamwork and cooperation • Creativity Knowledge: Know about the school The video corresponds to the 2-minutes script and illustrates teamwork	The video cor-responds to the 2-minutes script and illustrates teamwork	The video cor-responds to the 2-minutes script and illustrates teamwork	/ 3
Content of the video	Knowledge: Adequate content about the school Skill: convincing and per-suasive Values and attitude: Encouraging and luring The short video clip em-braces the core ideas of school rules, motto, and mission and vision state-ments.	The short video clip embraces the core ideas of school rules, motto, and mis-sion and vision statements.	The short video clip embraces the core ideas of school rules, motto, and mis-sion and vision statements.	/3

Presentation of the video	Skill: • Time management • delivery skills (posture, language) and • communication skills • social skills (relativity and connectivity) Values and attitude: confidence 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.	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.	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.	/3
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

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 script writing procedures	Well organised paper with clarity of video script writing procedures	Organised paper with some clarity of video script 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
Video Presentation	• 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.	• 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.	• 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.	/3

Video Clip Submission Time	• Video clip submitted **well before** the assessment deadline for presentations	• Video clip submitted **just before** the assessment deadline for presentations	• Video clip submitted **within** the assessment time for presentations	/3

1. How to Score using the rubric
Scoring Rubrics

Criteria	Achieved 3	Progressing 2	Novice 1	Scoring
Video Script Write up -	**Innovative** and **well** organised paper with **clarity** of video script writing procedures	**Well** organised paper with **clarity** of video script writing procedures	Organised paper with some **clarity** of video script writing procedures	2/3
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	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

Video Presentation	• 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 enroll at the school.	• 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.	• 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.	3/3
Video Clip Submission Time	• Video clip submitted **well before** the assessment deadline for presentations	• Video clip submitted **just before** the assessment deadline for presentations	• Video clip submitted **within** the assessment time for presentations	2/3
11/15				

2. How to <u>Grade</u> using the rubric

Grading Rubrics

Score Range	Grade	Qualifier (Proficiency)	Descriptor	Percentage
13 – 15	**A**	**Advanced**	Description reflecting **<u>highest</u>** level of performance.	**76 - 100%**
9 - 12	**B**	**Achieved**	Description reflecting **<u>mastery</u>** level of performance.	**46 - 75%**
5 – 8	**C**	**Progressing**	Description reflecting **<u>movement towards</u>** mastery level of performance.	**26 - 45%**

0 - 4	**D**	**Novice**	Description reflecting **beginning** 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 script writing procedures		Well organised paper with clarity of video script writing procedures		Organised paper with some clarity of video script 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	
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.	

Video Presentation	• 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 enroll at the school.	• 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 enroll at the school.	• 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 enroll at the school.
Video Clip Submission Time	• Video clip submitted **well before** the assessment deadline for presentations	• Video clip submitted **just before** the assessment deadline for presentations	• Video clip submitted **within** the assessment time for presentations

*Note: The **shaded** is the student's proficiency score for each task.*

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 performan **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	Portfo-lio 10 marks	Modera-tion 30 marks	Partici-pation 5 marks	Total Raw Score
1	Gill							/ 100
2	Jill							/ 100
3	Zill							/ 100
4	Bill							/ 100
Etc.								/ 100

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	Modera-tion 30 marks	Participa-tion 5 marks	Total Raw Score
1	Gill							/ 100
2	Jill							/ 100
3	Zill							/ 100
4	Bill							/ 100
Etc.								/ 100

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 and 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

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.
Artisan	-a worker who practices a trade or handicraft : craftsperson. a skilled artisan. : - People who manufacture handicraft goods are known as artisans. People who manufacture handicraft goods are known as craftspeople or artisans. Handicraft is the activity of making decorative or other objects by hand.
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 ˈbēd-ˌbȯrd. : 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 prod- ucts. 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 compara- tively 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
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 loosing 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.
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 out put.
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 descibe 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.
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
Manufactured fibres	-The fibers that belong to this category are **either entirely produced from chemical or is a combination of chemical processing and raw material** - 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
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	-Various fabrics, such as taffeta, velvet, and damask were **made from textiles like silk, cotton, and linen using specific weaving techniques**. - 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.

