Design and Technology Subject Field

Lower Secondary

Teacher Guide

Design and Technology

Practical Skills

Home Economics

Computing

Papua New Guinea
Department of Education

Acknowledgments

Contents

Secretary's message

This teacher guide is to be used by teachers when implementing the Design and Technology Lower Secondary subject field syllabuses throughout Papua New Guinea. It contains detailed information about subject content and a broad range of practical ideas, strategies and activities.

There are four subjects in the Design and Technology subject field: Design and Technology, Practical Skills, Home Economics and Computing. There is one teacher guide as all the subjects use the design process in each unit where students are actively involved in designing and making products through using and applying skills and techniques they have learnt. I encourage teachers to try out the ideas and strategies that they believe to be appropriate for their schools and effective with their students. Teachers can modify and amend these ideas to suit their local needs.

I commend and approve this lower secondary Design and Technology teacher guide for use in all schools with grades 9 and 10 students throughout Papua New Guinea.

DR. JOSEPH PAGELIO
Secretary for Education

Introduction

The purpose of this teacher guide is to help you implement one or two of the four Design and Technology syllabuses. It is designed to stimulate you to create exciting and meaningful teaching programs and lessons by enabling you to choose relevant and purposeful activities and teaching strategies. It will encourage you to research and look for new and challenging ways of facilitating students' learning.

The teacher guide and the syllabus must be used side by side. The syllabus states the learning outcomes for the subject and each unit, and outlines the content and skills that students will learn, and the assessment requirements.

The teacher guide provides direction for you in using the outcomes approach in your classroom using a step by step approach. Although the syllabus provides the assessment tasks at the end of each unit, the outcomes approach requires you to consider the assessment requirements early in your planning. This is reflected in the teacher guide.

This teacher guide provides examples of teaching and learning strategies for Design and Technology subjects, sample programs for the units, elaboration of suggested activities and content, detailed information on how to mark assessment tasks and the resources needed to teach Design and Technology subjects. The section on recording and reporting shows you how to record students' marks and how to report against the broad learning outcomes.

Teaching and learning

How students learn

What I hear I forget.

What I hear and see I remember a little.

What I hear, see and discuss I begin to understand.

What I hear, see, discuss and do, I acquire knowledge and skill.

What I teach to another, I master.

Active Learning Credo statement by Silberman 1996

In support of this are the findings that we remember:

- 20% of what we hear
- 40% of what we see
- 90% of what we see, hear, say and do or what we discover for ourselves.

A student-centred approach to learning

Different students learn in different ways. Some students learn best by writing, others by talking and discussing, others by reading and others by listening. Most students learn by using a combination of those. All students learn skills through practicing and repetition. You need to use a variety of teaching strategies to cater for the different ways your students learn.

Teaching and learning strategies

To assist and encourage students to learn, you perform certain tasks. These are referred to as teaching strategies. You need to engage students directly in learning but there are times when you have to take charge of the learning in the class and teach particular concepts or ideas

Teaching strategies include:

- group work
- skills practice
- research/inquiry
- class discussions/debates
- problem-solving activities
- teacher talk, instructions, explanations, lectures or reading aloud
- directed question and answer sessions
- audio-visual presentations
- text books or worksheets
- directed assignments
- demonstration and modelling
- guest speakers
- classroom displays.

Using groups of different sizes as a teaching and learning strategy

Using groups is an important strategy as students learn from each other and not just from the teacher and encourages students to participate in achieving a shared goal. Group work encourages cooperative learning. In deciding whether to use groups or not, you need to consider the following:

- your intended outcomes
- the extent to which the outcomes can be achieved by a groups
- the lesson content
- the time allocated for the completion of the task
- the classroom setting
- available materials and resources
- the structure of the group based on gender, ability, cultural background and student preferences.

These are important considerations and it may be the case for many lessons and subjects that group work it not appropriate.

Groups work well when:

- the group decides upon their goal, timelines and tasks
- students realise that success depends on the achievement of the whole group, not individuals
- the task is broken into subtasks which must be finished to successfully complete the overall task
- the whole class is involved in the activity
- everyone has a role to play, e.g. performances
- membership of small groups is changed regularly to provide a variety of learning experiences for all students.

Strategies for organising and managing groups:

- mixed-ability groups – the more able learners in the group can help the others to master the work so that the teacher need not teach some parts
- same-ability groups – the teacher can leave the groups of faster learners to get on with the work on their own. S/he can give extra help to individual learners in the slower groups.
- using group leaders – some teachers appoint faster, more able learners as group leaders who can help slower learners.

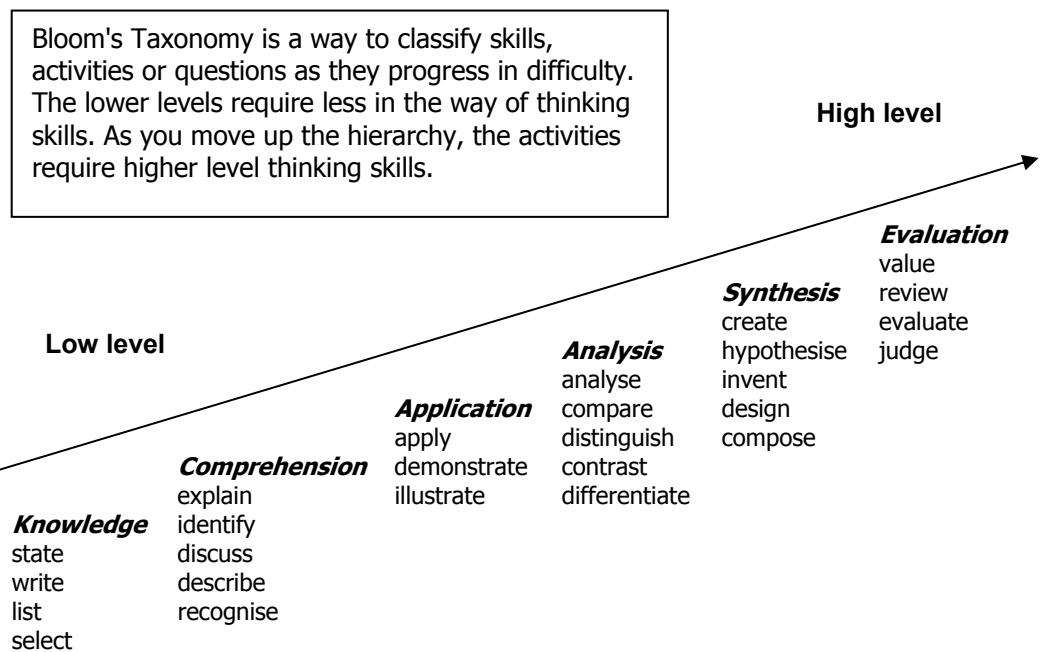# Developing Skills

Principles and procedures

Students need to develop skills to help them learn. Skills development should happen as a part of students' learning experiences and the learning and practicing of skills needs to occur in the context of the units being taught.

Skills learning tends to be most effective when:

- students go from the known to the unknown
- students understand why it is necessary to gain mastery of specific skills
- skills are developed sequentially at increasing levels of difficulty
- students identify the components of the skill
- the whole skill and the components of the skills are demonstrated
- there are frequent opportunities for practice and immediate feedback
- the skills being taught are varied in terms of amount and type, according to the needs of students
- the skill is used in a range of contexts.

To teach skills effectively you need to include learning activities that span the range from teacher-directed to student-centred learning, use groups of different sizes ranging from the whole class to small groups and use a range of teaching strategies which use higher order skills as students progress.

Bloom's taxonomy of skills

Bloom's Taxonomy is a way to classify skills, activities or questions as they progress in difficulty. The lower levels require less in the way of thinking skills. As you move up the hierarchy, the activities require higher level thinking skills.

High level

Low level

Evaluation
value
review
evaluate
judge

Synthesis
create
hypothesise
invent
design
compose

Analysis
analyse
compare
distinguish
contrast
differentiate

Application
apply
demonstrate
illustrate

Comprehension
explain
identify
discuss
describe
recognise

Knowledge
state
write
list
select

Language skills for Design and Technology

Students need to learn how to speak and listen, read and write, view and observe. Students learn language skills through, for example:

- discussions
- debates
- oral and written reports
- interviewing opportunities.

Providing opportunities for students to listen is very important. Guest speakers, CD's, tapes, radio, television, stories are listening resources. When students have listening experiences as a regular part of classroom activities, their ability to listen and their comprehension will improve.

Place of vernacular in Design and Technology subjects

Maintenance of the student's language is something that continues at Lower Secondary as stated in the Department of Education's Language policy in all schools. At times it will be appropriate to use vernacular, Motu or Tok Pisin to explain concepts or ideas. For example, it would be appropriate to use the vernacular, Motu or Tok Pisin when undertaking village technology projects.

Writing skills

Students must be able to choose the right word to get the message across and be able to put the words together in a way that makes sense to the reader. The ability to write well and use appropriate vocabulary and technical terms takes a lot of practice and writing skills and techniques should be emphasised in Design and Technology subjects.

Thinking and questioning skills

Design and Technology assists students to analyse and think critically about information they come across. By processing information rather than rote learning, students are more likely to understand and retain what they have learnt. Students must be involved in the process of thinking instead of simply accepting the end products of someone else's thoughts. The ability to think critically can be taught effectively by asking the types of questions listed below:

- what do you notice/see/find?
- what difference do you ...?
- what similarities do you ...?
- which ones belong together? why?
- why don't these belong to this group ...?
- what could have happened if ...?
- what would ... be like if ...?
- how would you ...?
- what explanation would you give for ...?
- is this always so?
- does evidence of ... change the original explanation?
- how can this be tested/checked?
- suppose ...what would happen?
- what makes you think this would happen?
- what would be needed for that to happen?
- is there a different explanation?
- if … happened, what would happen next?

Teaching and learning strategies for Design and Technology subjects

The most important teaching and learning strategy used in Design and Technology subjects is the design process. This process is introduced through a design brief provided by the teacher. The design brief should always be accompanied by assessment performance standards which will identify the specific features by which a student will be assessed.

Other teaching and learning strategies will be integrated into the design process.

Design Brief

A design brief outlines the task or project that student's will be expected to complete.

A design brief consists of:

A context – the context explains the content and the purpose of the task or project

A task – provides clear instruction about the task or project.

Specifications – specifies directions or places limitations on the design solution

The design process

Design – encourages students to investigate, identify, explore, develop, apply and communicate

Make – engages students in producing and constructing

Evaluate – asks students to question, examine, assess and to review

Market – encourages students to think about advertising, selling and making a profit.

The Design Process

Designing is about… identifying, exploring, developing, applying, communicating and evaluating ideas.
When students design they:

- identify a problem
- clarify/ explain the problem
- explore and think of ideas for design solutions
- share ideas with a range of people
- make appropriate design choices in terms of cost and availability of resources
- conduct a needs analysis through questioning (market research)
- model or trial design solutions
- develop and refine ideas

Making …is about producing and constructing products to meet identified needs.
When students make they:

- work on a design solution individually or cooperatively
- select and work with a range of tools and materials safely and resourcefully
- develop an understanding of the positive and negative consequence that the production, use and disposal of a product could have on a community
- develop a range of skills to work with accuracy to produce a quality product
- adapt ideas and plans in response to specifications and difficulties.
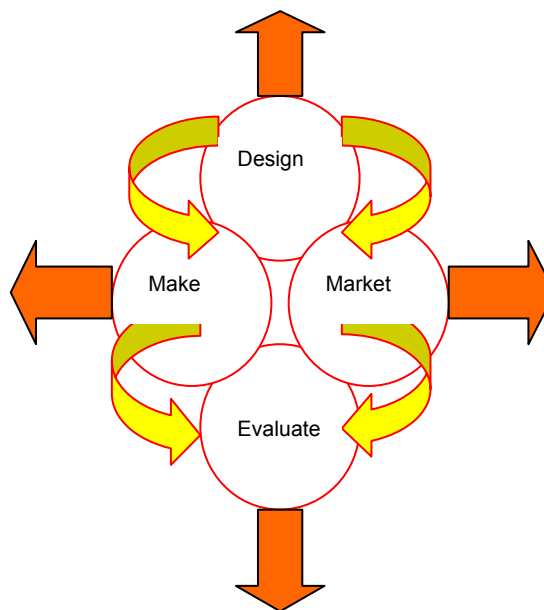
Marketing …is about advertising, selling and profit.
When students market a product they:

- recognise and meet the needs of the user or buyer
- calculate selling prices and keep a record of sales
- calculate production costs and determine profit
- develop and use competitive marketing strategies
- explore ways to effectively advertise and sell products
- investigate ways to value add to products
- consider alternative ways that a product can be used effectively if it is not marketable

Evaluating is about questioning, examining, assessing and reviewing
When students evaluate they:

- review the outcome to check if it successfully meets the needs of the design brief
- reflect on the process of designing, making and marketing to see if aspects of the design process could be modified or improved
- analyse the viability of the product to decide on continuation or possibility of exploring alternative products.

What makes a good design?

There is no secret formula for making something that everyone likes and agrees is a good design. It is up to people to make a choice and decide what they like or dislike and what works best. When deciding if a product is a good design, think about:

- Function – how effectively and efficiently a product carries out the task that it is designed to carry out.
- Aesthetics – what a product looks like. It is an emotional response based on how appealing an individual finds the design. Components such as visual appeal, proportion, colour and texture help determine whether an item is judged aesthetically pleasing or not.
- Shape and form – the outline or outward appearance of an object. Colour and material are not relevant to an object's shape or form.
- Proportion – balance. If a product is well proportioned, it is balanced. For example, if it is too tall and skinny it will fall over, or look silly either by itself or next to something else. Symmetrical balance means that one side looks the same as the other. Asymmetrical balance means that one side is different to the other. Either style can be used in good design.
- Colour – the colour of a product can affect whether or not a product is aesthetically pleasing.
- Ergonomics – this is how well the form of the product suits its purpose. For example, a chair that you sit in for long hours must have a form that is comfortable but does not hurt your back. Things that are ergonomically well designed are comfortable and easy to use.
- Safety – safe use and operation are essential considerations when designing products. This is particularly crucial in the design of products for babies or children or where electricity is involved. All aspects of a design need to be assessed for risk and any potential dangers removed or at least minimised.
- Durability – this is how long a product will last. Durability will depend on the quality of the materials used to make it, and how well it is made.
- Ecology – sustaining our environment by reducing waste and caring for our resources is becoming more important to designers. Many products today are developed using eco-design considerations and undergo analysis to minimise their impact on the environment and to ensure sustainable resources for the future.
- Equitable and intuitive use – this is ease of understanding for users, regardless of their experience, knowledge, language and physical abilities.

Starting to design and make things

- It is not always easy to work out how to start to design and make a project. Many designers use the problem-solving process to help design, make and appraise projects they make.
- You should explain to your students that the problem-solving process gives a starting point so that the task of designing and making projects is easier. The following are stages that a designer may work through in order to change an idea into a finished product.

Steps for undertaking the design process in Design and Technology subjects

1. The design brief

This explains exactly what the design problem is.

2. The specifications

These are things that limit or restrict the designer/maker such as:

- Materials – are the materials available? Will you be able to use them as you want to?
- Time – will there be enough class time to finish the project, or is it too big or too difficult?
- Cost – are the materials very expensive? Is the design too big, using so much material that it will be too expensive to make?
- Tools and machines – do you have the correct tools to make the project? Do you know how to use all the tools you will need to make the project?

3. Investigation

Students will need to think, read and talk about some of the difficult things that have to be worked out in order to make the project.

- Function – what will it be used for and how will this affect the design?
- Materials – some testing and research may need to be done to make sure that the materials they want to use are the best and safest for the project.
- Environmentally safe – how will the materials students want to use affect the environment?

4. Drawings

The more drawings students do the more skilled they will become at expressing their ideas in drawings. Drawings help them to see choices more clearly.

- Rough sketches – these are done first. They do not have to be detailed or neat, just put ideas down on paper quickly as they come into mind.
- Freehand sketches – these are next. Students choose from their rough sketches and draw the idea(s) that they want to make. More care must be taken with these drawings. They should be as neat as possible so that other people can understand their idea(s).

5. Prototype or sample

This is a small model that looks the same as the design for the project. It gives an idea of what the design will look like before it is made. A prototype can be made from paper cardboard or cheap material. Using this prototype students can alter their idea or improve it. It is not always necessary to make a prototype; sometimes just a paper pattern is enough.

6. Making

This is the student's action plan for making a project. Questions are asked under this heading to help them think through the order in which things need to be done. They must think about the answers to questions before starting to make the project. Making involves using skills and techniques to complete the product.

7. Evaluation/testing/modification

Does the finished project do what it is meant to do? Does it look good? Is it safe to use? Is it safe to eat? Does it fit?... and many more questions. Students have to be able to test their finished project and write about it honestly. Sometimes the product may need to be changed or modified to improve it, make it usable or make it safe.

Other teaching and learning strategies for Design and Technology

Brainstorming

This is a technique in which a class or group meets in order to record all the information already known on a topic, to develop new ideas or to stimulate creative thinking. Participants 'let the ideas come into their heads', write them down, sort them and decide which require further research. This is an excellent technique used in the introduction of a unit to gain an understanding of student's prior knowledge. This strategy could be used when introducing the Technical Drawing unit where students could be asked to identify where they have seen different lettering or investigate different types of lettering found on a range of print materials etc.

Consequence charts

A consequence chart is used to record what students believe to be the likely consequences of a decision or action. Charts can take different forms and enable students to explore cause and effect relationships, alternative consequences or the likely consequences of alternative actions or decisions. For instance this strategy could be used when teaching about safety: students could discuss what would happen if they did not follow safety procedures and practices.

Classroom displays

A classroom display provides a way of focusing on the current unit. It stimulates learning, provides a record of learning as well as encouraging students to interact and to respond to learning.

Charts

Helping students to learn to use charts, that is, to organise information in various groupings under different headings, is valuable. It not only helps them to make sense out of a previously unrelated mass of data, but it is a

crucial step in the process of developing new ideas and concepts to use in making sense of their experiences. Charts are a powerful organising tool and of considerable help in getting students to think about information and concepts, for example a chart could be made to list and classify different food groups or to list the uses of a range of tools.

Flow charts

A flow chart is a diagram showing a series of step -by-step operations which make up a particular process. The main elements of the process are shown in picture form and are linked by arrows to indicate how one operation leads to the next. A flow chart can also be used to show stages in the development of a product.

Diagrams

Diagrams may be used to illustrate features of an object. They can show how something works, e.g. the parts of a machine such as a sewing machine. The best diagrams are clear, with all the necessary details, and labels to identify features and explain how it operates.

Cultural activities

Through participation in cultural activities, students are exposed to a variety of activities that give them insight into their own culture or that of others. Programming should take into account local cultural events as well as national events. For instance in Home Economics students are encouraged to produce traditional foods as well as foods from a range of other countries.

Evaluation

Evaluation involves weighing up options, consequences and evidence in order to make choices and take action. The evaluation stage in the design process requires students to:

- reflect on the process of designing, planning, making and marketing to see if the product could be improved in the future
- determine if the product works or if it could be modified and improved
- analyse the viability of the product to decide on whether or not to continue producing the product.

Discussion

Discussions provide opportunities to express ideas and feelings and listen to others, to look at issues from other perspectives, however it is not practical with more than 20 people in a class. If class discussions are going to be used in a large class, the class should be divided into two or more groups.

Guest speaker or visitor

A guest speaker or visitor is a person who is invited to share his/her knowledge and skills with students. This may be a teacher from another class, a parent, a member of the local community or a representative from a group, organisation or institution. This strategy should be used when teaching Village Technologies units in Practical Skills where someone from the community who has the skills and knowledge in making products from resources in the village can come and share his/her knowledge with students.

Models

Models provide demonstration of a concept in concrete form. Models can include items made from timber, clay, fabrics and traditional materials.

Photographs and pictures

Photographs and pictures are visual texts. They can be used to develop numerous skills, e.g. observing, classifying, grouping, comparing and contrasting. Photographs allow for reinvestigation of first-hand experiences at a later date. They also clarify and stimulate further inquiry. Students can take/use photographs as a means of gathering and recording information. Computer technology enables photographs to be stored and reproduced in various ways. Pictures or photographs of tools, equipments and machines are particularly useful when emphasising safety aspects and issues.