Mechanical furnishing process	-Commonly used mechanical finishes include **calendaring, compressive shrinkage / Sanforizing, raising, emerizing / sueding / peaching, shearing** / -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 ..
Yarn	Yarn is **a material made from staple fibre or continuous filaments used to** make fabrics, sweaters, scarfs, and sewing garments. - 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.
Hair	-The principal hair fiber used to produce textile fabrics is **sheep's wool**. In wild sheep, the wool is a short, soft underlayer protected - Haircloth is a stiff, unsupple fabric typically made from horsehair and/or from the wooly hair of a camel.
Silk	Silk is a very smooth, light fabric that's usually made of fibers from silkworm cocoons. - Silk is a natural fiber known for its luster, shine, strength, and durability, and it has a long trading history across the world
Polyester	-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 - Polyester is a manufactured synthetic fiber. It is a kind of plastic and is usually derived from petroleum.
Rayon	- a textile fibre or fabric made from regenerated cellulose (viscose). "clothing made of rayon" -Rayon is a fiber from regenerated cellulose, generally derived from wood pulp. Rayon is usually made from eucalyptus trees,
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	In garment factory productivity is expressed in terms of number of garments produced per sewing machine per shift or per operator per shift. Productivity, in simple words, is the relationship between output and input.
Characteristics of fibres and fabrics	-Textile fibers are perhaps most obviously characterised by their fineness; they are long and very thin. - 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.
Design process	-Textile design is the process of creating patterns or designs onto fabrics by way of weaving, knitting, or printing. -Textile design is the process of creating knitted, printed, and woven textiles.
Denim	Denim is **a strong cotton fabric made using a twill weave**, which creates a subtle diagonal ribbing pattern 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.
Design	-Textile design is **the process of planning and producing a fabric's appearance and structure**. Textile designers dream up designs that are woven - Textile designing is a field that includes fashion design, carpet manufacturing and any other cloth-related field
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	-The four basic ingredients or elements of design used in fashion are shape or silhouette, line, colour and texture. - The elements of design are the fundamental aspects of any visual design which include shape, color, space, form, line, value, and texture
Principles of design	The principles of design consist of: balance, proportion (also referred to as scale), emphasis, and rhythm. -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.
Fashion ideas	**-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 -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.
Fashion design	-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. - ashion and textile design is about creating a cohesive and finished appearance that can convey sophistication, be it through clothing or interior design.
Fabric fastening	-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. -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.

Fabric porosity	Fabric porosity is **the total volume of void space within a specified area of the fabric.**[11] Apart from the fabric structure, hairy fibre and fabrics
Porous Fibres	Porous fiber consists of three-dimensional components using polymeric fibers that are bonded together where they touch. This creates a void in between the fibers to hold fluid, making them porous.
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
Composite garments	-Composite fabrics are fabrics that include several structural elements that are combined into a single structure -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.
Tailoring	Tailoring is the art of designing, cutting, fitting, and finishing clothes. The word tailor comes from the French tailler, to cut, and appears in the English language during the fourteenth century
Shawl	a piece of fabric or knitted or crocheted material worn around the shoulders by women or wrapped around a baby. - 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. Other shapes include oblong shawls.
Shearing	-Shearing is **a kind of mechanical finish in which the appearance of the fabric is enhanced by cutting the loops or raised surface to a uniform and even height**. -The removal of the fleece of the sheep along with a thin layer of skin from its body is called shearing. - Shearing is the process of cutting sheet metal to size out of a larger roll or flat stock. As the material moves through the shear machine, cutting blades come together in order to fracture the material into separate, smaller pieces. This process creates quality clean cuts that can be repeated quickly.

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. It reached Europe via the Middle East in the European Middle Ages. -T he other name of the spinning wheel is Charkha. It is a small, portable and hand-cranked wheel. This device is used to draw thread or yarn from different fibres. - this particular device was used to make yarn from wool. Spinning wheels help to twist fibers together tightly as a person draws out the yarn with their fingers. Smaller spinning wheels with a foot pedal are also common and were used to spin flax into linen.
De-clutter	Steps to help you declutter your sewing room. Getting rid of some of the stash is hard, but it makes for a more organised space.
Sash	A sash is a wide band of fabric that either secures clothing around your waist or decorates a uniform.
Personal safety	Personal protective equipment means any device or appli- ance to be worn or held by an individual for protection against one or more health and safety ...
Panels of fabric	In fabric, a panel is a large piece of cloth that's been cut into smaller pieces to create a finished product. Panels can be used in different ways to add depth and interest to an item, or they can serve as the main structural element of a garment.
Pressing	Pressing is a method of using your iron to ensure a seam is flat and is an important part of quilt making.
Textile Tools **storage safety**	Textile tools can be divided into categories depending on the stage of the chain of operation, in which they are used. This way we distinguish tools used in the processing of raw materials, in yarn and textile production, in textile dyes and finally in textile finishing.
Tools Storage safety	Safe Storage Of Equipment Treat your fabric shears with great respect and never cut anything than fabric or textile material with them. - Reduce the chance of an accident by following the below safety measures