Presentations

Presentations are used to share information obtained through individual and group research and study. Presentations can be spoken, written or multimedia. They give students experience in organising, planning and presenting information and material to a particular audience and are therefore valuable experiences for both the presenter and the audience.

Problem solving

A particularly relevant teaching and learning strategy for Design and Technology design briefs is problem solving. Students are involved in identifying and working towards solutions to design problems. The classroom, school grounds, community and home all contain problems which are appropriate starting points for Design and Technology investigation by students.

The purpose of learning through the application of problem solving skills is to link conceptual understandings with practical experiences. It is important that students be given opportunities and apply problem solving techniques to a range of issues.

The teacher's role is to:

- assist students identify problems that are relevant and solvable
- organise learning that develops skills in problem solving
- choose learning activities which encourage responsible actions.

Reflective learning

Reflection is the act of thinking about what has been learnt. It often involves putting learning into a new context, looking at the experiences in a new light, interpreting what has been said or done for different applications or a new situation. Teachers need to provide time both during and at the end of any learning experience for students to contemplate the content and processes in which they have been involved. This time needs to allow for individual, small group and whole class reflection. As a result of reflective learning students may develop flexibility and creativity.

Research

In Home Economics and Practical Skills students are encourage to carry out needs analysis or market research. This process occurs before students select a particular product to make. The purpose of this is to establish a need or a demand for the product. It is very important especially if the product is to be marketed or sold for an income.

Using the internet for investigations

The Internet encompasses a number of facilities including the World Wide Web and electronic mail (e-mail), It is both a useful source of information on many topics and a means of communicating with people in other places. Specific skills are required to access information on the Internet and more importantly to critically evaluate and validate such information.

Values education

No educational activity is value free. You have a responsibility to impart to your students' PNG values, and moral, ethical, democratic, and educational values.

Assessing Design and Technology subjects

Assessment is an important part of teaching and learning. It is used to:

- evaluate and improve teaching and learning
- report achievement
- provide feedback to students on their progress.

Assessment in Design and Technology subjects measures students' achievements of the unit learning outcomes described in the syllabus. It is an ongoing process of identifying, gathering and interpreting information about students' achievement of the learning outcomes and can be integrated into the students' normal learning activities.

Assessment *for* learning

Assessment *for* learning is often called formative assessment and is assessment that gathers data and evidence about student learning during the learning process. It enables you to see where students are having problems and to give immediate feedback which will help your students learn better. It also helps you plan your program to make student learning, and your teaching more effective. Often it is informal and students can mark their own work or their friends. An example is a quick class quiz to see if students remember the important points of the previous lesson.

Assessment *of* learning

Assessment of learning is often called summative assessment. It is used to obtain evidence and data that shows how much learning has occurred, usually at the end of the term or unit. End of year examinations are examples of summative assessment. It is usually done for formal recording and reporting purposes.

Assessing Design and Technology units

In the Design and Technology syllabuses, the unit outcomes, which link to the broad learning outcomes, are assessed through specified assessment tasks using a range of assessment methods. Assessment criteria for each unit outcome provide clear indications of how, and to what extent, the achievement of the learning outcomes may be demonstrated. Performance standards, marking guides and assessment criterion help teachers with the marking process and this ensures that assessment is consistent across schools.

Students must complete the assessment tasks for the unit. You will expand each task by providing a design brief which gives clear guidelines to students for how the task will be completed and how the criteria will be applied.

When you set a task make sure that:

- the requirements of the task are made as clear as possible to the student
- the assessment criteria and performance standards or marking guides are provided to the student so that they know what it is that they have to do
- any sources or stimulus material used are clear and appropriate to the task
- instructions are clear and concise
- the language level is appropriate for the grade
- it does not contain gender, cultural or any other bias
- materials and equipment needed are available to students
- adequate time is allowed for completion of the task.

Feedback

When you assess the task, remember that feedback will help the student understand why he/she received the result and how to do better next time.

Feedback should be:

- constructive so that students feel encouraged and motivated to improve
- timely so that students can use it for subsequent learning
- prompt so that students can remember what they did and thought at the time
- focused on achievement, not effort the work should be assessed, not the student
- specific to the unit learning outcomes so that assessment is clearly linked to learning.

Feedback can be:

- informal or indirect – such as verbal feedback in the classroom to the whole class, or person to person
- formal or direct –I n writing, such as checklists or written commentary to individual student either in written or verbal form
- formative – given during the topic with the purpose of helping the student know how to improve
- summative – given at the end of the unit with the purpose of letting the students know what they have achieved.

Tests

A test is a formal and structured assessment of student achievement and progress which the teacher administers to the class.

Tests are an important aspect of the teaching and learning process if they are integrated into the regular class routine and not treated merely as a summative strategy. They allow students to monitor their progress and provide valuable information for you in planning further teaching and learning activities.

Tests assist student learning if they are clearly linked to the outcomes. Evidence has shown that several short tests are more effective for student

progress than one long test. It is extremely important that tests are marked and that students are given feedback on their performance.

There are many different types of tests. Tests should be designed to find out what students know and about the development of thinking processes and skills. Open questions provide more detailed information about achievement than a question to which there is only one answer.

Principles of designing classroom tests

Tests allow a wide variety of ways for students to demonstrate what they know and can do. Therefore:

- students need to understand the purpose and value of the test
- the test must assess intended outcomes
- clear directions must be given for each section of the test
- the questions should vary from simple to complex
- marks should be awarded for each section
- the question types (true/false, fill-in-the-blank, multiple choice, extended response, short answer, matching) should be varied.

Tests should:

- be easy to read (and have space between questions to facilitate reading and writing)
- reflect an appropriate reading level
- involve a variety of tasks
- make allowance for students with special needs
- give students some choice in the questions they select
- vary the levels of questions to include gathering, processing and applying information
- provide sufficient time for all students to finish.

Who assesses?

Teacher assessment

Assessment is a continuous process. You should:

- always ask questions that are relevant to the outcomes and content
- use frequent formative tests or quizzes
- check understanding of the previous lesson at the beginning of the next lesson through questions or a short quiz
- constantly mark/check the students' written exercises, class tests, homework activities
- use appropriate assessment methods to assess the tasks.

Frequency of assessment

You should schedule the specified assessment tasks to fit in with the stages of the design process. Some assessment tasks might be undertaken in the first few weeks of the unit, others towards the end of the unit. You should take care not to overload classes with assessment tasks at the end of the term.

Judging student performance

Student achievement is recorded and reported against standards. You must use the performance standards or marking guides provided in each unit of this teacher guide when making a decision about the achievement of your students in relation to the unit learning outcomes. The performance standards describe the level at which the student has to be working to achieve a particular standard or mark.

Students should always have access to a copy of the assessment criteria and the performance standards so that they know what it is they have to know and be able to do to get a good mark in a particular task. The performance standards will help you in your marking and will help your students improve their performance in the future. They are useful when providing feedback to students as they explain what it is the student needs to do to improve.

Moderation

To ensure that you are interpreting the performance standards correctly when assessing your students, it is important to undertake subject moderation of student work within your school and with teachers of nearby schools.

To moderate student work, a common assessment task must be used and a marking scheme developed so that all students complete the same task under the same conditions, and all teachers use the same marking scheme. Teachers can then compare (moderate) the students' work and come to a common understanding of the performance standards and the requirements for a particular mark or level of achievement.

Moderation enables you to be sure that your understanding of the required standards for levels of achievement is similar to the understanding of other teachers and that you are assessing students at the appropriate level.

Self assessment and peer assessment

Self and peer assessment helps students to understand more about how to learn. Students should be provided with opportunities to assess their own learning (self assessment) and the learning of others (peer assessment) according to set criteria.

Self and peer assessment:

- continues the learning cycle by making assessment part of learning
- shows students their strengths and areas where they need to improve

- engages students actively in the assessment process
- enables students to be responsible for the learning
- helps students understand the assessment criteria and performance standards.

Managing assessment tasks for Design and Technology

Usually, the marking of assessment tasks is done by the teacher.

To reduce the amount of work it is necessary to develop a strategic approach to assessment and develop efficiencies in marking.

In Design and Technology subjects there are a number of assessment tasks that may be new to teachers and students. Below are suggestions on how to manage some of these tasks to minimise marking or presentation time.

Develop efficiency in marking

Clarify assessment criteria–plan the design brief carefully, and ensure that all students know what it is before they begin. Discuss the brief and its criteria in class, giving examples of what is required. Distribute a written copy of the instructions and the criteria, or put them on the board. Making the assessment criteria explicit, speeds marking and simplifies feedback.

Supply guidelines on what is required for the task–this reduces the amount of time wasted evaluating student work that is irrelevant**.**

Use attachment sheets such as marking guides–an assignment attachment sheet, which is returned with the assessed work, rates aspects of the task with a brief comment. Such a system enables each student's work to be marked systematically and quickly. This strategy can be applied to the design portfolios.

Assess in class–use class time to carry out and assess stages of the design tasks. On-the-spot reports on projects, stages of the design process, or practical work , take less time to mark, and are useful, because they give immediate feedback to students on their progress.

Feedback to the whole class–feedback to the whole class can cut down on the amount of individual feedback required. On returning assessed work, emphasise the criteria for judging the work, discuss the characteristics of good and bad answers, and highlight common strengths and weaknesses.

Set clear deadlines. Set aside a time for marking. Be careful about extending this period through allowing students to hand in work late.

Shift the responsibility

Introduce self and peer assessment–develop in students the skills to evaluate their own work and that of their peers. Help the students use the assessment criteria, performance standards and marking guides against which work is judged. Self-assessment increases the amount of feedback students get. It can supplement teacher assessment.

Treat each task differently

Every piece of work need not be evaluated to the same degree; a mark need not be the outcome in every case; and every piece of student work need not contribute to the final grade. Assessment is designed to enhance the teaching and learning experience for the teacher and the learner, not just to give marks.

Analysis of student products

Analysing student products means that you look at how well your students have made a product according to the design brief. When you mark products students have made, you analyse the product in relation to the assessment criteria and this provides evidence of achievement. You can then make a judgment about the level of your student's achievement. Use the following marking guide when assessing products in all units.

Note

Any major project or design brief assigned in class needs to be assessed in stages rather than as a final product. This will encourage and motivate students as they work towards completing their project.

Marking guide for assessing a product: 60 marks				
	Yes	**No**	**Some times**	**Mark**
Worked safely at all times				/3
Wore appropriate safety gear				/3
Kept work space clean and organised				/3
Selected appropriate tools to make the product				/3
Selected appropriate materials to make the product				/3
Materials selected showed understanding of their properties				/6
Correct process followed to make product				/6
Demonstrated high level skills when using tools				/6
Used correct techniques				/6
Demonstrated high level skills in all aspects of making the product				/6
Product completed within required time frame				/3
Product met all the specifications of the design brief				/6
Product finished to a high standard				/6
			Total marks /60	

Design portfolios

The portfolio provides evidence of student achievement in a range of contexts. The portfolio documents each strand of the design process (see page 9 of the Teachers Guide). It provides evidence of the learning that has occurred as the student works through a design brief to complete a task. Most units require students to present a design portfolio as one of the assessment tasks. This means that the design portfolio has a clear purpose that is linked to the unit outcomes. It should contain *all* the work specified in the syllabus.

The design portfolio should:

- include the design brief
- show results of the investigation
- explore a range of ideas and include rough notes, sketches, design ideas
- include timelines
- include final drawings or patterns
- include samples or drafts where appropriate
- outline the making process
- review the final outcome to check that it successfully meets the needs of the design brief.

How to minimise marking times of portfolios

- specify the pieces of work and keep the number as low as possible. Only ask for drafts if they are appropriate. Some samples of the students best work is enough for you to give a valid assessment of their achievement
- mark as you go: ask that one of the pieces of work be completed at the end of week 3 and mark it then. Do not leave the assessment of the whole portfolio until the end of term
- use self-assessment: the student can self assess some of the samples of work

The portfolio does not have to be a folder or binder; it can be in the form of an exercise book with the student marking the pages they want to have marked as part of their portfolio.

The following performance standards must be used for assessing the design portfolio for all Design and Technology units. Teachers are required to assess the student's work in the portfolio in stages rather than waiting for the complete task

Performance standards for assessment – Design portfolio			Total marks – 20
Criteria	**Very High Achievement 18–20 marks**	**High Achievement 14–17 marks**	**Satisfactory Achievement 10–13 marks**	**Low Achievement 0–9 marks**
Designing and planning	Documentation shows a problem is thoroughly identified with a wide range of possible ideas for outcomes. A timeline is included. Detailed notes and sketches for innovative or original ideas generated. Detailed reasons for final choice of product are given. Portfolio includes: • content page • heading • excellent presentation and attention to detail	Documentation shows a problem is clearly identified with a range of possible ideas for outcomes. A timeline is included. Clear notes and sketches for innovative or original ideas generated. Clear reasons for final choice of product are given. Portfolio includes: • content page, • heading • very good presentation and attention to detail	Documentation shows a problem is identified with some possible ideas for outcomes. A timeline is included. Some notes and sketches for ideas generated. Some reasons for final choice of product are given. Portfolio includes: • content page, • heading • good presentation and attention to detail	Documentation shows a problem is not clearly identified with a limited range of possible ideas for outcomes. A timeline is included. Few notes and sketches for ideas generated. A few reasons for final choice of product are given. Portfolio does not include: • content page, • heading • unsatisfactory presentation and attention to detail
Making	Documentation includes • an extensive range of processes and materials used to complete the product in detail • all stages of production	Documentation includes • most processes and materials used to complete the product • most stages of production	Documentation includes • some process and materials used to complete the product • some stages of production	Documentation includes • limited process and materials used to complete the product. • few stages of production
Evaluation	Documentation clearly reflects an evaluation of the design process, outlining what was successful, what could be improved. A detailed evaluation of how the product meets the design brief is included. Extensive documentation of what has been learnt is included in portfolio.	Documentation reflects an evaluation of the design process, outlining what was successful, what could be improved. An evaluation of how the product meets the design brief is included. Very good level of documentation of what has been learnt is included in portfolio.	Documentation reflects some evaluation of the design process, outlining what was successful, what could be improved. A brief but adequate evaluation of how the product meets the design brief is included. Sound level of documentation of what has been learnt is included in portfolio.	Documentation reflects a very limited evaluation of the design process. An inadequate evaluation of how the product meets the design brief is included. Very limited level of documentation of what has been learnt is included in portfolio.

Drawing for projects

As part of the design process and a requirement of the design brief, students must make do drawings of design ideas. They start by making rough sketches and then do final drawings. The final drawings or plans can be neat, hand drawn sketches, or they may need to be more detailed and include measurements – orthographic drawings or projections.

Rough sketches
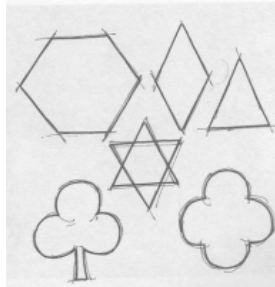
These drawings are used to work from when making the project. The first drawings are rough drawings or sketches.
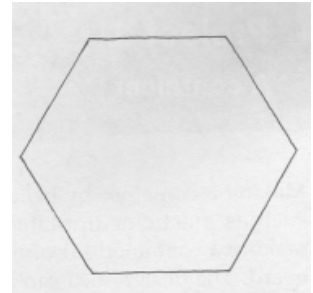
The best idea is chosen and a neater drawing done. These are called working drawings.

If precise drawings or plans are required, orthographic drawings are done. These are the final drawings. They are detailed drawings completed using tools such as rulers and set squares. All the measurements are written on them. They are referred to for checking measurements, the type of joint necessary or where materials are to be used.

Orthographic drawings

When producing orthographic drawings students generally produce three views; a *plan view, end elevation* and a *front elevation.*

The plan or top view/elevation

This is the view looking directly down on top of the object.

The front elevation or view

Looking straight on at the front of the object, this view normally shows most of the dimensions.

The end or side elevation

This is either one or sometimes both the remaining side views.

Hidden Detail

Hidden detail is shown by *dotted lines* and *centre lines* are shown by dashed lines. *Construction lines* are best left in the drawing and should not be rubbed out.

The drawing below is drawn in 3rd angle projection. There are three views, all of which are either exactly in line to one side or exactly in line above. The example shown gives a front view, a side view and a top view. These views are drawn with a drawing board and instruments. This type of drawing is called a working drawing
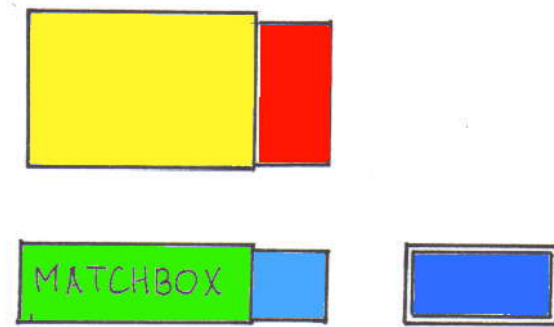
Working drawings are either full size or scaled if they are too big to fit on a page. All measurements are placed on the drawing to enable it to be made in the classroom. Measurements should not clutter the drawing and should be kept away from the drawing. Measurements should be read from the bottom or right hand side. Arrowheads can be used showing exactly where the measurements are from and to. Measurements should be in mm.
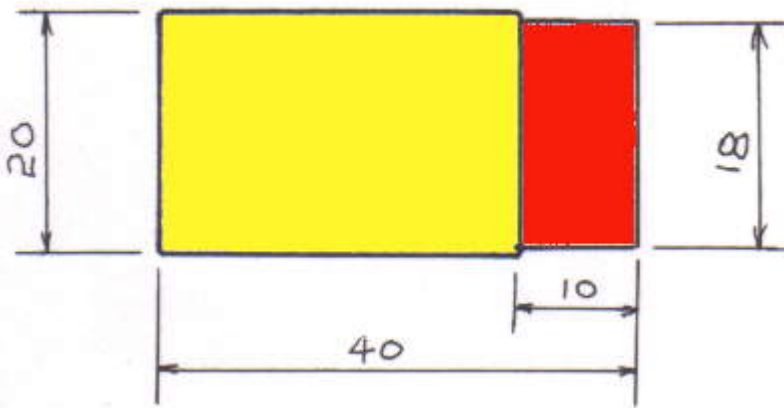
Planning and programming units

The main purpose of planning and programming is to help you to arrange the presentation of the unit in an organised manner. This will help you to know what to teach and when to teach it. It is strongly recommended that you plan with the other teachers who teach the same grade. By planning together, you will *all* have better lessons and make better use of your limited resources.

Points to consider when programming

- Which outcomes are students working towards?
- What is the purpose of this unit/topic/learning experience?
- Which learning experiences will assist students to develop their knowledge and understandings, skills, and values and attitudes in the subject?
- What are the indicators of student learning that you would expect to observe?
- How can the learning experiences be sequenced?
- How do the learning experiences in the unit relate to students' existing knowledge and skills?
- How are individual learning needs to be catered for?
- What are the literacy demands of this unit/learning experience?
- What authentic links can be made with the content of other subjects?
- How can school events and practices be incorporated into the program?
- Do the assessment methods address the outcomes and enhance the learning?
- How can the assessment be part of the teaching and learning program?

The planning process

In this teacher guide, ideas for programming and organising each unit have been provided. These have been arranged in steps to help you teach the unit. The steps follow the thinking processes involved in the outcomes-based approach.

Step 1 – Interpreting the unit learning outcomes

The first step is to read the unit description in the syllabus and then study the unit learning outcomes to determine what students will know and be able to do by the end of the unit.

You need to look at the action verb, concept and context of each learning outcome. This will help you see what skills and knowledge are embedded in the outcome. Remember the unit learning outcomes link to the broad learning outcomes.

This teacher guide gives you a brief description of the main requirements of each learning outcome.

Step 2 – Planning for assessment

It is necessary to study the assessment requirements of the unit early in your planning to ensure that you teach the content and skills students need to achieve the unit learning outcomes.

The assessment tasks are described in the syllabus. They indicate what specific knowledge and skills students will need to demonstrate that they have achieved the unit learning outcomes.