Combination tools	**Combination tools** (Spanner). It is usually made of forged steel. The size of spanners denotes the size of the bolt on which it can work.
Pliers	se **Fabric** Edge Match **Pliers** to pull and match up your top layer with your bottom layer when sewing complicated curved and contoured shapes.
Overhauling	Visible mending is the practice of **repairing** clothes and other **textile** based objects in a way that is clearly visible, rather than trying to hide the **repair**.
Cutting tools	There are many different types of cutting tools that can be used for sewing. These include scissors, rotary cutters, pinking shears, thread snips, seam rippers, and more. Each type has its own unique purpose which is crucial to your project's success.
Repair	Repairs can include **replacing broken or lost components such as zippers, buttons or rivets** or the repairing of rips and snags in the fabric itself. Mending is the act of repairing clothes with imperfections from being well-worn.
Rayon	a yarn, thread, or fabric made from fibers produced chemically from cellulose. -Rayon is produced by dissolving cellulose, then converting this solution back to insoluble fibrous cellulose. -Various processes have been developed for this regeneration. -The most common methods for creating rayon are the cupram-monium method, the viscose method, and the lyocell process.
Repair techniques	There are two common types of mending: visible mending and invisible mending. Invisible mending is a repair technique that is used when you don't want the mended area to stand out – the less obvious, the better. The aim is for the garment to look as close to its original condition as possible.
Business opportunities	Textile manufacturing is a huge industry that entails the conver-sion of fiber into yarn, and that yarn into fabric. These fabrics are dyed, printed, or fabricated into clothes and various other items. Different types of fibers are used to produce yarn, with cotton remaining the most important natural fiber.

Innovative approach	The idea is to come up with different textiles with an eye on creativity and design to create and recreate different articles of clothing People have been creating clothing for thousands of years, but it was not until the Industrial Revolution that the textile industry radically changed. The invention of the power loom in 1785 sharply increased the efficiency of garment production.18 Sept
Reeling	Reeling is the process of unwinding raw silk filament from the cocoon directly onto a holder. When several filament strands, either raw silk or synthetic, are combined and twisted together, producing yarn of a specified thickness, the process is called throwing.
Telemarketing	Telemarketing refers to contacting, qualifying, and canvassing customers and prospective customers by telephone and other devices.
Trade shows	Trade shows are often business-to-business (B2B) events attended by businesses in a specific market. Visitors are typically representatives of companies, distributors, resellers, suppliers, and media in the industry. Examples: Beauty, software, architecture and medical trade shows.6 Oct 2022
Textile designer	A textile designer is a person who manages the aesthetic aspect of textile production, including texture, color, and patterns. Basically, they're in charge of the designs printed, woven, knit, or sewn into textiles.
Trading and commodity	Commodity trading is where various commodities and their derivatives products are bought and sold. A commodity is any raw material or primary agricultural product that can be bought or sold, whether raw cotton fibres , silk etc
Functions of tools	Textile tools have a number of different tools, such as loom sword, loom weights, wool comb / flax hackle, whorls, needles made of bone or metal, needle cases, seam smoothers and scissors. -textiles have an assortment of uses, the most common of which are for clothing and for containers such as bags and baskets. In the household, textiles are used in carpeting, upholstered furnishings, window shades, towels, coverings for tables, beds, and other flat surfaces, and in art.