You will have to decide when to schedule the assessment tasks to allow yourself time to teach the required content and time for students to develop the necessary skills. You will also need time to mark the task and provide feedback. Practical tasks may, for example, be broken into a series of stages that are marked over several weeks as students progress with making their product. It is not appropriate to leave all the assessment until the end of the unit.

This teacher guide provides the performance standards and marking guides which you must use when you are marking the tasks. This is to ensure consistency with marks awarded to students in all schools in Papua New Guinea. However you must develop clear and detailed instructions for completing the task yourself and ensure all students know exactly what they have to do.

Any major project or design brief assigned in class should be assessed in stages rather than as a final product. This will encourage and motivate students as they work towards completing their project.

Step 3 – Programming a learning sequence

This step requires you to develop a program outlining a sequence of topics and the amount of time spent on each topic. The syllabus units list the topics and skills that must be taught and learned during this unit.

Students are required to make a product, or products using specific tools, techniques, equipment and processes. You must make sure adequate time is provided for students to complete the project outlined in the design brief. This may mean starting the unit with theory-based lessons to develop background knowledge of materials, processes and techniques before students begin their project. A better approach is to start the project early in the term and introduce theory at relevant stages throughout the project, for example, finishing techniques need not be taught until the project is almost complete.

Once you have completed your unit plan you will have to consider each topic in more detail. For example, if you have allocated two weeks for a topic that means you have six lessons available (three lessons per week). You will have to develop a plan for each topic that includes in more detail what you will cover in each lesson. Your topic plan must include a sequence of student activities and teaching points that contribute to the overall achievement of the unit outcomes. Your topic plan should include what you think your students will do in each lesson, but you must remember that the individual lessons must flow logically, one from the previous and must be

adjusted according to how students are progressing through the topic. You may develop outcomes for the topic and for each lesson, but these must be related to the unit outcomes.

This teacher guide provides a sample program for each unit. It does not provide individual lesson plans.

Step 4 – Elaboration of content and activities

Once you have mapped out your program for the term you must then develop more detailed plans for each topic in the unit. All units require students to be actively engaged in producing a product, not just copying from the board. Make sure you develop a range of activities that suit all learning needs – some reading and writing, some speaking and listening, some observing and doing.

Browse through the text books and teaching resources you have access to and list chapters, pages or items that you will use for each topic in your program. The text books should also provide you with ideas for activities related to the topic. You may have to collect or develop some resources for yourself.

Once you have sorted out your ideas and information you can then develop your more detailed weekly program and daily lesson plans.

This teacher guide gives examples in each unit of some activities you might like to use to ensure active learning. It also gives background information on some of the content.

The structure of the Design and Technology subject field

The Design and Technology subject field is organised into four subjects:

1. Design and Technology
2. Practical Skills
3. Home Economics
4. Computing

```
                    ┌──────────────────┐
                    │   Design and     │
                    │   Technology     │
                    │  Subject Field   │
                    └──────────────────┘
```

Design and Technology	Practical Skills	Home Economics	Computing
Grade 9 1 core unit 3 option units	Grade 9 2 core units 2 option units	Grade 9/10 2 core units 2 option units	Grade 9 3 core units 1 option unit
Grade 10 3 option units	Grade 10 1 core unit 2 option units	Grade 9/10 1 core unit 2 option units	Grade 10 3 option units
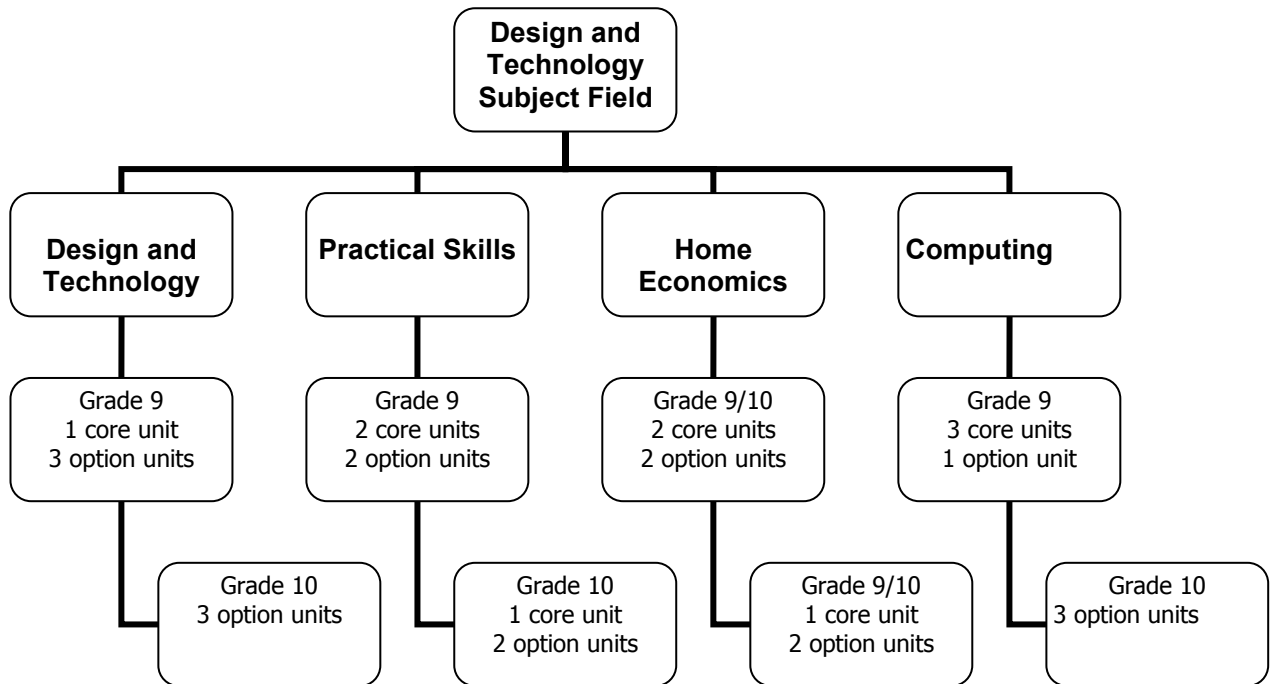
Design and Technology requirements

There are four subjects in this subject field: Design and Technology; Practical Skills; Home Economics and Computing. Students may study any two of the subjects but may not study any unit within these subjects more than once.

Any student, male or female, is entitled to study any of the Design and Technology subjects.

School must ensure they have the essential resources/equipment before offering a unit. All units in this subject field require students to develop knowledge and skills by completing practical projects using the design process.

Subject: Design and Technology

Design and Technology is a general subject that enables students to develop a range of skills and basic content knowledge from each of the

subjects in the Design and Technology field. This subject consists of a core unit and any six units from the Practical Skills, Home Economics or Computing subjects that are of interest, provided the school has the resources to teach the unit. Each unit must be taught in ten weeks. If students decide to study some of the Computing units, they must do the core units before they study the options.

Subject: Practical Skills

Practical Skills is designed for those students who have a specific interest in developing skills in and gaining knowledge about various trade and industry technologies. This subject comprises two core units in Grade 9 and one core unit in Grade 10. Core unit 9.1: Technical Drawing must be completed in Grade 9 Term 1, and core unit 9.2: Working with Wood in Grade 9 Term 2. Core unit 10.1: Building Construction must be taught in Grade 10 Term 1.

Students must complete two option units in Grade 9 and two in Grade 10. Schools may select from the option units described in the syllabus or develop their own option units to meet the required learning outcomes, using the framework provided in the syllabus.

Essential resources/equipment for Practical Skills units	
Technical Drawing (Core)	Set squares, graph papers, compasses and other drawing equipment, visual resources, examples of orthographic and other specialist drawings
Working with Wood (Core), and any Timber technologies	Timber; cutting, planing and sawing tools; hammers; nails and other fasteners; safety equipment; posters
Village technologies	Timber, cane, bamboo and fibres; cutting and fastening equipment; paint or colouring materials
Building Construction (Core)	Examples of building plans; timber; cutting, planing and sawing tools; hammers; nails and other fasteners; safety equipment; posters
Metal, Concrete, Electrical, Integrated etc	Metal; assorted wires and cabling; batteries and dry cells; circuit boards; cement and sand; cutting and smoothing tools; safety equipment; posters
Welding	Oxy torch, flux, welding rod; safety equipment such as welding shield, goggles, protective clothing

Subject: Home Economics

Home Economics is designed for those students who have a specific interest in developing skills in and knowledge about techniques and technologies applicable to the home environment and food, hospitality and fashion industries. To study Home Economics students must complete the two core units for the Food Technology component and one core unit for the Fibres and Fabrics component. Students must also complete four options units which can be selected from the syllabus or developed by the school, using the framework provided in the syllabus.

The Home Economics units can be taught in any order – the two core Food Technologies units and options can be taught in Grade 9 or 10. The core Fibres and Fabrics unit and options can be taught in Grade 9 or 10.

Essential resources/equipment for Home Economics units	
Fibres and Fabrics (Core) and sewing options	Fabric pieces, fabric samples, sewing machines, sewing equipment such as scissors, needles, cottons, pins, tape measures; magazines; patterns; fasteners such as buttons, zips; decorative items
Introduction to Food Technology (Core), Food and Nutrition (Core), and food preparation options	Stoves, cook tops and ovens; kitchen equipment such as pots, pans, cutlery, crockery; serving equipment; measuring equipment; recipes

Subject: Computing

This is a practical subject. Students must have the opportunity to use computers and a range of application programs.

In Grade 9 Computing students must complete the three core units Computer Basics, Word Processing and Presentation Graphics before selecting an option unit. Keyboarding is integrated into all Grade 9 core units.

Computer Basics assumes that students have no previous computing experience. This unit is to be completed before any other computer unit (except Keyboarding) is taken. Students with previous computing experience may complete this unit in a very short time and progress to other computing units. Word Processing 1 has Computer Basics as a pre-requisite. Presentation Graphics 1 and any option unit have both Word Processing 1 and Computer Basics as pre-requisites.

Keyboarding can be undertaken without completing any other unit. It consists of formal training in keyboarding using one of the software packages available. Students could use computers outside the classroom, e.g. library computers. Keyboarding is a good link to further vocational studies for students leaving school in year 10.

All Grade 10 units are options. Schools may also use Grade 10 to reinforce or expand on the learning in the Grade 9 core units. Schools may develop their own option units for Grade 10. School-developed options must be approved by CDD.

Essential resources/equipment for Computing units
Computers (enough for no more than 3 students to a computer), peripheral devices, supporting hardware such as printers, application software, visual resources

Design and Technology

Subject   Design and Technology

Planning and programming Design and Technology units

Students must complete the core unit. They can then choose the remaining seven from units from any of the Design and Technology subjects.

For **Design and Technology** students must complete:

Grade 9	Grade 10
Term 1 Core unit	**Term 1** Any unit
Term 2 Any unit	**Term 2** Any unit
Term 3 Any unit	**Term 3** Any unit
Term 4 Any unit	**Term 4** Any unit

An example of a Design and Technology course in one school

Grade 9	Grade 10
Core: Design and Technology: Principles and Practice	Food and Nutrition
Computer Basics	Working with Wood
Word Processing	Textile Technology 1
Introduction to Food Technology	Presentation Graphics

An example of a Design and Technology course in another school

Grade 9	Grade 10
Core: Design and Technology: Principles and Practice	Presentation Graphics
Computer Basics	Timber Technology 2
Working with Wood	Food Technology 1
Timber Technology 1	Spreadsheet 1

All units in the Design and Technology subject are based on students gaining knowledge, skills and techniques about a particular technology and designing and making or producing a product using that technology.

All units have the same or very similar outcomes and assessment requirements. The difference between units is the type of technology used, for example timber or fibres and fabrics, or computing applications.

Design and Technology

9.1 Design and Technology: Principles and Practice

For *all Design and Technology units* teachers must follow the steps when planning and programming individual units.

Step 1 – Interpreting the unit learning outcomes

Remember these units learning outcomes link to all the broad learning outcomes.

Outcome 9.1.1: Investigate and explain the nature and impact of technological change.

This outcome requires you to teach what is technology and the impact of technological change and provide opportunities for students investigate the impact of technological change on themselves, their families and communities. Students must also be given the opportunity to explain how and why technology has changed over time.

Outcome 9.1.2: Describe and apply elements of design.

This outcome requires you to teach the elements of good design such as function and aesthetics. These are described earlier in the teacher guide. Students must be provided with opportunities to examine aspects of the design of various products and to draw/sketch their own designs.

Outcome 9.1.3: Describe and use the design process to produce appropriate solutions.

This outcome requires you to teach the design process of planning, making and evaluating a product using a design brief. This process is outlined earlier in the teacher guide. Students must use the design process to make a product.

Step 2 – Planning for assessment

Study the assessment requirements of the unit. These will tell you what specific knowledge and skills students will need to demonstrate they have achieved the learning outcomes.

Assessment task one requires students to develop and produce diagrams, or charts, or models or an annotated collection of items showing changes in design and technology and the impact of changes. It is important that their diagrams or models show why and how technology has changed and the impact of these changes.

Performance standards for assessment task 1				40 marks
Develop diagrams, charts, models or an annotated collection of at least two items charting changes in design and technology and the impact of those changes				
Assessment criteria	**Very High Achievement**	**High Achievement**	**Satisfactory**	**Low achievement**
Describe technological change (10 marks)	Describes and explains in detail features of a wide range of technological change	Describes in detail a range of technological changes	Some technological changes described	Few or no technological changes described
Identify and track changes in design and technology (20 marks)	Charts, diagrams etc contain many detailed images that track changes in design of, or technology used in production of several different products/systems	Charts, diagrams etc contain several detailed images that track changes in design of, or technology used in production some different products/systems	Charts, diagrams etc contain some images that track changes in design of, or technology used in production of one or two different products/systems	Charts, diagrams etc do not contain enough images to adequately track changes in design of, or technology used in different products/systems
Demonstrate knowledge and understanding of the impact of technological change (10 marks)	Describes, explains and evaluates cause and effect (impact) of changes in a wide range of technologies and environments	Describes and explains cause and effect (impact) of changes in a range of technologies	Describes and explains cause and effect (impact) of some technologies	Describes some impact of one or two technologies

Assessment task two requires students to use the design process to design and construct a simple item such as a child's toy, musical instrument, model, ornament or other item using found materials such as cans, Styrofoam, bottle tops, straws, plastic, ice block sticks or skewers.

At the end of the term, students must have the product they have completed ready for assessment. You should assess drawings of initial ideas early to provide students' with feedback about the practicality of their ideas/decisions.

Adapt and use the marking guide for assessing the toy, musical instrument, model, ornament or other item on page 19

Use the performance standards on page 21for assessing the design portfolio.

Step 3 – Programming a learning sequence

Sample unit program

This program gives you some ideas about how the learning for this unit could be sequenced.

Topics	Activities	Assessment
Weeks 1 – 2 Traditional and modern technologies	Compare materials, tools/equipment and techniques used to produce a range of traditional and modern items	Provide opportunities for students to work on collection of ideas for task 1
Weeks 3 – 4 Elements of design	Practice basic drawing skills Study the elements of design by tracing the development of products over time, for example cars, telephones, clothing	
Week 5 Design and technological change	Discuss how changing technology and the range of goods now available have impacted on daily life. Discuss the concepts of appropriate and sustainable technology	Task 1 collected
Weeks 6 –10 The design brief	Work through the steps in the design brief to produce a simple object such as a container made from cardboard. *(All students do this)* Students then make their choice of product following selected design briefs	Mark stages of Task 2 project as students progress through production

Once you have completed your unit plan you will have to consider each topic in more detail. For example, if you have allocated two weeks for a topic that means you have ten lessons available (five lessons per week). You will have to develop a plan for each topic that includes in more detail what you will cover in each lesson. Your topic plan must include a sequence of student activities and teaching points that contribute to the overall achievement of the unit outcomes. Your topic plan should include what you think your students will do in each lesson, but you must remember that the individual lessons must flow logically, one from the previous and must be adjusted according to how students are progressing through the topic. You may develop outcomes for the topic and for each lesson, but these must be related to the unit outcomes.

Topic: Elements of design (Weeks 3–4)				
Lesson 1 Read the notes on elements of good design. Revise basic drawing skills	**Lesson 2** Look at a product in the classroom, for example students' footwear, or the furniture. Sketch some examples and comment on materials, shape, colour etc	**Lesson 3** Library research and observation – trace the evolution of one of the following items over time, using sketches and descriptive notes e.g. String bags to backpacks; record player to ipod/mp3 player; telephone exchange to mobile phone	**Lesson 4** Continue with library research and observation activity	**Lesson 5** Study pictures of traditional PNG houses from different parts of the country. Do a chart that compares size, shape, materials
Lesson 6 Add one or two rows to your comparison chart to include modern houses	**Lesson 7** Draw a floor plan for a house you would like to live in and list some of the design features of your house, for example large windows to see the view	**Lesson 8** Study a range of bilums/baskets and copy the weave patterns and colours on to paper patterns.	**Lesson 9** Create a new weave and colour pattern for a bilum or basket	**Lesson 10** Review elements of design and work on Assessment Task 1

Step 4 – Elaboration of content and activities

A selection of the following learning activities and teaching strategies could be used in this unit.

Traditional and modern technologies

- Take a field trip to examine what technologies are being used in a particular community, village, organisation or at your school
- Collect and display items such as traditional and modern tools.
- Study early photographs of PNG. Compare them to recent photographs. What do they tell you about changing technology?
- Take an inventory of all the equipment, appliances, machines (or brainstorm) used in your school. What was used before ten of the items on your list e.g. before computers, before photocopier?
- How do people communicate in PNG today? How did they communicate 30 years ago? Discuss the materials/equipment used and the obstacles to communication.
- Compare farming/gardening tools and equipment in use today and traditionally.

- What do you wear, what is it made from and where do you get your clothing? What did your grandparents wear, what was it made from and how did they get their clothing?
- Compare cooking and eating utensils from now and from the past. How has cooking technology changed?
- Describe the technology and materials used to make some traditional crafts such as fish traps, bilums, axes, pottery. What is used to make the same items now?
- Sketch and label main operating parts of canoe, banana boat and coastal boat. Sketch different types of boats used by PNG communities in earlier times.
- Describe how modern roads are built, including the machinery used – wall chart of steps. Compare this with making of village tracks.
- Explain with the use of simple diagrams how either cameras, radio or television work.

Elements of design

- Draw diagrams and charts to illustrate changes to house design, vehicles, equipment such as radios.
- Library research and observation – trace the evolution of the following items over time, using sketches and descriptive notes e.g. string bags to backpacks; record player to ipod/mp3 player; telephone exchange to mobile phone.
- Look at the variety of products around you and sketch and describe three or more examples e.g. different footwear worn by your classmates – describe their shape, materials, purpose. The same could be done for chairs/ desks in the classrooms.
- Draw up a table to compare traditional and modern housing. Your table should include columns for materials, size, layout, construction techniques. Draw some sketches to illustrate the differences.
- Draw a floor plan for the house you would like to live in.
- How have traditional materials and designs been adapted to suit modern tastes, for example colours and patterns in bilums, bilas, costumes?
- Draw (or collect pictures) of a person in a traditional costume and one in modern clothes – describe what has changed and why, for example materials, comfort, appearance.
- Study a range of bilums/baskets and draw some of the patterns. Create some new designs/patterns for bilums and baskets.

Impact of change

- Interview people in the community who have to learn new skills such as computing to keep their jobs.
- Do research and write a report about the impact of technological change in other countries; or women's lives; or a particular job e.g. banking.
- Describe or discuss the traditional technologies that are losing their importance and those that are remaining strong and explain why.
- What possessions do you have as a student that your parents or their generation did not have? What changes have taken place in society to enable you to have these things?

- PNG has a music industry because of technology – discuss.
- Information and other electronic and digital technology changes rapidly. What IT equipment is available now that was not in use 10 years ago?
- What difference has electricity made to people's lives?
- Develop consequence charts to show the impact of different technologies such as ATMs, mobile phones.
- Whose lives have been affected most by household technology? Is home maintenance easier or harder now?
- Short essay – To what extent has modern technology impacted on traditional crafts such as bilum making and pottery?
- Interview people about their first experience of flying.

Sample design briefs

Design brief 1: A cardboard container
(To be completed by all students as an introduction to the design process)
Containers can be made from many materials – timber, tin-plate, plastic, clay. As a design starting point however, a container can be made out of thick paper or cardboard. The design idea can be drawn up using the correct drawing methods and tested using the paper/cardboard prototype.
Problem
Students' desks are messy as they have nowhere to put their personal pens, pencils etc
Design brief
Make a paper or cardboard prototype of an open container that can hold all the bits and pieces that collect on a student desk, such as pens, rulers, scissors, stapler.
Specifications
• Use only thick paper or cardboard
• Use glue, staples or sticky tape to construct your container
• Container may be painted or decorated
Investigations
• List all the things the container will have to hold
• How will you make sure the listed items will fit into the container?
Drawings
• Divide your paper into four even parts and do a different design in each part.
• Choose the design you like best and draw it again, this time including all the measurements.
• Draw it orthographically if drawing materials are available
Making
• Mark out your pattern pieces according to your measurements on the paper or cardboard
• Cut out the pieces and construct your container with the selected joining materials

• Paint or decorate the container

Evaluation/testing
• Consider these questions and write an honest comment about your product
• Does your container do what it is meant to do?
• Does it look good?
• How could you have made it better?

Select one of the following design briefs or create one of your own in consultation with your students.

Design Brief 2: A decoration for the table or shelf
Many people decorate their homes with ornaments such as carvings, vases, lamp stands, candle holders, models.

Problem
You want to give your mother a gift for the house

Design brief
Make small ornament or decorative item that can be displayed on a table or shelf in your home or room.

Specifications
Use only found or second hand items such as soft drink cans, string, plastic, fabric pieces, shells, sticks, cardboard, wood pieces. These are suggestions only. There are many more found items that you can consider. You cannot buy anything new for this project.
• Use glue, staples, string, small nails or tape only to construct your ornament
• The ornament is to be no more than 30cm high.

Investigations
• List the different types of decorations you have seen and what they are made from
• Collect pictures of ornaments or decorative items to help give you ideas
• Make a collection of bits and pieces that you could use for your construction. Share or swap with other students.
• Decide what you will need to connect or shape your pieces into the finished product.

Drawings
• Divide your paper into four even parts and do a different design in each part.
• Choose the design you like best and draw it again, this time including all the measurements.
• Draw it orthographically if drawing materials are available

Making
• Assemble your selected found items and lay them out as a pattern
• Join the bits and pieces you have selected with appropriate joining materials
• Paint or decorate the ornament if required

Evaluation/testing

Consider these questions and write an honest comment about your product

- Does it look good?
- How could you have made it better?

Design Brief 3: A small woven mat

Design brief

Design and make a small woven mat that could be placed on the table as a base for special items or very hot dishes or as a decoration.

Specifications

- Use only wool, fabric strips, thick paper, cardboard or local fibres such as pandanus
- The mat is to be no more than 50 cm long and 30 cm wide
- The mat must be woven
- The mat must contain at least two colours

Investigations

- Study examples of traditional and modern table and floor mats – what are they made from? What patterns are used? What colours are used? What shape are they?
- Decide what materials you wish to use and how you will get two colours

Drawings

- Divide your paper into four even parts and do a different design in each part.
- Choose the design you like best and draw it again, this time including all the measurements.
- Draw the weave pattern you are going to use.

Making

- Cut the strips of material you need for weaving – fabric, paper, fibre or cardboard
- Dye strips if necessary to get two colours
- Experiment with your weave pattern
- Complete your mat to the desired size and shape

Evaluation/testing

Consider these questions and write an honest comment about your product

- Does it suit the purpose for which it was made?
- Does it look good?
- How could you have made it better?

Practical Skills

Subject   Practical Skills

For Practical Skills, students must complete:

Grade 9	Grade 10
Term 1– Unit 9.1 Technical Drawing	**Term 1– Unit 10.1** Building Construction
Term 2– Unit 9.2 Working with Wood	**Term 2** Any option unit
Term 3 Any option unit	**Term 3** Any option unit
Term 4 Any option unit	**Term 4** Any option unit

An example of a Practical Skills course in one school

Grade 9	Grade 10
Unit 9.1 Technical Drawing	Unit 10.1 Building Construction 1
Unit 9.2 Working with Wood	Building Construction 2
Timber Technologies 1 Animal Enclosures	Concrete Technologies
Timber Technologies 2 School Furniture	Plumbing Technologies

An example of a Practical Skills course in another school

Grade 9	Grade 10
Unit 9.1 Technical Drawing	Unit 10.1 Building Construction 1
Unit 9.2 Working with Wood	Building Construction 2
Village Technologies 1 Bamboo Craft	Electrical technologies
Village Technologies 1 Handicraft	Electrical technologies (finish off)

Practical Skills

Core 9.1 Technical Drawing

Step 1 – Interpreting the unit learning outcomes

Remember these unit learning outcomes link to the broad learning outcomes 3, 4 and 6.

Outcome 9.1.1: Apply technical drawing techniques to produce a range of appropriate drawings.

This outcome requires you to teach the technical drawings and techniques outlined in the syllabus and to provide opportunities for students to practice these skills and construct a wide range of technical drawings

Outcome 9.1.2: Demonstrate knowledge and understanding of the appropriate use of technical drawing techniques.

This outcome requires you to teach students when, how and why technical drawing techniques should be used. You should provide opportunities for students to do problem solving exercises where they decide which technical drawing technique is appropriate for a particular situation.

Outcome 9.1.3: Communicate ideas and information in a variety of ways.

This outcome requires you to teach students how technical drawing and techniques can be used to communicate ideas and information and give students opportunities to communicate technical ideas through plans and drawings using appropriate technical drawing skills and techniques.

Step 2 – Planning for assessment

Study the assessment requirements of the unit. These will tell you what specific knowledge and skills students will need to demonstrate they have achieved the learning outcomes.

Students will be expected to keep a folder of drawing exercises which range from the simple to complex for assessment task one.

The drawing collection will provide a record of student's learning and development. All drawing exercises and formative tasks should be included in the folder. The teacher is to set at least four drawing exercises that range from simple to complex. Use the performance standards when marking the drawings.

9.1 Performance standards for assessment task 1 –Drawing portfolio includes four formative drawing tasks plus portfolio presentation Total marks – 60				
Assessment criteria	Very High Achievement	High Achievement	Satisfactory Achievement	Low achievement
Demonstrate knowledge and understanding of the appropriate use of technical drawing techniques

30 marks | Demonstrates extensive knowledge and understanding in the appropriate use of a wide range of technical drawing techniques | Demonstrates a high level of knowledge and understanding in the appropriate use of a wide range of technical drawing techniques | Demonstrates a sound knowledge and understanding in the appropriate use of some technical drawing techniques | Demonstrates very limited knowledge and understanding in the appropriate use of technical drawing techniques |
| Apply technical drawing techniques to produce appropriate drawings

30 marks | All techniques used correctly to produce a range of drawings

Folder of ideas/drawings neatly presented with all labelling correct, demonstrating a very high level of skill and care | Most techniques used correctly to produce a range of drawings

Folder of ideas/drawings neatly presented with most labelling correct, demonstrating a high level of skill and care | Some techniques used correctly to produce a limited range of drawings

Folder of ideas/drawings presented with some labelling correct demonstrating a satisfactory level of skill and care | Limited or incorrect techniques used to produce drawings

Folder of ideas /drawings presented with limited labelling, demonstrating a low level of skill and care |

Assessment task two comprises a test. Students will be required to answer a number of short answer questions (maximum number 10) that test their level of understanding of the concepts introduced in the unit.

For example, a question may ask students to describe the difference between drawing techniques or they may be asked to demonstrate their understanding of lettering techniques.

This task is seeking evidence that students can understand the technical drawing techniques they have been taught and that they can do appropriate drawings for particular situations. During the course of the unit you will have to make sure students are taught these skills and that they apply them to different tasks.

Step 3 – Programming a learning sequence

In industry a product is usually made by a different set of people that create the designs. It is important to have a common language. These are called conventions and are understood all over the world.

The focus of this unit is on graphics (elementary shapes and 3D objects) as a universal language or a medium of communication which deals with the alphabet of lines, including methods and techniques. Practical application of

this knowledge involves developing constructions, pictorial drawings, and orthographic projections with an emphasis on drafting standards and conventions. A major activity could be problem solving exercises where students decide which type of lettering and drawing is appropriate for a given situation.

Sample sequential program

Topics	Activities	Assessment
Weeks 1 Graphics as a universal language Lettering	• Introduce terms and definitions, e.g. projection, extension, dimension • Introduce drawing instruments and their care • Prior knowledge activity–brainstorm (p20). Where have students seen different lettering? What type of lettering have they seen? Investigate different types of lettering found on a range of print materials (upper case, sloping, vertical etc) • Students produce a poster composed of different types of lettering to tell a message • Introduce universal symbols/ logos	Students will need to keep all work examples in their drawing folder.
Weeks 2 Lines Borders Title block	• Research, identify and demonstrate types of lines used in technical drawing • Students use correct techniques to draw different types of lines, borders and the title block	Students will need to keep all work examples in their drawing folder.
Weeks 3–5 Constructions (Plane Geometry) Basic Construction Set square exercises (30' – 60' and 45') Regular planes Scale	• Students do research on the parts and uses of the compass and demonstrate its uses • Students draw arcs with a compass and bisect a line, an arc, and an angle • Students draw a parallel line, a perpendicular line, a square to a given side. Draw an angle equal to a given angle • Students identify angles of set squares and use the set squares to draw shapes or figures • Draw regular plane figures with both set square and compass • Brainstorming – see teaching and learning strategies What is scale? What is a scale drawing? Students discuss in their groups and report to class giving examples • Students practice using correct procedures in scale drawing	
Week 5 Scale		
Weeks 5–6 Pictorial drawing Free hand sketching Oblique projection Isometric projection Perspective drawing	• Student to sketch any object around them • Students identify the proper pencil type for sketching and make proper sketch of different types of objects. • Research and sketch the three main types of pictorial drawings and identify their differences from each other • Students select the proper instruments and draw the three main types of pictorial drawings	

Week 7 Third angle Projection (Glass box)	• Students recognise and understand the vertical and horizontal plane which the 3rd angle can be located in a glass box • Discuss in groups the different views of the object seen in the glass box and identify the appropriate views to show a better understanding of the object • Draw third angle projections	
Week 8–9 Orthographic drawing and projection Page planning	• Investigate and work out the number of spaces required between the views along the length of A4 paper and also along the width of the A4 paper • Calculate these spaces using total length, total width, and total height of the drawing • Students demonstrate and explain how to select appropriate views of elementary shapes. Students draw them using given measurements in their group. • Students follow the proper procedures to draw orthographic drawings	
Week 10 Exploded views	• Research, define and demonstrate in their groups how to convert simple frame joints from orthographic drawings to exploded views • Students apply proper procedures to draw exploded views • Research and define sectioning and its purpose. • Identify the lines used to show sectioning done and lines on a sectioned face • Students section a solid with section planes and apply the dimensions required for a sectioned face	Test (50 marks) Students put together all the drawings that have been done in this unit and present them in a folder for assessment.
Resources:	Magazines, books, signs around the school and in local community Visual resources, teacher explanations, drawing instruments	

Once you have completed your unit plan you will have to consider each topic in more detail. For example, if you have allocated two weeks for a topic that means you have six lessons available (three lessons per week). You will have to develop a plan for each topic that includes in more detail what you will cover in each lesson. Your topic plan must include a sequence of student activities and teaching points that contribute to the overall achievement of the unit outcomes. Your topic plan should include what you think your students will do in each lesson, but you must remember that the individual lessons must flow logically, one from the previous and must be adjusted according to how students are progressing through the topic. You may develop outcomes for the topic and for each lesson, but these must be related to the unit outcomes.

Step 4 – Elaboration of activities

Universal symbols

Students brainstorm range of universal symbols and logos. Each student draws an example of these, e.g. coco cola, karamap, a rugby league team logo.

Examples of universal symbols are:

 Give Way
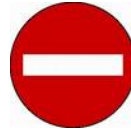
 No Entry

 No Smoking

 No Swimming – Danger

Universal symbols for animals

 Pig

 Chicken

 Sea-horse

 Elephant
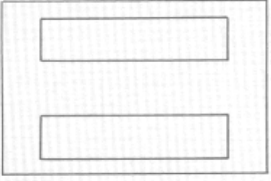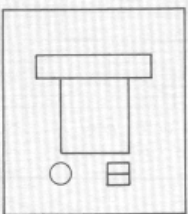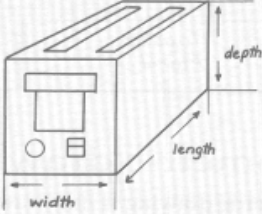
Orthographic drawings or projections

Orthographic drawings have rules that are understood worldwide. Orthographic drawings show three views and three dimensions of a project on the same page. Think of a toaster inside a cardboard box but each side of the toaster can be seen on the box. The top of the toaster is drawn on the top of the box and the ends are drawn on each end of the box. When the box is unfolded and laid out flat the three views of the toaster are seen. This is the idea behind orthographic drawings.

There are ways that will help students to draw orthographically.

- Use graph paper.
- Keep the three views in the correct place so that the lines for the plan, end and front line up.
- Use a computer. This is called computer aided drafting (CAD).

How to show views and dimensions

Plan – a bird's eye view. What is seen when looking down on the product?	End – what is seen when looking at the end of the product	Front – what is seen when looking at the front of the product.	Dimensions – length – width – depth

Measurements

Measurements such as how long, wide or deep an item or product is will be written on the orthographic drawing. These measurements are used as a reference while the project is being made, so they need to be easy to see and able to be quickly understood.

- Write in the measurements so that they can all be read from one direction. Then you will not have to move the page around when you are making the project, especially when holding materials and tools.
- Write in the measurements a little way from the actual drawing of the project. This makes it easier to read because then the lines and measurements do not get mixed up together.
- Use arrows on the ends of the lines to show the part being measured. Make the arrowheads solid, so you can see exactly where the measurements end.
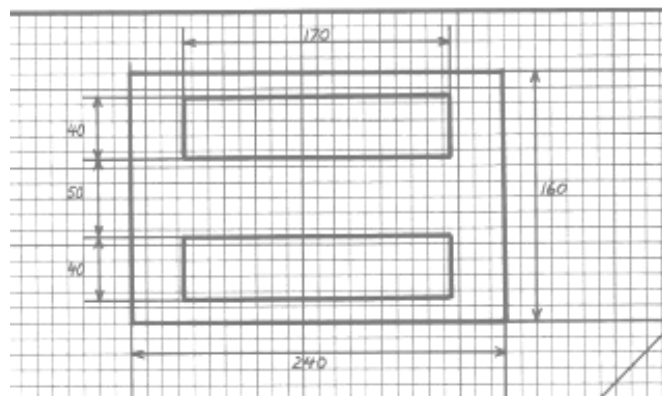
Isometric drawing

Isometric drawing is one drawing, not three different ones, that lets you see the project from the front, end and plan (three views) at once. All the sides of

the project are drawn to scale using the measurements of the final product, but the measurements are not written on the drawing. The shape is drawn using 30 degree lines. In isometric drawing all vertical lines are drawn vertically on the page; but horizontal lines are drawn on a 30 degree angle, not horizontally along the page.
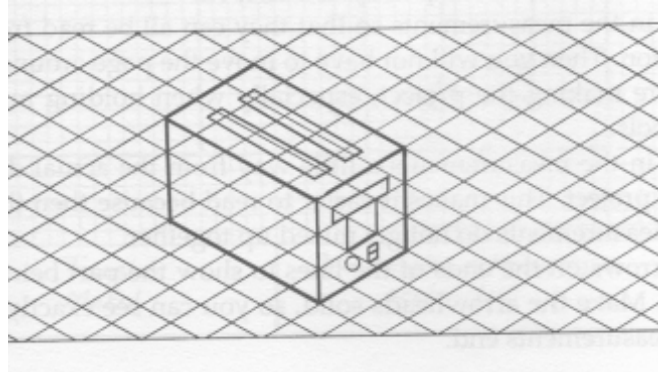
Sample test

Question 1

State what these universal symbols stand for:

(5 marks)

Question 2

Write the alphabet using the technical drawing lettering types in *UPPER CASE*; use the lines as a guide

_____

A   B   C   D   E   F   G   H   I   J
*K*_____

_____
_____   (10 marks)

Question 3

(Select a small object such as a pencil, matchbox or coke can and provide one object per student.)

Each student must draw a plan view, end view and a front elevation of the object using correct scale and measurements.

(10 marks)

Question 4

Draw an isometric drawing of the object.   (15 marks)

Practical Skills

Core 9.2 Working with Wood

Step 1 – Interpreting the unit learning outcomes

Remember these units learning outcomes link to all the broad learning outcomes.

Outcome 9.2.1: Apply safe and appropriate codes and practices in the classroom.

This outcome requires you to teach about safety, first aid and maintenance routines in the woodwork shop or classroom and to teach students how to apply this knowledge.

Outcome 9.2.2**:** Apply knowledge and understanding through identifying, selecting and using various materials and systems.

This outcome requires you to teach the students about the properties, sources and ranges of wood technologies and provide opportunities for students to identify, select and use them.

Outcome 9.2.3: Demonstrate practical skills and techniques.

This outcome requires you to teach students about the functions and parts of tools, machines or equipment and to give students the opportunity to practice using basic skills and techniques required for working with wood. You must also provide opportunities for students to develop and use these skills when producing an item.

Outcome 9.2.4: Use the design process to produce appropriate solutions.

This outcome requires you to teach the design process of planning, making and evaluating a product using a design brief. Students must use the design process to make a product.

Outcome 9.2.5: Evaluate the appropriateness of the materials and systems used to produce a product.

This outcome requires you to teach students how to evaluate to determine whether the product met the requirements of the design brief and to reflect on the process of designing and making to see whether or not aspects of the design process could be improved.

Step 2 – Planning for assessment

Study the assessment requirements of the unit. These will tell you what specific knowledge and skills students will need to demonstrate they have achieved the learning outcomes.

At the end of the term, students must have the product they have completed ready for assessment together with their design portfolio. The portfolio might contain rough notes or sketches about the product, a marking guide covering the design brief, plans, and drawings of initial design ideas, progressive

records, and work samples with comments written by the teacher, labelled drawings and diagrams or a report.

You will assess the product along with the design portfolio. The marking guide for the product and the performance standards for the design portfolio must be used to assess the student's work (see pages 19 and 21).

A short test worth 20 marks will also be given to assess the unit.

Step 3 – Programming a learning sequence

The syllabus units list the topics and skills that must be taught and learned during this unit. Students are required to make a product, or products using specific tools, techniques, equipment and processes. You must make sure adequate time is provided for students to complete the project outlined in the design brief. This may mean starting the unit with theory-based lessons to develop background knowledge of materials, processes and techniques before students begin their project. A better approach is to start the project early in the term and introduce theory at relevant stages throughout the project, for example, finishing techniques need not be taught until the project is almost complete.

The focus of this unit is on working with wood and using the design processes to make a product out of wood. You will have to provide the students with a simple design brief so that they can consider the materials available, their characteristics and properties and come up with a solution to the brief. The solution must be a product that they can make. Practical knowledge involves identifying how materials have been used safely in innovative and non- traditional ways.

Sample sequential program

Topics	Activities	Assessment
Weeks 1 – 2 Safety and First Aid Timber /materials Introduction of design brief	Introduce the design brief Plan and design a product Library research and presentation on types of PNG timbers Excursion to a sawmill Design a poster showing steps in the preservation of timber	Results of investigation for design brief
Week 3–4 Manufactured sheets Marketing timber Materials Basic hand tools	Investigate, design and draw a product Identify, classify and show the uses of materials and equipment Draw; label parts and state uses and care or maintenance of specific hand tool. Practice using hand tools Produce posters with photographs or pictures of • portable power tools • fixed woodwork machines • manufactured timbers Collect and display samples of : • common ply • special types of plywood • hard board • soft board • particle board.	Rough drawings or sketches of design ideas. Test (20 marks)

Weeks 5–10 Design process	Production of a simple product using the design process (see page#18 and 19)	Students present portfolio and product for assessment.