Setting up maintenance	**Preventive maintenance is the systematic care and protection of tools, equipment, machines, and vehicles** in order to keep them in a safe -Equipment maintenance is any process used to keep a business's equipment in reliable working order. It may include routine upkeep as well as corrective repair work. Equipment may include mechanical assets, tools, heavy off-road vehicles, and computer systems.
Scouring	"Scouring" is the textile term for cleaning fibers prior to mordanting and dyeing, and does not refer to washing fabrics in a washing machine. If the fiber is not clean, the mordant and dyes will not adhere well to the fiber. Fabrics sold as gray goods or "greige" require a thorough scour.
Scouring **Process**	Scouring is the process of washing the sheared hair. Wool scouring is the process of washing wool in hot water and detergent to remove the non-wool contaminants and then drying it. The woolen fibres are thoroughly washed in big tanks to remove grease, dust, and dirt by fully mechanized machines.
Silk thread	Silk is a natural fiber known for its luster, shine, strength, and durability, and it has a long trading history across the world. Silk is the epitome of luxury due to its high cost to produce, soft feel, and elegant appearance, and it is thus a popular textile in high-end and couture fashion design.12 Aug 2021
Silk thread process	Extracting silk from the cocoon is known as the processing of silk. Silk is separated from the cocoon by exposing it to sunlight. After the reeling of silk is done, the process of unwinding silk from a cocoon takes place. Silk thread is then bleached. The silk fibre is then spun into silk threads.
Process of a silk	This process, silkworm larvae are fed with mulberry leaves, and after the fourth moult, they climb a twig placed near them and spin their silken cocoons. Then the cocoon is treated with boiling water and then silk is unwound from the cocoon delicately. Around 10 kg of cocoon produces 1 kg of silk.
Silk production process	Extracting raw silk starts by cultivating the silkworms on mulberry leaves. Once the worms start pupating in their cocoons, these are dissolved in boiling water in order for individual long fibres to be extracted and fed into the spinning reel.

Silk	A fine continuous protein fiber produced by various insect larvae usually for cocoons. especially : a lustrous tough elastic fiber produced by silkworms and used for textiles.
Thread Extraction:	Once the silkworms have spun their cocoon, they will eventually enclose themselves inside it and then it's time to extract.
Sericulture	This is the term used to describe the process of gathering the silkworms and harvesting the cocoon to collect the materials.
Water repulsive	Water repellency is, therefore, a step up from water resistance. This means that water can't easily penetrate the material (the technical term is that it's hydrophobic). Meaning: Not easily penetrated by water, especially as a result of being treated for such a purpose with a surface coating.
Water repellent	Water repellency is a term related to the ability of a fabric to resist wetting. Here, due to the fabric pores and permeability to air and water vapor, protection against water is not complete under high hydrostatic pressure and the wearer will become wet in downpour when the hydrostatic pressure is high enough.
Methods of water repellent	There are two main methods of water-repellent treatment such as hydrophobic admixture method and surface treatment method [29,30,31]. Many studies have shown that hydrophobisation has a positive effect on improving material properties.

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APPENDICES

Appendices #: **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, hypothesize, 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, characterize, 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, dramatize, 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 remember the information?	Define, describe, draw, find, identify, label, list, match, name, quote, recall, recite, tell, write, duplicate, memorise, recall, repeat, reproduce, state,

Appendices #: 21ST CENTURY SKILLS

WAYS OF THINKING	Creativity and innovation • Think creatively • Work creatively with others • Implement innovations Critical thinking, problem solving and decision making • Reason effectively and evaluate evidence • Solve problems • Articulate findings Learning to learn and meta-cognition • Self-motivation • Positive appreciation of learning • Adaptability and flexibility
WAYS OF WORKING	Communication • Competency in written and oral language • Open minded and preparedness to listen • Sensitivity to cultural differences Collaboration and teamwork • Interact effectively with others • Work effectively in diverse teams • Prioritise, plan and manage projects

TOOLS FOR WORKING	**Information literacy** • Access and evaluate information • Use and manage information • Apply technology effectively **ICT literacy** • 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	**Citizenship – global and local** • Awareness and understanding of rights and responsibilities as a global citizen • Preparedness to participate in community activities • Respect the values and privacy of others **Personal and social responsibility** • Communicate constructively in different social situations • Understand different viewpoints and perspectives **Life and career** • Adapt to change • Manage goals and time • Be a self-directed learner • Interact effectively with others

Appendices #: TEACHING AND LEARNING STRATEGIES

STRATEGY	TEACHER	STUDENTS
CASE STUDY Used to extend students' understanding of real life issues	Provide students with case studies related to the topic of the lesson and allow them to analyse and evaluate.	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.
DEBATE A method used to increase students' interest, involvement and participation	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.	Conduct researches to gather supporting evidence about the selected topic and summarising the points. They are engaged in collaborative learning by delegating and sharing tasks to group members. When debating, they improve their communication skills.

DISCUSSION The purpose of discussion is to educate students about the process of group thinking and collective decision.	The teacher opens a discussion on certain topic by asking essential questions. 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. Use how and why follow-up questions to guide the discussion toward the objective of helping students understand the subject and summarise main ideas.	Students ponder over the question and answer by providing ideas, experiences and examples. Students participate in the discussion by exchanging ideas with others.
GAMES AND SIMULATIONS Encourages motivation and creates a spirit of competition and challenge to enhance learning	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 prices.	Go into groups and organize. Follow the instructions and play to win

OBSERVATION Method used to allow students to work independently to discover why and how things happen as the way they are. It builds curiosity.	Give instructions and monitor every activity students do	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 • Observe and ask essential questions • Record • Interpret
PEER TEACHING & LEARNING (power point presentations, pair learning) 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.	Distribute topics to groups to research and teach others in the classroom. Go through the basics of how to present their peer teaching.	Go into their established working groups. Develop a plan for the topic. Each group member is allocated a task to work on. Research and collect information about the topic allocated to the group. Outline the important points from the research and present their findings in class.

PERFORMANCE-RELATED TASKS (dramatization, song/lyrics, wall magazines) Encourages creativity and take on the overarching ideas of the topic and are able to recall them at a later date	Students are given the opportunity to perform the drama using the main ideas of a topic. Provide the guidelines, expectations and the set criteria	Go into their established working groups. Being creative and create dramas, songs/ lyrics or wall magazines in line with the topic.
PROJECT (individual/group) Helps students complete tasks individually or collectively	Teacher outline the steps and procedures of how to do and the criteria	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.
USE MEDIA & TECHNOLOGY to teach and generate engagement depending on the age of the students	Show a full movie, an animated one, a few episodes from documentaries, you tube movies and others depending on the lesson. Provide questions for students to answer before viewing	Viewing can provoke questions, debates, critical thinking, emotion and reaction. After viewing, students engage in critical thinking and debate

Appendices #: ***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 #: *Assessment Strategies*

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.

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.

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.

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.

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.

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.

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. Reconvene as a group, and call on different pairs to ask them to share their thoughts.

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.

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.

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

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.

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.

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 #: **LESSON PLAN TEMPLATE**

Strand: ……

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:

- ……
  ...
- ……
  ...

Appendices #: *A Sample Scoring Rubric*

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

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

Appendices #: **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 #: **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 #: **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 p rofessional 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 q uality project. Project obviously does not meet minimal standards.
Creativity/ Design	Project reflects many fundamental elements of design and ceativity. 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.

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.
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.

Appendix; 7

This extra content knowledge that teachers will need to enhance the knowledge on Fibres and fabrics in the benchmarks of the first unit of this strand

10 Differences Between Fibre And Fabric

Fibre refers to the individual threads or strands that are used to make a yarn, which is then woven into a fabric. Fabrics, on the other hand, are the finished product that is created by weaving, knitting, or otherwise joining fibers together.

So the fiber can be compared to a brick used in the construction of a building, and the fabric is the building itself. The properties of a textile, such as strength, durability, and appearance, are determined by the type and quality of the fibers used. In this article, we discuss 10 differences between fibre and fabric.

Difference between fibre and fabric

Difference between fiber and fabrics:

Fibre refers to the individual threads or strands that are used to make fabrics. Fabrics, on the other hand, are the finished product that is created by weaving, knitting, or otherwise joining fibers together.

Fibers can be natural as well as synthetic. For example, fibres such as cotton, wool, and silk are natural, and fibres such as polyester and nylon are synthetic. They can also be blended together to create different types of fabrics. Fabrics, on the other hand, can be used to make a wide range of products, including clothing, blankets, and upholstery. They can also have different properties, such as being lightweight, stretchy, or waterproof.

In short, fibers are the raw materials that are used to make fabrics, and fabrics are the finished products that are created from those fibers. In the below table, we have tried to summarize the 10 differences between fibre and fabric based on different parameters like definition, hierarchy, origin, examples, production, properties, uses, durability, and cost.