Once you have mapped out your program for the term you may develop more detailed plans for each topic in the unit. The timing of activities and teaching sequences needs to be flexible so that you can meet the learning needs of students in your class.

Browse through the text books and teaching resources you have access to and list chapters, pages or items that you will use for each topic in your program. The text books may also provide you with ideas for activities related to the topic. You will have to collect or develop some resources for yourself, for example pictures that show a range of items and concrete samples of items.

Step 4 – Elaboration of activities

Excursion to a timber yard or saw mill

Excursions should include questionnaires or worksheets. Excursions must follow proper procedures and approval from the school, parents and the company or place to be visited.

Sample worksheet

- Describe the set-up of the centre or company.
- What timber products are produced?
- Are there special methods that they use?
- Where do they get their forest products from?
- What are the processes involved in the production of the timber and manufactured sheets?

Research done outside of school may depend on location and availability of resources.

Questions to be used for the activity (excursion/research) can be provided by the teacher brainstormed or brainstormed and discussed by the class.

Design brief

An example of a design brief is set out below. You should think of a design brief that is appropriate for your students and the school's resources. Students may come up with good suggestions as to a product or item they would like to make and could develop an individual or class design brief in consultation with you.

Sample design brief: Container to hold pens and pencils
Problem
Students have nowhere to keep pens and pencils.
Design brief
Produce a container to hold a minimum of ten pens or pencils.
Specifications:
• article must serve its intended function • the container must look good • the container must be made from wood • materials used must be functional • manufacturing time less than 10 weeks • appropriate shape and size and form • container can be painted, varnished or oiled • cost – less than K10.
Investigations
• Measure the length and circumference of the pencils. • How will you make sure the listed items will fit into the container? • What type of wood will be most appropriate to use? • What type of fastening or joints will be most appropriate?
Drawings
• Divide your paper into four even parts and do a different design in each part. • Choose the design you like best and draw it again, this time including all the measurements. • Draw it orthographically if drawing materials are available.
Making
• Mark out your pattern pieces according to your measurements on the wood or ply-wood. • Cut out the pieces and construct your container with the selected joining materials. • Paint or decorate the container.
Evaluation/testing
Consider these questions and write an honest comment about your product: • Does your container do what it is meant to do? • Does it look good? • How could you have made it better?

Practical Skills

Option units Timber Technologies 1, 2, 3, 4, 5

Schools can develop timber technologies option units using the following unit framework and teach any aspects of timber technology that is relevant to their community and students. Teachers must provide, or develop with students, a design brief for the product/s to be completed during the term. Schools may also select from appropriate vocational education and training units.

Here are some suggestions for timber technologies option units:

- outdoor furniture
- animal enclosures
- ornaments
- toys
- musical instruments
- indoor items
- indoor furniture
- school furniture
- storage items.

Unit Framework
Unit name: *(Insert the name of your option unit here)*
Unit description: *(Insert a brief description of the content and purpose of your unit here)*
Learning outcomes for every option unit: *(You must use these learning outcomes for your unit)*
Students can: • apply safe and appropriate codes and practices in the classroom • apply knowledge and understanding through identifying, selecting and using various materials or systems • demonstrate practical skills and techniques • use the design process to produce appropriate solutions • evaluate the appropriateness of materials or systems used to produce a product.
Content: *(Insert a list of topics and sub topics for your unit here)*
Students acquire knowledge and skills through the teaching and learning of content developed by the school. Safety must be taught in context and proper equipment and protective clothing used where necessary.
Assessment: (You must use these assessment tasks for your unit)
Assessment task one
Use the design process to design and make a product using timber.

Assessment criteria
The learning outcomes will be assessed by the extent to which the student can:
- apply safe work practices   - use appropriate materials and processes to make the product   - select and use with skill tools and techniques to make the product   - produce a timber product which meets the design brief.
60 marks
Assessment task two
Produce a design portfolio showing the steps undertaken in the making of the product.
The design portfolio might include: - results of investigation   - rough notes or sketches of design ideas   - timelines   - final drawings or plans   - evaluation notes or report.
Assessment criteria
The learning outcomes will be assessed by the extent to which the student can: provide evidence in the portfolio of investigation, design ideas/drawings, materials and equipment used, and evaluation of the process and product.
20 marks
Assessment task three
A short test based on the topics in the unit.
Assessment criteria
The learning outcomes will be assessed by the extent to which the student can: demonstrate knowledge of tools, materials, skills, and processes used in working with timber.
20 marks
Total: 100 marks

Practical Skills

Option unit Village Technologies option – Weaving

Note: This sample Village Technologies unit – Weaving, can be adapted to any village technology using the option framework on the previous pages.

Step 1 – Interpreting the unit learning outcomes

Outcome: Apply safe and appropriate codes and practices in the classroom.

This outcome requires you to teach about safety, first aid and maintenance routines in the village or classroom and to teach students how to apply this knowledge.

Outcome: Apply knowledge and understanding through identifying, selecting and using various materials and systems.

This outcome requires you to teach the students about the properties, sources and ranges of village technologies and provide opportunities for students to identify, select and use them.

Outcome: Demonstrate practical skills and techniques.

This outcome requires you to teach students about village tools, which are used for weaving and to give students the opportunity to practice using basic skills and techniques required for working with village technologies. You must also provide opportunities for students to develop and use weaving skills.

Outcome: Use the design process to produce appropriate solutions.

This outcome requires you to revise the design process of planning, making and evaluating a product using a design brief. Students must use the design process to make a product from village technologies.

Outcome: Evaluate the appropriateness of the materials and systems used to produce a product.

This outcome requires you to revise with students how to evaluate to determine whether the product met the requirements of the design brief and to reflect on the process of designing and making to see whether or not aspects of the design process could be improved.

Step 2 – Planning for assessment

Study the assessment requirements of the unit. These will tell you what specific knowledge and skills students will need to demonstrate they have achieved the learning outcomes.

At the end of the term, students must have the product or products they have completed ready for assessment.

You will assess the woven product according to the design brief. Remember that students must complete at least two simple woven products or one

complex one, for example a small fan and a mat, or one large basket with an intricate design.

See page 19 for the marking guide to asses this task. You will need to *insert the specific features* of the product that is being assessed

Step 3 – Programming a learning sequence

The focus of this unit is on weaving and experimenting with a wide range of village materials, using their characteristics and properties to produce different products. Practical knowledge involves identifying how materials have been used in traditional, innovative and non- traditional ways. Safety issues must always be taken into account and activities structured so that students work in a safe environment and have the skills to use tools safely.

Sample sequential program

Topics	Activities	Assessment
Weeks 1 – 10 Design Brief Safety and First Aid and HIV/AIDS Weaving products Seasoning and treatment of basket weaving materials Bleaching Construction techniques Basic hand tools in basket weaving Finishing techniques Care and maintenance of cutting tools Design process (#see page 18 and 19) Design Brief	• introduction of design brief • excursion to a local area where cane, pandanus or other weaving materials are available • identify different species and describe characteristics of cane found in PNG • excursion to a craft market or handicraft store • classroom displays and posters of cane, bamboo and pandanus products • develop a flow chart showing seasoning methods such as air seasoning • compare and contrast the different methods of treatment of cane or other materials • investigate by experiment the best and cheapest method of altering the colour of cane.	Students will need to keep all work examples in their drawing portfolio
Resources – local materials, local crafts-persons, villagers, trades-people, craft market		

Once you have mapped out your program for the term you may develop more detailed plans for each topic in the unit. Because students are engaged in completing major activities spread across the term, it is better not to construct rigid lesson plans. The timing of activities and teaching sequences needs to be flexible so that you can meet the learning needs of students in your class.

Step 4 – Elaboration of activities and content

Excursions to a handicraft shop or market

Students participating in an excursion should design questionnaires or be provided with worksheets. Excursions must follow proper procedures and approval from the school, parents and the company or place to be visited.

Sample worksheet questions

- Describe the set-up of the market, centre or company.
- What cane products are produced?
- Are there special methods that are used?
- Where do they get their cane from?
- What are the processes involved in making bamboo, cane wicker and pandanus?
- What patterns are used in weaving?
- Are these traditional patterns?
- Are they owned by a particular tribe or clan?

Research done outside of school may depend on location and availability of resources.

Questions to be used for the activity (excursion/research) can be provided by the teacher.

Sample design brief – Product made from weaving such as basket, mat or mini fan etc
Problem
A family of five spends a lot of time cooking and eating outdoors. They have only one small mat.
Design brief
Produce a mat that will enable at least two people to sit on the ground comfortably.
Specifications
- article must satisfy the need and serve its intended function   - local materials must be used   - selected materials must be functional and efficient   - shape and size – mat greater than 1 square metre, less than 2 square metres   - the mat must contain a pattern and at least two colours   - the mat must be well finished   - cost – less than K10.
Investigations
- Study examples of traditional and modern floor mats – what are they made from? What patterns are used? What colours are used? What shape are they?   - Decide what materials you wish to use and how you will get two colours.

Drawings

- Divide your paper into four even parts and do a different design in each part.
- Choose the design you like best and draw it again, this time including all the measurements.
- Draw the weave pattern you are going to use.

Making

- Cut the material you need for weaving – cane, fibre etc.
- Treat the material if necessary to get two colours.
- Experiment with your weave pattern.
- Complete your mat to the desired size and shape.

Evaluation/testing

Consider these questions and write an honest comment about your product

- Does it suit the purpose for which it was made?
- Could different materials have been used to make a better mat?
- Will it last?
- What would you do differently next time?
- Content, techniques and processes
- Care and maintenance of hand tools:
- sharpening of cutting tools
- setting and sharpening of saw teeth
- sharpening chisel blade
- plane cutting blades
- drill bit cutting edge
- testing for sharpness.
- Types of cane

Process of preparation of cane such as:
- submerge in water
- peeling skin
- splitting cane core
- wicker preparation
- types of joints and concealing

Methods of bonding:
- adhesive
- fastening.

Methods of straightening or curving cane:
- dipping into hot water
- heating in direct flame.

Re-visit the uses and parts of tools
- marking and measuring

- holding tools

- boring tools

- cutting tools e.g. bush knife, knife, scratch awl etc.

Finishing techniques:

- staining

- different types of finish applications on the market

- methods of applying coats of finish.

Integration of subjects

This unit could be integrated with Unit 9.4 in Arts where students carve or construct three dimensional art forms and construct an art form from fabrics or fibres. Beautification of traditional and contemporary three dimensional cane craft items involves artistic designs, skills which can be used in both Arts and this Design and Technology unit.

Practical skills

Core 10.1 Building Construction

Step 1 – Interpreting the unit learning outcomes

Outcome 10.1.1: Apply safe and appropriate codes and practices in the classroom

This outcome requires you to revise safety, first aid and maintenance routines in the woodwork shop or classroom and to teach students how to apply this knowledge.

Outcome 10.1.2: Apply knowledge and understanding through identifying, selecting and using various materials and systems.

This outcome requires you to teach the students about the properties, sources and ranges of building technologies and provide opportunities for students to identify, select and use them.

Outcome 10.1.3: Demonstrate a range of practical skills and techniques

This outcome requires you to teach students about the functions and parts of tools, machines or equipment and to give students the opportunity to practice using a range of skills and techniques required for building construction. You must also provide opportunities for students to develop and use these skills when building.

Outcome 10.1.4: Use the design process to produce appropriate solutions

This outcome requires you to revise the design process of planning, making and evaluating a product using a design brief. Students must use the design process to make a product.

Outcome 10.1.5: Evaluate the appropriateness of the materials or systems used to produce a product

This outcome requires you to revise with students how to evaluate to determine whether the product met the requirements of the design brief and to reflect on the process of designing and making to see whether or not aspects of the design process could be improved.

Step 2 – Planning for assessment

Study the assessment requirements of the unit. These will tell you what specific knowledge and skills students will need to demonstrate they have achieved the learning outcomes.

At the end of the term, students must have the product they have completed ready for assessment together with their design portfolio. The portfolio might contain rough notes or sketches about the product, a marking guide covering the design brief, plans, drawings of initial design ideas, progressive records, budget and work samples with comments written by the teacher, labelled drawings and diagrams and evaluation notes or report.

You will assess the product along with the design portfolio. The marking guide for the product and the performance standards for the design portfolio must be used to assess the student's work (see page # and #)

A short test worth 20 marks will also be given to assess the unit.

Step 3 – Programming a learning sequence

The focus of this unit is on building construction where plans, specifications for building requirements, and actual practice in building construction can be acquired through building models of houses, or working on real building construction projects such as school classrooms, or animal shelters.

At the beginning of the unit you provide the students with a simple design brief so that they can consider the materials available, their characteristics and properties, the skills and techniques they will need to learn and come up with a solution to the brief. The solution must be a product that they can make.

See the syllabus for topics and content to be taught.

Step 4 – Elaboration of activities

Sample design brief 1: Construction of a pig pen
Problem
A sow is about to have piglets. There is nowhere on the school farm for them to be housed safely.
Design brief
Design and construct a pig pen or model of a pig pen to house the sow and a minimum of seven piglets safely. The pen must have a watering and feed area, and allow waste to be removed easily.
Specifications
- enclosure/building must house one pig and a minimum of seven piglets   - building must suit the environment   - local materials should be used   - construction time – less than 10 weeks   - waste system should allow for the production of bio-gas   - cost less than 100 kina   - time-line – one term.

Investigations

- Study examples of traditional and modern pig sties – what are they made from? Do the plans have common features? What is a good material for the floor? What type of material would be suitable for a feeding trough and watering trough?

- Decide what materials you wish to use and how you will them.

- Drawings

- Divide your paper into four even parts and do a different design in each part.

- Choose the design you like best and draw it again, this time including all the measurements.

- Draw the design and floor plan neatly so it can be used to build the sty.

Making

- Collect or purchase the material you need for the sty.

- Measure and cut the material to the appropriate sizes.

- Prepare the site.

- Dig the foundations.

- Construct the sty.

Evaluation/testing

- Consider these questions and write an honest comment about your product

- Does it suit the purpose for which it was made? Does if house the pigs securely and safely, in comfort?

- Could different materials have been used to make a better sty?

- Will it last?

- What would you do differently next time?

Sample design brief 2: A small model of a house

Problem

A person in a wheel chair needs suitable accommodation

Design brief

Produce a model of a house to satisfy the special needs of a person in a wheel chair

Specifications

- model must have features to make the house easy to use by someone in a wheel chair – no steps, wide doors, low benches, doors easy to open

- local materials to be used for house

- model must be constructed to scale

- cost of model – less than K20

- time-line – one term.

Investigations

- Study examples of buildings constructed with disabled access.

- Note the common features such as ramps instead of steps.

- Decide what materials you wish to use.

Drawings

- Divide your paper into four even parts and do a different design in each part.

- Choose the design you like best and draw it again, this time including all the measurements.

- Draw the design and floor plan neatly so it can be used to build the model house.

Making

- Cut the material you need for constructing the model.

- Complete your model to scale.

Evaluation/testing

Consider these questions and write an honest comment about your product

- Does it suit the purpose for which it was made?

- Does it look good?

- How could you have made it better?

- Integration of subjects

- Building construction could be integrated with aspects of Mathematics such as geometry, estimating, area and volume, and ratio.

Practical Skills

<div style="background:black;color:white">Grade 10 Option units</div>

Building Construction 2

Welding Technologies

Plumbing Technologies

Cement Technologies

Metal Technologies

Electrical Technologies

The units Welding Technologies, Plumbing Technologies, Cementing Technologies, Metal Technologies and Electrical Technologies have the same learning outcomes, assessment tasks and assessment criteria.

Schools choosing to teach these option units must have access to workshops with appropriate equipment and teachers trained in the teaching of these technologies. Local arrangements with TVET or vocational centres can be made to access facilities and/or trained teachers if they are not available at the school.

It is not appropriate for students to do the Welding Technologies unit by copying notes about welders and welding techniques.

Students are required to *make a product* in all these option units using the design process which meets the needs of a design brief provided by the teacher.

Step 1 – Interpreting the unit learning outcomes

Study the learning outcomes to determine what students know and be able to do by the end of the unit.

Outcome: Apply safe and appropriate codes and practices in the classroom.

This outcome requires you to teach revise safety, first aid and maintenance routines in the woodwork shop or classroom and to teach students how to apply this knowledge.

Outcome: Apply knowledge and understanding through identifying, selecting and using various materials and systems.

This outcome requires you to teach the students about the properties, sources and ranges of the technologies which you are studying and provide opportunities for students to identify, select and use them.

Outcome: Demonstrate a range of practical skills and techniques.

This outcome requires you to teach students about the functions and parts of tools, machines or equipment and to give students the opportunity to

practice using a range of skills and techniques required. You must also provide opportunities for students to develop and use these skills when using the technology.

Outcome: Use the design process to produce appropriate solutions.

This outcome requires you to revise the design process of planning, making and evaluating a product using a design brief. Students must use the design process to make a product.

Outcome: Evaluate the appropriateness of the materials or systems used to produce a product.

This outcome requires you to revise with students how to evaluate to determine whether the product met the requirements of the design brief and to reflect on the process of designing and making to see whether or not aspects of the design process could be improved.

Step 2 – Planning for assessment

Study the assessment requirements of the unit. These will tell you what specific knowledge and skills students will need to demonstrate they have achieved the learning outcomes.

At the end of the term, students must have the product they have completed ready for assessment. You must assess the product using the marking guide for the product (see page 19).

A short test worth 20 marks will also be given to assess the unit.

Step 3 – Programming a learning sequence

This teacher guide will not provide a sample program or give background information on these specialised areas as teachers trained in these areas will have the required skills and knowledge to teach students the appropriate skills and techniques.

Step 4 – Elaboration of activities

Example of design briefs and activities are set out below. You should think of a design brief that is appropriate for your students and the school's resources. Students may come up with good suggestions as to a product or item they would like to make and could develop an individual or class design brief in consultation with you.

Design ideas

Plumbing Technologies – Design and implement a method of collecting rain water from a tin roof and complete the task.

Building Construction Technologies – Design and implement a method of collecting bio-gas from pig pens.

Electrical Technologies – Design and make a small basic electrical device to produce light

Cement Technologies – Design and construct a gutter for taking away excess rain water in the wet season

Welding Technologies – Design and make a metal shelves for storing library books

Sample design brief for Metal Technologies: Pot stand
Problem
There is a need by a family of three to be able to cook vegetables and taro over an open fire.
Design brief
Produce a pot stand that can safely hold two pots for cooking vegetables and taro over an open fire.
Specifications
- all parts of the pot stand must be fire proof   - metal materials to be used   - pot stand must be easy to use   - pot stand must be stable   - design must allow pots to be easily accessed without the handles of the pots getting too hot   - cost of model – less than K20   - time-line – one term.
Investigations
- Study examples/designs of pot stands, both traditional and modern.   - Research the types of metal that would be most appropriate to use.   - Research construction methods.
Drawings
- Divide your paper into four even parts and do a different design in each part.   - Choose the design you like best and draw it again, this time including all the measurements.   - Draw the design neatly so it can be used to construct the pot stand.
Making
- Purchase or collect your material.   - Cut the material you need for constructing the pot stand.   - Complete your pot stand.
Evaluation/testing
Consider these questions and write an honest comment about your product   - Does it suit the purpose for which it was made?   - Does it look good?   - How could you have made it better?

Home Economics

Subject   Home Economics

Home Economic Units

For **Home Economics**, students must complete:

Grade 9 or Grade 10	Grade 9 or Grade 10
Term 1– Unit 9.1 Fibres and Fabrics	**Term 1– Unit 10.1** Introduction to Food Technology
Term 2–Any option unit	**Term 2** Food and Nutrition
Term 3 Any option unit	**Term 3** Any option unit
Term 4 Any option unit	**Term 4** Any option unit

An example of a Home Economics course in one school

Grade 9	Grade 10
Unit 9.1 Fibres and Fabrics	Unit 10.1 Introduction to Food Technology
Unit 9.2 Textile Technology 1 – Making a Meri Blouse	Unit 10.2 Introduction to Food Nutrition
Textile Technology 2 – Designing Clothes	Textile Technology 4 Sports Gear
Textile Technology 3 – Undergarments	Textile Technology 4 Sports Gear (continued)

An example of a Home Economics course in another school

Grade 9	Grade 10
Unit 10.1 Introduction to Food Technology	Textile Technology 2 – Designing Clothes
Unit 10.2 Food and Nutrition	Textile Technology 5 – Bed Linen
Food Technologies 1 – School Canteen	Food Technologies 2 – Catering for parties or functions
Unit 9.1 Fibres and Fabrics	Textile Technology 6– Adapting Second Hand Clothes

Home Economics

Core 9.1 Fibres and Fabrics

Step 1 – Interpreting the unit learning outcomes

Remember these units learning outcomes link to all the broad learning outcomes.