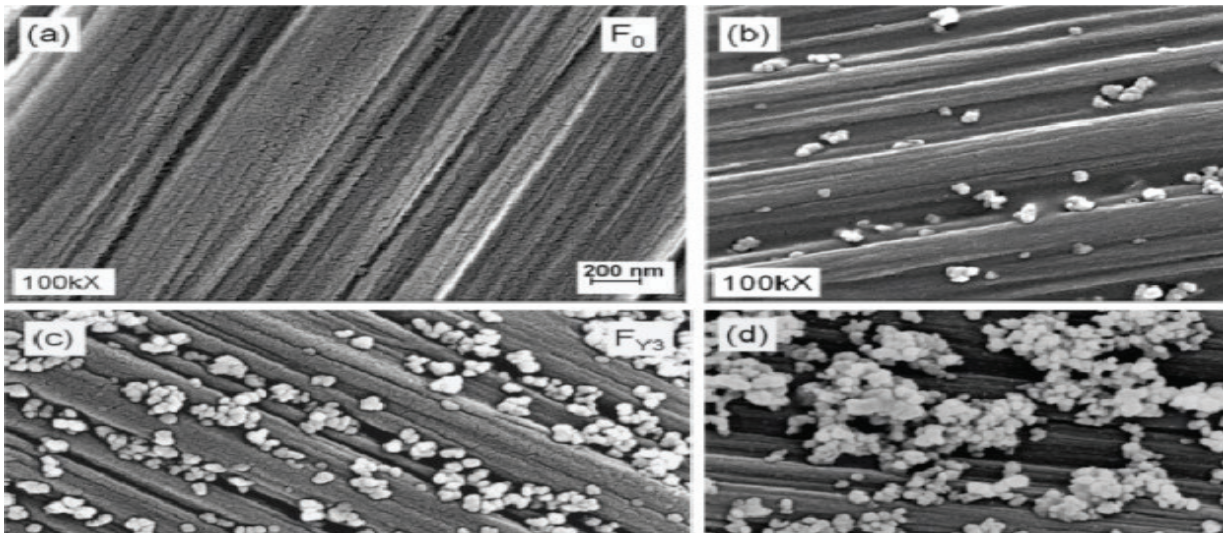
Differentiation	Fibre	Fabric
Definition	Fibre refers to the raw materials used to make fabric, such as cotton fibre is used to make cotton fibre, wool fibre is used to make woollen fabric, silk fibres to make silk fabrics, etc	Fabric refers to the finished product made from these fibers, such as cotton T-shirts, wool sweaters, and silk scarves.
Hierarchy	The raw material used to make textiles.	The finished product is made from fibers.
Origin	Can be sythetic or natural	can be a combination of synthetic and natural or pure.
Examples	Examples include cotton, wool, silk, etc	Examples include cotton shirts, wool suits, silk curtains
Processing	Can be spun into yarn or thread	Can be woven or knitted into various textures and patterns
Production	Fibre is produced through natural processes such as growing cotton plants or raising sheep for wool.	Fabric production involves spinning the fibers into yarn and then weaving or knitting the yarn into fabric.
Properties	Fibers have different properties such as absorbency, strength, and elasticity.	The property of the fiber affects the properties of the fabric, such as how well it absorbs moisture or how stretchy it is.
Uses	Fibres are used in a wide range of products, from clothing and textiles to industrial materials such as rope and insulation.	Fabrics are used primarily in clothing and home furnishings, but also in industrial and medical applications.

Durability	Fibres are generally more durable than fabrics as they can withstand more wear and tear.	Fabrics made from natural fibers such as cotton and linen are more durable than those made from synthetic fibers such as polyester.
Cost	Fibres are generally cheaper than fabrics as they are the raw materials used to make the fabric.	However, the cost of fabric can depend on the type of fiber used, the quality of the yarn, and the type of fabric.

Difference between fibre and fabric

Research articles to understand the difference between fibre and fabrics

In this article titled "Strengthening of a Fibre-Matrix Interface: A Novel Method Using Nanoparticles" authors have tried to improve the properties of a carbon fabric made from carbon nanofibers by adding Ytterbium nanoparticles on the surface of the individual fibres. They used electron microscopy to view the increased roughness of the fiber surface and the adhesion of NPs on the fiber surface.



Field emission scanning electron microscope images of a simple carbon fibre fabric and a nanoparticle modified carbon fibre fabric.

Is a yarn similar to a fibre?

A yarn is a long, thin strand (or thread) consisting of many fibers that can be woven into fabric. So, yarn is made up of many fibers, and fabric is made up of many yarns. Ply is a term used to describe the number of threads or yarns that are twisted together to create a single strand of thread or yarn. And Denier is used to measuring the fineness of a fiber or yarn, which is determined by the weight of the fiber or yarn per unit length. A warp in a fabric is a set of threads or yarns that run lengthwise in a fabric and are interlaced with the weft to create a woven fabric. A weft in a fabric is a set of threads or yarns that run widthwise in a fabric and are interlaced with the warp to create a woven fabric.

APPENDIX 8: TIME ALLOCATION FOR JUNIOR AND SENIOR HIGH