Outcome 9.1.1: Apply safe and appropriate codes and practices in the classroom.

This outcome requires you to teach about safety First Aid and maintenance routine in the workplace and to teach students how to apply this knowledge in the classroom or workplace.

Outcome 9.1.2: Apply knowledge and understanding through identifying, selecting and using various fibres and fabrics.

This outcome requires you to teach the students about the properties and sources of a range of fibres and fabrics and provide opportunities for students to investigate and identify these.

Outcome 9.1.3: Demonstrate practical skills and techniques.

This outcome requires you to teach the practical skills and techniques used to work with fabrics and to provide opportunities for students to develop and use these skills when producing a fabric item.

Outcome 9.1.4: Use the design process to produce appropriate solutions.

This outcome requires you to teach the design process of planning, making and evaluating a product using a design brief. Students must use the design process to make a product.

Outcome 9.1.5: Evaluate the appropriateness of fibres or fabrics used to produce a product.

This outcome requires you to teach students how to evaluate to determine whether the garment or item met the requirements of the design brief and to reflect on the process of designing and making to see whether or not aspects of the design process could be improved.

Step 2 – Planning for assessment

At the end of the term, students must have the product they have completed ready for assessment together with their design portfolio. The portfolio might contain rough notes or sketches about the product, a marking guide covering the design brief, plans, drawings of initial design ideas, progressive records, and work samples with comments written by the teacher, labelled drawings or patterns or a report.

You will assess the fibre and fabric product/s along with the design portfolio. The marking guide and the performance standards for both the product and the design portfolio must be used to assess the student's work (see page 19 and 21).

A short test worth 20 marks will also be given to assess the theory part of the unit.

Step 3 – Programming a learning sequence

This unit provides students with the opportunity to learn about different types of fabrics and to master skills in producing textile items. It will focus on safe use of all sewing equipment, practice of hand and machine sewing skills and completing different types of decoration and fastenings.

Students are required to make a product, or products using sewing techniques and equipment. You must make sure adequate time is provided for students to complete the project outlined in the design brief. This may mean starting the unit with theory-based lessons to develop background knowledge of materials, processes and techniques before students begin their project. A better approach is to start the project early in the term and introduce theory at relevant stages throughout the project, for example, finishing techniques need not be taught until the project is almost complete.

Students will demonstrate problem solving skills through a design brief which will enable students to decide which type of fabric item they will produce, promoting meaningful learning.

Sample Program

Topics	Activities	Assessment
Weeks 1 – 4 Safety and First Aid and Materials Tools Techniques and procedures	• Workshop safety • Basic First Aid • Brainstorming – what are fibres and fabrics? • Research – visit to textile factory, market or second hand clothes store • Practice sewing skills and techniques for decorating fabrics and fastening	Students will need to keep all work examples in their drawing portfolio
Weeks 5–10 Design Brief and design process	• Introduction to the Design Brief • Students design, make and evaluate a product made from fibres and/or fabric	Assessment of design portfolio and product

Step 4 – Elaboration of activities

• Workshop safety including the three human factors that gets students involved in an injury or accident.
  – disobedience
  – carelessness
  – ignorance
• the spread of HIV through blood injuries when dealing with Basic First Aid Procedure

- Guest speaker – St Johns Ambulance or Health worker to explain First Aid and HIV/AIDS
- Brainstorming–prior knowledge on what are fabrics and fibres.
- Excursion to a textile company or research different types of fabrics and fibres using items in Second Hand shops

(An excursion to a textile company or Second Hand shop must be prepared in advance. Proper procedures must be followed, meaning that prior approval must be obtained from the authorities such as the Provincial Education Board, school and the company you would like to visit. Consent forms need to be filled before students can take part in this excursion. To make the trip more educational and beneficial to the students, it important that the students are prepared and know what to look for and what questions to ask*.)*

Ask students to investigate, for example:

- different types of fibres/fabrics for different purposes
- properties and uses of fibres/fabrics
- processes of production of fibres/fabrics
- different types of weave.
- the set-up of the centre or company.
- what textile items are produced or sold?
- are there special fabrics that are used?
- where do they get their fabrics/clothes from?
- what are the processes involved in the production of the textile item?

Design brief

An example of a design brief is set out below. You should think of a design brief that is appropriate for your students and the school's resources. Students may come up with good suggestions as to a product or item they would like to make and could develop an individual or class design brief in consultation with you.

Sample design brief 1: Protective clothing

Problem

There is a need for better protective clothing for people working in a kitchen in a nearby kai bar or restaurant.

Design brief

Produce an article that will protect the workers clothes from food spills and splashes.

Specifications

- materials used must be "food and spatter proof"
- article must be able to be washed easily
- appropriate shape, size and form – it must fit
- article must protect clothes
- cost K10.00 + or – K2.00 in total
- time-line – one term.

Investigations

- Study examples of protective clothing.
- Research the different types of fabrics used for protective clothing.
- Note any common features.
- Decide what materials you wish to use.

Drawings

- Divide your paper into four even parts and do a different design in each part.
- Choose the design you like best and draw it again, this time including all the measurements.
- Draw or draft a simple pattern with measurements.

Making

- Cut the fabric to the pattern.
- Pin and tack the garment.
- Complete your garment by using appropriate techniques.

Evaluation/testing

Consider these questions and write an honest comment about your product:

- Does it suit the purpose for which it was made?
- Does it look good?
- How could you have made it better?

Design brief 2: Small children's toy from fibre or fabric

Problem

The local store does not stock soft toys for children.

Design brief

Produce a small product/item from fibre/fabric that can be used as a toy by a child.

Specifications

- article must be appealing to children
- materials used must be safe and dye-fast
- safety issues must be considered. The toy must be large enough that it cannot be swallowed
- cost – less than K5
- time-line – one term.

Investigations

- Study examples of children's toys
- Research the different types of fabrics that could be used for the outer covering.
- Research the different types of fabrics that could be used for the outer stuffing.
- Decide what materials you wish to use.

Drawings

- Divide your paper into four even parts and do a different design in each part.
- Choose the design you like best and draw it again, this time including all the measurements.
- Draw or draft a simple pattern with measurements.

Making

- Cut the fabric to the pattern.
- Pin and tack the toy.
- Complete your toy by using appropriate techniques.

Evaluation/testing

Consider these questions and write an honest comment about your product:

- Does it suit the purpose for which it was made?
- Is it safe?
- Is it appealing to children?
- How could you have made it better?

Sample test: Fibres an fabrics

Question 1

Select a fibre and draw a flow diagram to show how the fibre is processed until it is made into a fabric. Show only 3 stages of processing in your diagram. 6 marks

Question 2

Complete the table by classifying the following fibres.

Nylon, cotton, wool, silk, polyester, flax

Man-made	Vegetable	Animal

3 marks

Question 3
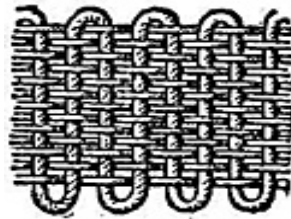
Label the warp and weft threads in the diagram above. 2 marks

Question 4

From the list below, select any two weaves and draw and label an example of each in the boxes provided.

twill weave, pile weave, plain weave 4 marks

Question 5

You have been chosen to run in the sports carnival and you are going to make your own running gear. Describe what you would make and how you would care for the garment:

• the material

• design

• care/laundry requirements. 5 marks

Total 20 marks

Home Economics

Option Basic Sewing

Step 1 – Interpreting the unit learning outcomes

Outcome: Apply safe and appropriate codes and practices in the classroom.

This outcome requires you to revise safety, first aid and maintenance routines in the sewing room or classroom and to teach students how to apply this knowledge.

Outcome: Apply knowledge and understanding through identifying, selecting and using various materials and systems.

This outcome requires you to teach the students about the properties, sources and ranges of sewing technologies and provide opportunities for students to identify, select and use them.

Outcome: Demonstrate practical skills and techniques to produce basic hand stitches, embroidery work and attach fasteners.

This outcome requires you to teach students about the functions and parts of equipment and sewing machines or equipment and to give students the opportunity to practice using a range of skills and techniques required for hand and machine sewing.

Outcome: Use the design process to produce appropriate solutions.

This outcome requires you to revise the design process of planning, making and evaluating a product using a design brief. Students must use the design process to make a product.

Outcome: Evaluate the appropriateness of the materials or systems used to produce a product.

This outcome requires you to revise with students how to evaluate to determine whether the product met the requirements of the design brief and to reflect on the process of designing and making to see whether or not aspects of the design process could be improved.

Step 2 – Planning for assessment

At the end of the term, students must have the product or products they have completed ready for assessment together with their design portfolio. The portfolio might contain rough patterns or sketches of the product, a marking guide covering the design brief, plans, drawings of initial design ideas, patterns, progressive records, and work samples with comments written by the teacher, labelled drawings and diagrams or a report.

You will assess the product along with the design portfolio. The marking guide for the product and the performance standards for the design portfolio must be used to assess the student's work (see pages 19 and 21).

A short test worth 20 marks will also be given to assess the unit.

Step 3 – Programming a learning sequence

Study the topics listed in the syllabus and think about the learning activities that will best provide students with the opportunity to learn the content and practice the appropriate skills, and how long the activities will take.

Plan you activities for the term by putting together a term and topic program and then do your weekly lesson plans.

Step 4 – Elaboration of content and activities

- Research work in groups where students can draw posters or collect pictures of different types of sewing machines and identify their parts etc.
- Students demonstrate how to use sewing machines and other appliances correctly.
- Students demonstrate how to maintain and take care of sewing equipment such as sewing machines and scissors.
- Excursion to a second hand shop where students can identify different stitches such as:
  – basic hand stitches
  – embroidery/decorative stitches
  – basics seams.
- Students do a presentation on the different types of fasteners such as:
  – hook and eye
  – press studs
  – button and button holes
  – zippers
  – tape ties.

Sample design brief – Make/sew a product made from fabric
Problem
The new pillows in the dormitories are getting dirty
Design brief
Sew a protective cover for a pillow.
Specifications
- article must serve its purpose   - cover must be well finished   - cover must be washable and dye-fast   - sewing techniques used must be strong so that seams do not come undone   - cover must fit the pillow   - cost – less than K5   - time-line – one term.

Investigations

- Study examples of pillow and cushion covers.
- Research the different types of fabrics that could be used for the outer covering.
- Research the different types of seams that could be used.
- Decide what materials you wish to use.

Drawings

- Divide your paper into four even parts and do a different design in each part.
- Choose the design you like best and draw it again, this time including all the measurements.
- Draw or draft a simple pattern with measurements.

Making

- Cut the fabric to the pattern.
- Pin and tack the cover.
- Complete you cover by using appropriate techniques.

Evaluation/testing

Consider these questions and write an honest comment about your product

- Does it suit the purpose for which it was made?
- Is it safe?
- How could you have made it better?

Sample test – Basic sewing

Teacher gives each student a square of material with five ruled lines.

The student must sew along the lines using a variety of stitches such as:

- straight stitch (machine)
- zigzag stitch (machine)
- back stitch (hand)
- tacking stitch (hand)
- a decorative stitch (hand or machine)

(4 marks each – total 20 marks)

Home Economics

Option Textile Technologies

Textile Technologies option units can be taught in Grade 9 or 10 provided core unit 9.1 has been completed first.

Schools can develop textile technologies option units using the following unit framework and teach any aspects of textile technology that is relevant to their community and students. Teachers must provide, or develop with students, a design brief for the product/s to be completed during the term. Schools may also select from appropriate vocational education and training units.

Here are some suggestions for textile technologies option units:

- Making a Meri Blouse
- Designing Modern Clothes
- Making Underclothes
- Sports Clothes
- Bed Linen
- Adapting Second Hand Clothes
- Sewing a Garment with Collar, Sleeves and Buttons
- Tailoring – Pattern Drafting
- Home Crafts
- Costumes for School Performances.

Unit Framework
Unit name: (Insert the name of your option unit here)
Unit description: *(Insert a brief description of the content and purpose of your unit here)*
Learning outcomes for every option unit: *(You must use these learning outcomes for your unit)*
Students can: - apply safe and appropriate codes and practices in the classroom - apply knowledge and understanding through identifying, selecting and using various materials or systems - demonstrate practical skills and techniques - use the design process to produce appropriate solutions - evaluate the appropriateness of materials or systems used to produce a product.
Content: *(Insert a list of topics and sub topics for your unit here)*
Students acquire knowledge and skills through the teaching and learning of content developed by the school. Safety must be taught in context and proper equipment and protective clothing used where necessary.
Assessment: (You must use these assessment tasks for your unit)

Assessment task one	
Use the design process to design and make a product using textile/s.	
Assessment criteria	
The learning outcomes will be assessed by the extent to which the student can: • apply safe work practices • use appropriate materials and processes to make the product • select and use with skill tools and techniques to make the product • produce a textile/s product which meets the design brief.	
	60 marks
Assessment task two	
Produce a design portfolio showing the steps undertaken in the making of the product.	
The design portfolio might include: • results of investigation • rough notes or sketches of design ideas • timelines • final drawings or plans • evaluation notes or report.	
Assessment criteria	
The learning outcomes will be assessed by the extent to which the student can: • provide evidence in the portfolio of investigation, design ideas/drawings, materials and equipment used, and evaluation of the process and product.	
	20 marks
Assessment task three	
A short test based on the topics in the unit.	
Assessment criteria	
The learning outcomes will be assessed by the extent to which the student can: • demonstrate knowledge of tools, materials, skills, and processes used in working with textiles.	
	20 marks
	Total: 100 marks

Home Economics

Core 10.1 Introduction to Food Technology

Step 1 – Interpreting the unit learning outcomes

Remember these units learning outcomes link to all the broad learning outcomes.

Outcome 10.1.1: Apply safe and appropriate codes and practices in the classroom

This outcome requires you to teach First Aid and safe food preparation and hygiene standards and techniques including, personal kitchen and food hygiene and provide opportunities for students to demonstrate these practices

Outcome: 10.1.2: Apply knowledge and understanding through identifying, selecting and using various utensils, equipment, foods and processes

This outcome requires you to teach about the characteristics, properties and sources of food and provide opportunities to investigate and identify these, and to understand the processes which must be used to safely prepare, cook or preserve food.

Outcome: 10.1.3: Demonstrate a range of practical skills and techniques

This outcome requires you to teach the practical skills and techniques used in preparing, processing and presenting food and to provide opportunities for students to develop and use these skills when producing food item.

Outcome 10.1.4: Use the design process to produce appropriate solutions

This outcome requires you to revise the design process as it applies to planning, preparing, cooking or preserving, and evaluating food products using a design brief. Students must use the design process to plan meals and menus for specific reasons or occasions.

Outcome 10.1.5: Evaluate the appropriateness of the materials or systems used to produce a product

This outcome requires you to teach students how to evaluate whether the food products met the requirements of the design brief and to reflect on the process of planning and making to see whether or not aspects of the process could be improved.

Step 2 – Planning for assessment

Study the assessment requirements of the unit. These will tell you what specific knowledge and skills students will need to demonstrate they have achieved the learning outcomes.

During the term, students must have the products they have completed ready for assessment together with their design portfolio. The portfolio might contain rough notes or recipes, a marking guide covering the design brief, plans, initial ideas, menus, with comments written by the teacher.

You will assess the products (e.g. preparation and presentation of healthy meals/dishes) along with the design portfolio. The marking guide for the products and the performance standards for the design portfolio must be used to assess the student's work (for an example see pages 19, 21 and 87). You will need to *insert the specific features* of the product that is being assessed

A short test worth 20 marks will also be given to assess the theory part of the unit.

Step 3 – Programming a learning sequence

Students are required to make food products using specific techniques, equipment and processes. You must make sure adequate time is provided for students to complete the tasks. This may mean starting the unit with theory-based lessons to develop background knowledge of materials, processes and techniques before students begin their project. A better approach is to start the project early in the term and introduce theory at relevant stages throughout the project.

Topics	Activities	Assessment
Weeks 1–5 Safety /Hygiene and First Aid Materials Tools Techniques and processes	Introduce the design brief Research Brainstorming activities Learning games Group presentations Identify common properties of food within each of the food groups	Students will need to keep all work examples in their drawing portfolio
Weeks 5–10 Design Brief and design process	Students design, make and evaluate food products Select and prepare food for a design project Select and correctly use a variety of appropriate food utensils and appliances to prepare quality food items for a design project Select, interpret and/or modify/develop recipes for a design project.	Assessment of design portfolio and product
Resources: Guest speaker such as chef, nutritionist etc**,** kitchen equipment, recipe books		

Step 4 – Elaboration of activities

Learning game

Test your knowledge of the five food groups, and how much food you need from each group.

Students discuss the human diet, food groups and the food pyramid. They practice identifying food groups by playing a bingo-style game.

Materials

- Food Pyramid sheet
- Pictures of food items cut from grocery and magazine ads
- Card stock
- Food Group Cover-up board #1
- Food Group Cover-up board #2
- Lunch bags (or other paper bags)

Activity

- Print out or copy the Food Pyramid sheet and the Food Group Cover-up Boards (there are two versions of the boards). Make enough photocopies for each student to use.
- Discuss the fact that humans are omnivores, or meat and plant eaters. Have students give examples of plants and meats that people eat. Define and discuss raw foods and processed foods and share examples of each.
- Do a scavenger hunt. Look for plants that are edible. Also look for food wrappers, drink cans etc. Display the results of the scavenger hunt to see what the students found. Discuss results.
- Discuss examples of healthy foods and "junk" foods. Hand out copies of the Food Pyramid sheet. Review each category, share examples of foods that belong to each one, and discuss the importance of daily servings.
- Ask students to bring in 10 food ads from newspapers or collect them beforehand yourself. Divide students into pairs. Help them sort the pictures by food group. Have students paste the pictures onto cardboard, or draw examples of different foods to make cards for the game (you may need to make reduced photocopies of pictures that will be too large to fit on a Food Group Cover-up square).

  1. All food cards go into the bag.

  2. Players take turns pulling out cards (no peeking). Each player identifies which food group the card fits into and places it on a matching space on the board. If there is no matching space, the card gets returned to the bag.

  3. The first player to cover up all his or her squares is the winner.

Note: As an alternative, you can make your own "deck" of cards randomly labelled with the name of each food group. Give each pair copies of the Food Group Cover-up boards (one version for each player), along with a lunch bag. Explain the game rules:

You are what you eat

Have students record what they eat for a day, then sort these foods by food group. Ask them to analyse which types of foods they eat most, and challenge them to come up with a healthier meal plan.

Food pyramid sheet

Fish, oils and fat
Use sparingly

Dairy products –
Milk, yoghurt
and cheeses
2–3 servings

Meat, poultry, fish,
dry beans, eggs and
nuts
2–3 servings

Vegetable
group
5 servings

Fruit groups
2–4 servings

Bread, cereal, rice
and pasta
6–10 servings
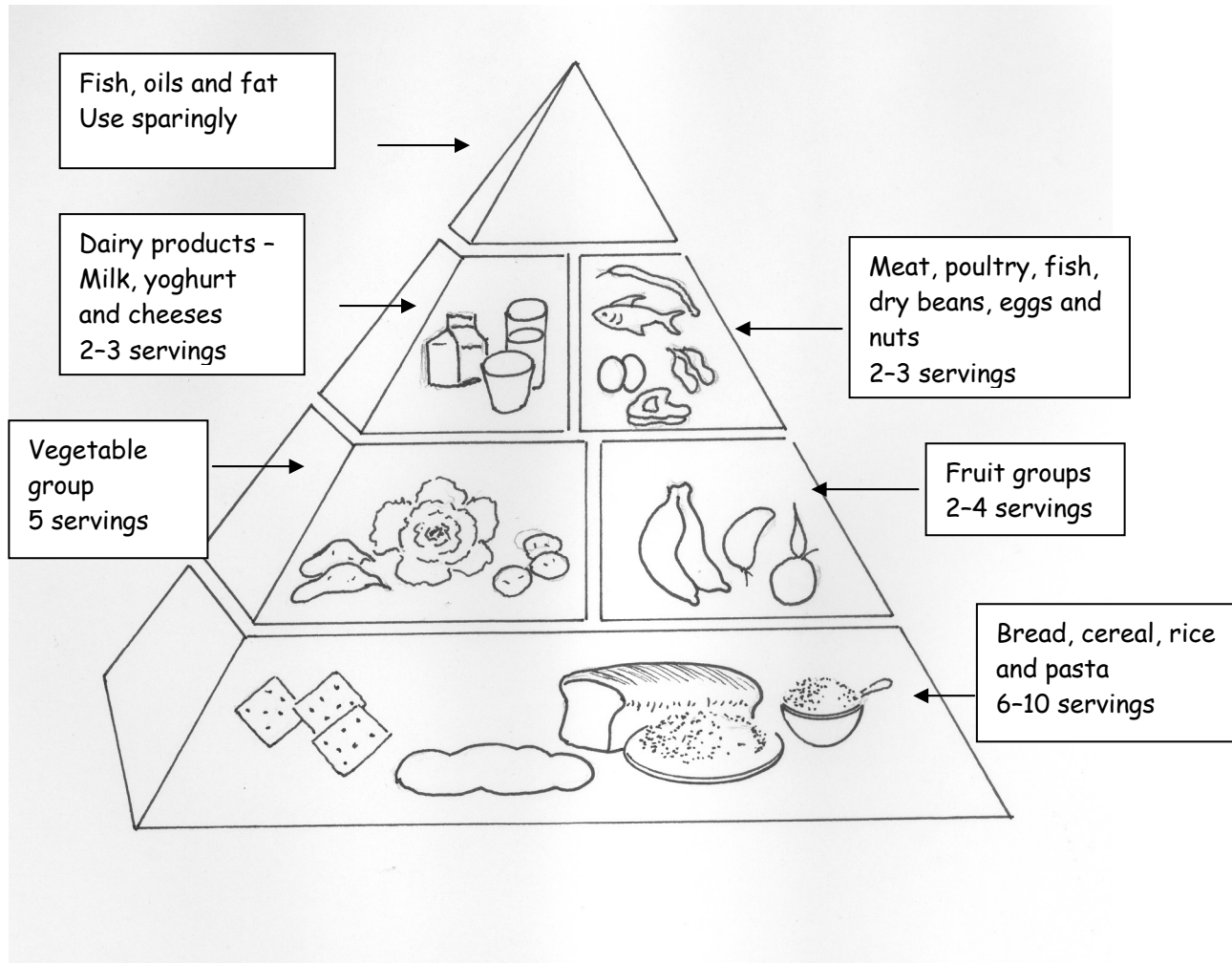
Food Group Cover-up board (make two copies)
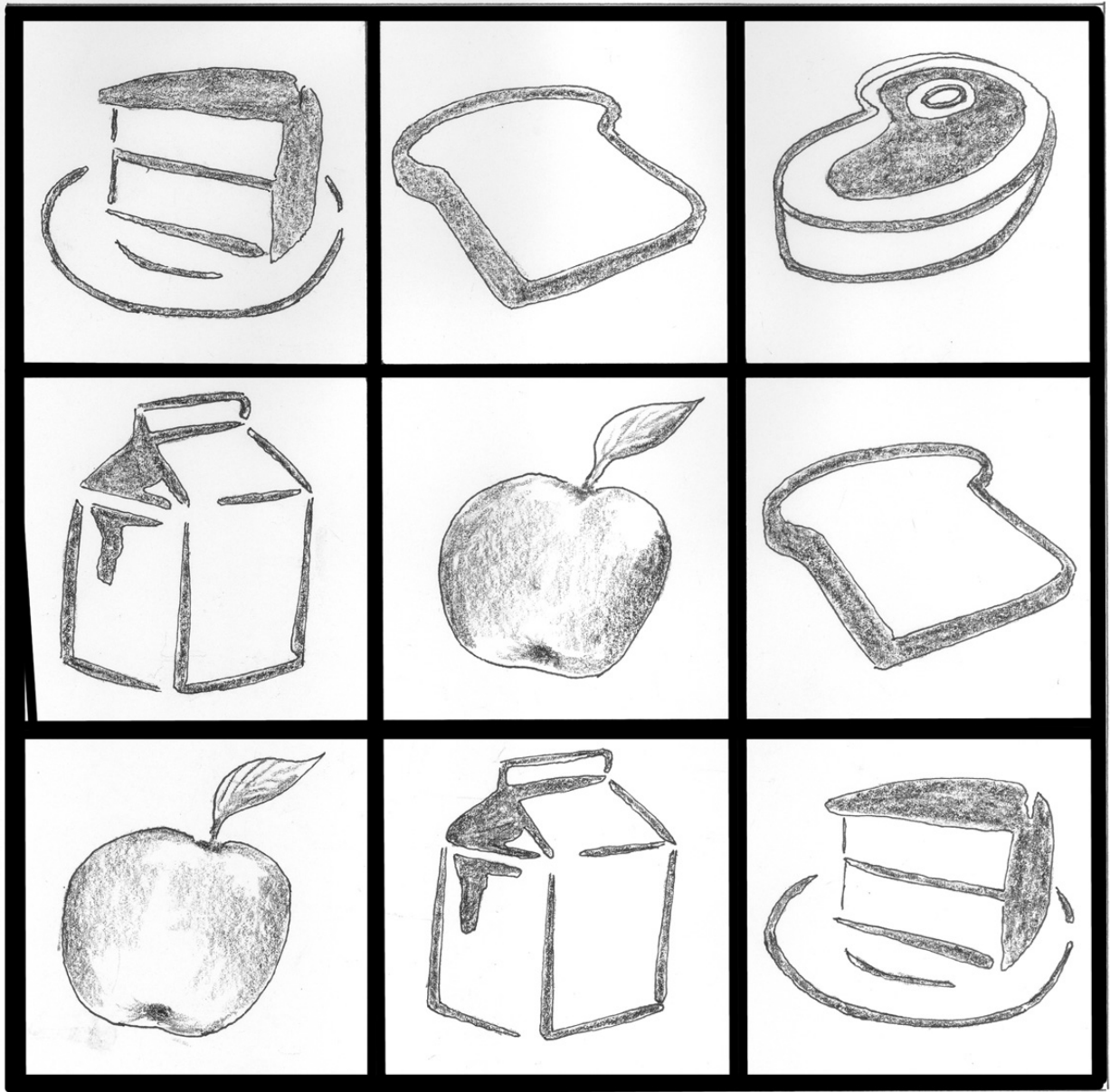
Design brief

An example of a design brief is set out below. You should think of a design brief that is appropriate for your students and the school's resources. Students may come up with good suggestions as to a product or item they would like to make and could develop an individual or class design brief in consultation with you.

Sample design brief: A range of healthy dishes of seasonal food
Problem
There has been a good harvest/production of, for example, kaukau, fish/ eggs/vegetables/coconuts/oranges and the school has bought a lot. What can you do with it?
Design brief
• Plan, prepare and cook meals/dishes using the in-season produce. • Preserve at least four types of food so that they can be safely used in the future.
Specifications
• food must be nutritious and use the seasonal produce • food must be prepared and stored hygienically and safely • food must taste good • food must be well presented • cost – less than K3 per dish or meal • time-line – one term.
Investigations
• Study recipes for the food types. • Research methods of cooking to preserve the nutritional value of the foods. • Research different ways of preserving the food. • Decide what recipes and methods you wish to use. • Write out the recipes or methods.
Making
• Prepare the food. • Cook the food. • Preserve the food.
Evaluation/testing
Consider these questions and write an honest comment about your products • Did the dishes taste good • Did you use new ways of cooking or preserving the food? • Was it safe? • Was it appealing? • How could you have made the dishes or meals better? • How could you have preserved the food better

Home Economics

Core 10.2 Food and nutrition

Step 1 – Interpreting the unit learning outcomes

Remember these units learning outcomes link to all the broad learning outcomes.

Outcome 10.2.1: apply safe and appropriate codes and practices in the classroom

This outcome requires you to teach First Aid and safe food preparation and hygiene standards and techniques including, personal kitchen and food hygiene and provide opportunities for students to demonstrate these practices

Outcome 10.2.2: Demonstrate knowledge of effect of good and poor nutrition on the body.

This outcome requires you to teach the principles of nutrition and the relationship between health and food selection. This outcome also requires you to teach essential nutrients for good health (carbohydrates, protein, oils, vitamins and minerals) and provide opportunities for students to select appropriate and nutritious food for a range of circumstances.

Outcome 10.2.3: Demonstrate practical skills and techniques.

This outcome requires you to teach students how to construct a menu and provide opportunities for students to share their ideas with the class, designing and making healthy dishes from menus.

Outcome 10.2.4: Use the design process to produce appropriate solutions.

This outcome requires you to revise the design process, applying it to planning, making and evaluating a meals and dishes using a design brief. Students must use the design process to prepare and cook nutritious meals.

Outcome 10.2.5: Evaluate the appropriateness of materials or systems used to produce a product.

This outcome requires you to teach students how to evaluate the meals or menus they have prepared in terms of taste, presentation and nutritional value. Students should be given the opportunity to reflect on their work and think about how they would do better next time.

Step 2 – Planning for assessment

During the term, students must have the products they have completed ready for assessment together with their design portfolio. A number of prepared meals or dishes will be assessed during the term, rather than cooked dish at the end of term. The portfolio might contain notes about the meals or menus, a marking guide covering the design brief, plans, ,

progressive records, menus and recipes with comments written by the teacher, labelled drawings and diagrams or a report.

You will assess the products along with the design portfolio. Use the marking guide for assessing the product and the performance standards for assessing the design portfolio (page 21) to assess the student's work.

A short test worth 20 marks will also be given.

Marking guide for assessment task one **60 marks** Use the design process to make nutritious food products.				
	Yes	**No**	**Some times**	**Mark**
Worked safely at all times Understands and follows safety rules in the kitchen Always handles sharp tools, equipment and electrical appliances safely. Health and Hygiene – always washes hands, cleans up work area				**/5**
Wore appropriate safety gear				**/1**
Kept work space clean and organised Cares for and maintains cooking equipment.				**/3**
Selected appropriate tools to make the product Correct cooking tools and equipment for preparing the meal for the family are used				**/3**
Selected appropriate materials to make the product Ingredients and quantities are appropriate for the recipes				**/3**
Materials selected showed understanding of their properties All ingredients chosen are healthy, nutritious and appropriate to the dietary needs of the identified family member.				**/6**
Correct process followed to make product Steps followed in correct order to make the dish or meal				**/6**
Demonstrated high level skills when using tools Kitchen equipment used with skill				**/6**
Used correct techniques Correct techniques selected used for all aspects of food preparation and cooking				**/6**
Demonstrated high level skills in all aspects of making the product Well organised, competent in the kitchen, showed a high level of expertise				**/6**
Product completed within required time frame Food ready on time, prepared most things ahead of time.				**/3**
Product met all the specifications of the design brief A specific meal is clearly identified Product is highly nutritious and clearly meets the dietary requirements of an identified family member				**/6**
Product finished to a high standard Meal is very well presented and very good tasting. very appealing to look at.				**/6**
			Total marks /60	

Step 3 – Programming a learning sequence

Sample program

Topics	Activities	Assessment
Weeks 1–5 Safety /Hygiene and First Aid Essential nutrition Special nutritional requirements Processing food	Introduce the design brief and design process Library research Class discussions Group presentations Collect recipes Plan meals	Students will need to keep all work examples in their portfolio
Weeks 5–10 Design Brief and design process	Students plan, cook and evaluate a number of healthy and nutritious meals.	Assessment of portfolio and food products

Step 4 – Elaboration of activities and content

- For the research activity students can work in groups/pairs to find out about special nutritional requirements and food preferences for certain groups such as pregnant mothers, sick people, young children, etc.
- Invite guest speakers such as nutritionist from the health department to present a talk on nutrition related diseases.

Sample design brief 1: Healthy dishes
Problem
An elderly person and a young child and a teenager have not been well and have not been eating properly. How can you help?
Design brief
Prepare and cook nutritious meals and dishes. Each one must contain at least three food groups.
Specifications
- meals must be nutritious   - meals must taste good   - food must be well presented   - correct processes used to prepare and cook meal   - must contain at least three food groups   - cost – less than K10 per meal or dish.

Investigations

- Study recipes.
- Research methods of cooking to preserve the nutritional value of the food.
- Research different ways of preparing and cooking food.
- Decide what recipes and methods you wish to use.
- Write out the recipes or methods.

Making

- Prepare the meal.
- Cook the food.
- Present the food.

Evaluation/testing

Consider these questions and write an honest comment about your product:

- Does it taste good?
- Did you use new ways of cooking or presenting the meals?
- Was it safe?
- Was it appealing?
- How could you have made them better?

Sample design brief 2: Biscuit products

Problem

Students at the school have said they want to be able to buy small, cheap snacks from the school canteen.

Design brief

Develop, prepare and market a biscuit product that will meet the needs of the students.

Specifications

- Biscuits product must be
- value for money
- nutritious
- use environmentally friendly packaging
- convenient
- all steps of the production process must be listed
- cost – less than 20 toea per biscuit.
- a different biscuit must be produced each week for five weeks.

Investigations
• Study recipes for biscuits. • Do a market survey to find what type of biscuits will sell well. • Research methods of cooking biscuits to preserve their nutritional value. • Determine the cost of the ingredients. • Experiment using various recipes and methods. • Decide what recipes and methods you wish to use. • Write out the recipe or method.
Making
• Prepare the ingredients. • Cook the biscuits. • Package the biscuits.
Evaluation/testing
Consider these questions and write an honest comment about your product: • Do the biscuits taste good? • Which were the most popular types of biscuit? • Did you use efficient ways of cooking the biscuits so that a lot of biscuits were cooked at once? • Is the packaging appealing? • Did you sell all the biscuits? • Have you made a profit?

Home Economics

Option Food Technologies

Food Technologies options can be completed in either Grade 9 or Grade 10.

Food Technology option units teach students to produce food products using appropriate ingredients, tools and equipment safely and competently. Students apply the principles of food preparation and presentation and explore the relationship between health and food selection. Students demonstrate safe food practices and investigate the effect technology has on production and preservation of food. Students complete food practical tasks often working in cooperative groups.

Schools can develop food technologies option units using the following unit framework and teach any aspects of food technology that is relevant to their community and students. Teachers must provide, or develop with students, a design brief for the product/s to be completed during the term. Schools may also select from appropriate vocational education and training units.

Here are some suggestions for food technologies option units:

- Seafood Cookery
- International Cooking
- Traditional Cookery
- Cooking with Local Produce
- Catering for Parties or Functions
- School Canteens
- Food Preservation

Unit Framework
Unit name: *(Insert the name of your option unit here)*
Unit description: *(Insert a brief description of the content and purpose of your unit here)*
Learning outcomes for every option unit: *(You must use these learning outcomes for your unit)*
Students can: - apply safe and appropriate codes and practices in the classroom - apply knowledge and understanding through identifying, selecting and using various materials or systems - demonstrate practical skills and techniques - use the design process to produce appropriate solutions - evaluate the appropriateness of materials or systems used to produce a product.
Content: *(Insert a list of topics and sub topics for your unit here)*
Students acquire knowledge and skills through the teaching and learning of content developed by the school. Safety must be taught in context and proper equipment and protective clothing used where necessary.

Assessment: (You must use these assessment tasks for your unit)

Assessment task one

Use the design process to design and make a product using textile/s.

Assessment criteria

The learning outcomes will be assessed by the extent to which the student can:

- apply safe work practices
- use appropriate materials and processes to make the product
- select and use with skill tools and techniques to make the product
- produce a textile/s product which meets the design brief.

60 marks

Assessment task two

Produce a design portfolio showing the steps undertaken in the making of the product.

The design portfolio might include:

- results of investigation
- rough notes or sketches of design ideas
- timelines
- final drawings or plans
- evaluation notes or report.

Assessment criteria

The learning outcomes will be assessed by the extent to which the student can:

- provide evidence in the portfolio of investigation, design ideas/drawings, materials and equipment used, and evaluation of the process and product.

20 marks

Assessment task three

A short test based on the topics in the unit.

Assessment criteria

The learning outcomes will be assessed by the extent to which the student can:

- demonstrate knowledge of tools, materials, skills, and processes used in working with textiles.

20 marks

Total: 100 marks

Computing

Subject   Computing

Computing Units

```
                        ┌─────────────────┐
                        │   Entry Point   │
                        └─────────────────┘

┌──────────────────┐                      ┌──────────────────┐
│  Computer Basics │  ═══════════════>    │   Keyboarding    │
│     Grade 9      │  <═══════════════    │     Grade 9      │
│      Core        │                      │                  │
└──────────────────┘                      └──────────────────┘

┌──────────────────┐
│ Word Processing  │                      ┌─────────────────┐
│     Grade 9      │                      │   Exit Point    │
│      Core        │                      └─────────────────┘
└──────────────────┘

┌──────────────────┐
│   Presentation   │
│     Graphics     │
│     Grade 9      │
│      Core        │
└──────────────────┘
```

┌───┐
│ ┌──────────────────┐   │
│ │ 9/10 Option Units│   │
│ └──────────────────┘   │
│   │
│ ┌──────────────┐ ┌──────────────┐ ┌──────────────┐   │
│ │ Word   │ │ The Internet │ │ Spreadsheet 1│   │
│ │ Processing 2 │ │   │ │   │   │
│ └──────────────┘ └──────────────┘ └──────────────┘   │
│   │
│ ┌──────────────┐ ┌──────────────┐ ┌──────────────┐   │
│ │ Databases   │ │ Information │ │ Spreadsheet 2│   │
│ │ Grade 10   │ │ Management   │ │ Grade 10   │   │
│ └──────────────┘ └──────────────┘ └──────────────┘   │
└───┘
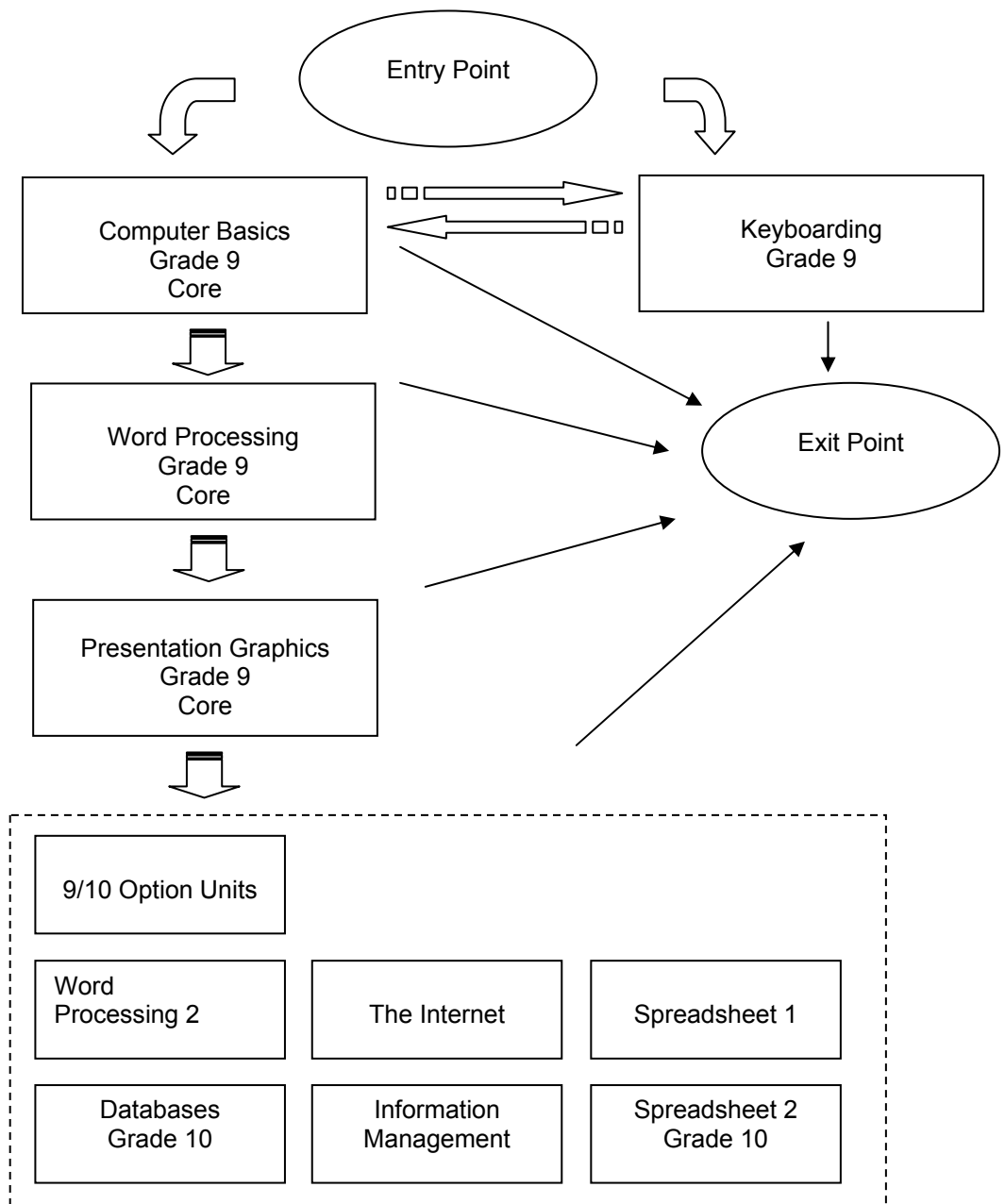
Computing

9.1 Computer Basics

Step 1 – Interpreting the unit learning outcomes

Outcome 9.1.1: Identify and demonstrate appropriate use of a range of hardware components and peripheral devices

This outcome requires you to teach students to identify the various hardware components that make up the Personal computer. Students are also taught the correct way of using all these hardware devices.

Outcome 9.1.2: Use a range of computer applications

This outcome requires you to teach students how to use a range of computer applications. Students learn about basic features and how to access different application software studied in this unit.

Step 2 – Planning for assessment

Study the assessment requirements of the unit. These will tell you what specific knowledge and skills students will need to demonstrate they have achieved the learning outcomes.

Assessment task one requires students to create at least three documents using a variety of computer skills. You need to provide opportunities for students to practice using basic computer applications. A marking guide for the products/documents is provided below.

Assessment task two comprises two tests – a practical test where students demonstrate basic computing skills and techniques worth 20 marks and a theory test worth 20 marks. The practical test is best done using a skills and techniques checklist. It must be conducted using computers as students have to show you that they can operate a computer correctly and produce basic documents. This test can be conducted over several weeks as individual students are ready to demonstrate their knowledge and skills. A sample theory test is provided at the end of this unit.

Marking guide for assessment task one: Create at least three documents using computer, including a simple spreadsheet 60 marks				
	Yes	**No**	**Some times**	**Mark**
Worked safely at all times				/2
Kept work area clean and organised				/3
Used correct keyboarding skills				/5
Identified appropriate programs for a task				/5
Correct process/steps followed when using hardware (turn on/off monitor and UPS etc)				/5
Demonstrated high level skills when using programs				/5
Demonstrated knowledge and understanding of file management (save, save as, access documents etc)				/5
Products completed within required time frame				/5
Products met all the specifications				/5
Products presented to a high standard with correct spelling, appropriate formatting and spacing, use of graphics etc				/20
			Total marks /60	

Step 3 – Programming a learning sequence

This unit provides students with the opportunity to learn about computers and different types of computer applications, and to practice skills in producing various types of computer generated documents. It will focus on studying basic types of software and their features.

Students are required to make a product, or products using computers and technical computing skills. You must make sure adequate time is provided for students to complete the set tasks. This may mean starting the unit with theory-based lessons to develop background knowledge of applications and skills before students begin creating their documents.

Sample program

Topic(s)	Activities	Assessment
Week 1–2 What is a computer? Computer hardware and peripheral devices Computer terminology Starting the computer	▪ Brainstorm prior knowledge about the computer and associated hardware. ▪ Research and list the different types of computers ▪ Students observe and identify computer components including hardware and peripheral devices *(use parts stripped from an old computer)* ▪ Draw and label diagrams ▪ Brainstorm basic computer terms and use computer dictionary to develop definitions ▪ Practice starting and shutting down the computer	
Week 3 – 6 Computer Applications	▪ Create documents with basic formatting such as headings, margins, single font. ▪ Use range of commands such as save, print, print preview ▪ Create documents with different font sizes and styles	Assessment task – produce formatted documents
Week 7 – 8 File Management:	• Access and exit software programs • Manage files – organise, rename, delete, copy files, create backup	
Weeks 9 – 10 Presentation skills Enhancing documents	• Add and edit text • Add a suitable background • Arrange objects on the screen • Insert a picture and write a poem or story to describe the picture. • Insert graphics/ and or clip art	Assessment task two Practical test
Resources Computers – working and not; computer textbook; application software – typing, word processing		

Once you have mapped out your program for the term you may develop more detailed plans for each topic in the unit.

Step 4 – Elaboration of activities and content

Notes for the teacher

- Be aware that working with computers can be time-consuming and may require additional teacher support at unexpected times.
- Consider methods of troubleshooting, eg having students with computer expertise designated as computer assistants.
- Check protocols, procedures and policies of your school and system regarding the use of the Internet.
- Your school may have different application software. Lessons must be planned according to the programs available in your school.

Students may begin the unit by carrying out library research to find out about different types of computers. The computer that is usually referred to in the basic hardware component is classified as a *Micro Computer.*

For the activity in Weeks 1 and 2 it is advisable to strip an old computer out for students to be able to view and physically *identify* the basic computer hardware components and other basic features such as the system clock, processor, power supply, data cables, the RAM, etc.

The Mouse

The mouse is a hand held device that lets you select and move items on the computer. The mouse uses a ball to sense the movement. The mouse fits in to your hand with the cable pointing away from you. The index finger is commonly placed on the left button. As you move the mouse over the mouse pad the curser or arrow will move around the screen. If you ever run out of space on the mouse pad – lift up the mouse and set it down at the top of the mouse pad.

A click is a quick light tap on the mouse button. A double click is two quick light taps on the mouse button. To load a program or open a file move the mouse over the correct icon and double click. Once you are in a program a single click should be all you need.

Students should be given lots of time to experiment, play and try out different functions of the computer, such as:

- what happens when you press the shift key and 8 together?
- what happens when you press the shift key and any other number together?
- what happens when you press the tab key?
- how do you type in capitals?
- how do you get rid of a typing mistake?
- how do you highlight and cut text?
- find three ways to copy and paste a line of text
- find the following keys, find out what they do, type some text and then practice using the keys:
  - delete key
  - enter key
  - shift key

- control key
- alt key
- backspace key
- number pad and number lock.

Sample test

1. Which of the following are peripheral devices?   2 marks

a)	Keyboard	A	all of the above
b)	Modem	B	b) only
c)	Printer	C	b), c), d)
d)	Mouse	D	d), e), f)
e)	Hard disk		
f)	Digital Camera	[Answer A]	

2. Fill in the blanks with the most suitable word / term from the list below: (monitor, mouse, floppy disk drive, flash drive, hard disk drive, CD-ROM drive, sound card, modem, printer, keyboard, system unit,)

3. The _____ is the case that holds the main circuit boards, microprocessor, power supply, and storage devices. [System Unit]

4. Most desktop computers use a separate _____ as a display device. [Monitor]

5. A _____ is a storage device that uses laser technology to read data that is permanently stored on computer or audio CDs. [CD-ROM drive]

6. A _____ can store billions of characters of data. It is usually mounted inside the computer's system unit. A small external light indicates when it is reading or writing data. [Hard disk drive]

7. A _____ is an output device that produces computer-generated text or graphical images on paper.[Printer]

8. A _____ is a storage device that reads data from and writes data to floppy disks.[Floppy disk drive]

9. A small circuit board, called a _____ is required for high quality music, narration, and sound effects. [sound card]

10. Almost every personal computer system includes a built-in _____ that can be used to establish an Internet connection using a standard telephone line.[modem]

11. A _____ is an alternative input device design to manipulate on-screen graphical objects and control.[mouse]

2 marks each

Total 20 marks

Computing

9.2 Word Processing

Step 1 – Interpreting the unit learning outcomes

Outcome 9.2.1: Use word processing applications for specific tasks.

This outcome requires you to teach how to use word processing programs and to teach the basic skills required for work processing. You must provide opportunities for students to practice these skills.

Outcome 9.2.2: Design, produce and evaluate appropriate word processing solutions to a range of problems.

This outcome requires students to use the design process to produce solutions for a range of problems involving word processing. Students are required to document their work activities and evaluate the final document they have produced.

Outcome 9.2.3: Use ethical practices when dealing with information and computer technology.

This outcome requires you to teach students about ethical use of computers such as ethical issues involved in sharing files on one computer as well as other issues related to information and data security.

Step 2 – Planning for assessment

Study the assessment requirements of the unit. These will tell you what specific knowledge and skills students will need to demonstrate they have achieved the learning outcomes.

The design task requires students to use the design process to create documents using a variety of word processing techniques. At the end of the term, students must have the word processed documents they have completed ready for assessment together with their design portfolio. The portfolio can be a combination of electronic and print documentation. It will contain drafts, showing initial design ideas and progressive changes, reasons for design choice and an evaluation of the final document. Each time the student works on a document they must 'save as' in their design brief personal folder so there is a record of their progress.

A short test worth 20 marks will also be given to assess the unit.

You will assess the word processed documents along with the design portfolio. The marking guide for the documents and the performance standards for the design portfolio must be used to assess the student's work.

Marking guide for assessment task one: Create word processed documents using a variety of techniques				**60 marks**
	Yes	**No**	**Some times**	**Mark**
Worked safely at all times				/2
Kept work area clean and organised				/3
Used correct keyboarding skills				/5
Identified appropriate programs for a task				/5
Correct process/steps followed when using hardware (turn on/off monitor and UPS etc)				/5
Demonstrated high level skills when using programs				/5
Demonstrated knowledge and understanding of file management (save, save as, access documents etc)				/5
Product completed within required time frame				/5
Product met all the specifications of the design brief				/5
Product presented to a high standard with correct spelling, appropriate formatting and spacing, use of graphics etc				/20
			Total marks /60	

Performance standards for assessment task two – Design portfolio				
				Total marks – 20
Criteria	**Very High Achievement 18–20 marks**	**High Achievement 14–17 marks**	**Satisfactory Achievement 10–13 marks**	**Low Achievement 0–9 marks**
Designing and planning	Documentation shows a wide range of possible ideas for word processed documents. Detailed notes/drafts for innovative or original ideas generated. Detailed reasons for final choice of product are given.	Documentation a range of possible ideas for word processed documents. Clear notes/drafts for innovative or original ideas generated. Clear reasons for final choice of product are given.	Documentation some possible ideas for word processed documents. Some notes/drafts for innovative or original ideas generated. Some reasons for final choice of product are given.	Documentation lacks ideas for word processed documents. Limited notes for innovative or original ideas generated. A few reasons for final choice of product are given.
Evaluation	Documentation clearly reflects an evaluation of the process, outlining what was successful, what could be improved. A detailed evaluation of how the documents meet the design brief is included.	Documentation reflects an evaluation of the design process, outlining what was successful, what could be improved. An evaluation of how the documents meet the design brief is included.	Documentation reflects some evaluation of the design process, outlining what was successful, what could be improved. A brief but adequate evaluation of how the documents meet the design brief is included.	Documentation reflects a very limited evaluation of the design process, outlining what was successful, what could be improved. An inadequate evaluation of how the documents meet the design brief is included.

Step 3 – Programming a learning sequence

This unit provides students with the opportunity to learn about different types of word processing software and to master skills in producing various types of word processed documents.

Sample program

Topic(s)	Activities	Assessment
Week 1 Review – computer hardware; file management	• Review activities to assess existing knowledge about hardware and appropriate use (worksheets) • Practice sessions on organising and managing files. • Introduce and discuss the importance of behaving ethically when using shared computers and accessing files and data	Provide students with the design brief
Week 2 Word Processing	Create and save a new document • identify intended use • use save and save as Open, view, and print documents • print entire file • use print preview • print selected parts Format documents • Modify font style and size • word and line spacing • indent text and justify text • change case • select page orientation • set margins and tabs • setting tabs • use headers, footers and pagination *(provide sample documents for students to copy, or students produce sample texts for other subjects)*	Students keep drafts of word processed documents for the portfolio either in hard copy or saved as documents in a personal file on the computer
Weeks 3 – 9 Word processing continued	Edit text • change font style and size • cut, copy, paste, and delete text • use spell check and thesaurus • use find and replace feature Word processing in real world context • write stories or poems • type reports • generate letters • create a resume • create a formal report for another subject/unit	Students keep drafts of word processed documents for the portfolio. Edit and correct any errors in the document. Do final formatting and copy for presentation in the portfolio.
Week 10 Desktop publishing techniques	• insert and size graphics • create columns • create tables	Week 10 Test

Once you have mapped out your program for the term you may develop more detailed plans for each topic in the unit.

Step 4 – Elaboration of activities and content

The activities in week 1 and 2 are a review of the skills covered in Unit 9.1. Students familiarise themselves with a word processing program and practice word processing. Student need to have sufficient time for hands-on practice. This means that you must give students opportunities to use the computers as much as possible. There are lots of word processing games and simple activities you can use like the ones below.

Formatting Fun

Have students type these words then use the font colour tool to colour each word appropriately (example, red). Next, have students appropriately align the words left, right, and centre. Do not let them use the tab or space bar. Finally, have students add or delete spaces so only one space appears between each word and between each sentence.

Type and colour these words:

- red
- blue
- green
- yellow
- orange.

Move these words:

- right
- left
- centre.

Space these words:

Kambi   was   afrog.Hedid   not like to hop. Kambi likedto walk   on his tiptoes.Silly Kambi!

Sample design brief: Produce a chart about hardware and peripheral devices that make up a computer.
Specifications
The chart must include text and at least one of the following: • graphics • word Art.
Investigations
Investigate different fonts and font sizes that are used in charts.

Drafts

- Open a blank document.
- Do different designs of charts on different pages.
- Add the text and graphics and experiment with different fonts and font sizes.
- Save drafts for your portfolio.
- Choose the chart design you like best and save.

Producing

- Edit the chart.
- Print.

Evaluation/testing

Consider these questions and write an honest comment about your product

- Does the wall chart suit the purpose for which it was developed?
- How could you have made it better?

Integration of subjects

Students can use computers for all their other subjects to type up work, word process assignments etc. All tasks that students do in Computing should be taken from work students are doing in their other subjects so that there is a real purpose to Computing lessons. For example, if students have to write a letter for an English assignment, it could be word processed in Computing.

Sample test

Copy and complete the following sentences

1. _____ a document involves correcting any typing mistakes.[editing]   2 marks

2. A word processor is a software package whose purpose is to allow the user to _____.[write]   2 marks

3. The _____ is a blinking rectangle on the monitor which indicates the user's current position. [cursor]   2 marks

4. To use a word processor it must firstly be _____ into the computer's main memory.[loaded]   2 marks

5. _____ is the altering of the appearing for impact and readability.[formatting]   2 marks

6. Copy and complete the following table for your word processing program.   10 marks

Function	Command or action
Move cursor to the beginning	
Deleting to the left of cursor	
Deleting to the right of cursor	
Saving a document	
Move cursor right	
Move cursor to end	
Copy text	
Find text	
Find and replace text	
Move text	

Computing

9.3 Presentation Graphics

Access to computers with presentation graphics is required.

Step 1 – Interpreting the unit learning outcomes

Outcome 9.3.1: Use a presentation graphics application.

This outcome requires you to teach the students the skills and techniques required for using presentation applications and to provide opportunities for them to practice creating presentations for a variety of purposes.

Outcome 9.3.2: Design and create graphic presentations for a range of purposes.

This outcome requires you to ensure that students use the design process to come up with ideas and create graphic presentations for particular purposes.

Outcome 9.3.3: Use ethical practices when dealing with information and computer technology.

This outcome requires you to teach students about ethical use of computers such as ethical issues involved in sharing files on one computer as well as other issues related to information and data security.

Step 2 – Planning for assessment

Study the assessment requirements of the unit. Students have to create a presentation using a graphics presentation application and document the process of designing the presentation in a portfolio. The portfolio can be a combination of electronic and print documentation. It will contain drafts of slides, initial design ideas and progressive changes, pictures of word Art, reasons for design choice and an evaluation of the final document. Each time the student works on a document they must 'save as' in their design brief personal folder so there is a record of their progress.

You have to ensure that all students have access to a computer and the presentation application so that they can meet the assessment requirements. Peer assessment could be used to assess a presentation if you program enough time to allow each student or group to present their slides or graphics presentation to the class. The marking guide for the product and the performance standards for the design portfolio must be adapted from the ones on page 102 and used to assess the student's work.

A short test worth 20 marks will also be given to assess the unit.

Step 3 – Programming a learning sequence

This unit provides students with the opportunity to learn about different types of presentation software and to master skills in producing various types of

presentations. It will focus on studying different types of presentation software and their features. Students also demonstrate problem solving skills through the use of the design process to enable meaningful learning that is engaging.

Sample program

Topic(s)	Activities	Assessment
Week 1–3 Presentation graphics software	• explore the features of presentation graphics software • review the design process • design a presentation by adding, formatting and editing text and choosing different slide layouts	Provide students with the design brief
Week 4–5 Presentation software continues	Change the look of presentation by • customising background • organising objects on screen • inserting graphics, clip art and Word Art.	Students keep drafts of graphic presentations in a personal folder on the computer. The portfolio could also be kept on the computer.
Week 6 Presentation software continues	Add effects to presentation by • adding transition • setting timing and other properties to slides • arranging slides in presentation	Students keep drafts of slides.
Week 7–8 Presentation software continues	Add effects to presentation by, for example • Using audio in presentation • Applying slide layout to organise information on slides • Using animation to add impact	Edit and correct any errors in the slides.
Week 9–10 Presentation software continues	Present slide show by • rehearsing set up of slide show (projector/computer) • showing slide presentation • evaluating slides (content and appearance)	Finalise presentation for assessment. Week 10 Test

Once you have mapped out your program for the term you may develop more detailed plans for each topic in the unit.

Step 4 – Elaboration of activities and content

All activities in this unit require student to have sufficient time for hands on practice. This means that you will have to allow students to use the computers as much as possible.

In the final part of the unit, students should present their graphics presentations to other members of the class. This is a good opportunity to

use self and peer assessment. The students are to be given marking criteria which they will use to assess their peers. Assessment criteria could include

- clarity of material
- organisation of content (sequence of presentation)
- the quality of slide content
- the impact of the slides or graphics.

| **Sample design brief: Create a graphics presentation on (topic)** |
|---|
| **Specifications** |
| use presentation software the presentation must include text, the presentation must include graphics use audio and video if possible presentation must be no longer than 3 minutes. |
| **Investigation** |
| What presentation software is available? Which would be the most appropriate for the presentation? Is it easy to use? |
| **Drafts** |
| Open a blank document Do different designs of slides on different pages Add the text and graphics and experiment with different fonts and font sizes Add special effects such as transition effects Save drafts for your portfolio Organise slides into a logical presentation Choose the slides you like best and save. |
| **Producing** |
| Edit the presentation Present to the class or a group. |
| **Evaluation/testing** |
| Consider these questions and write an honest comment about your product Did the presentation suit the purpose for which it was developed? How could you have made it better? |

Integration

This unit can be integrated with all other subjects as graphic presentation can be used to convey information on a variety of topics.

Sample test

1. Label the parts of the diagram below
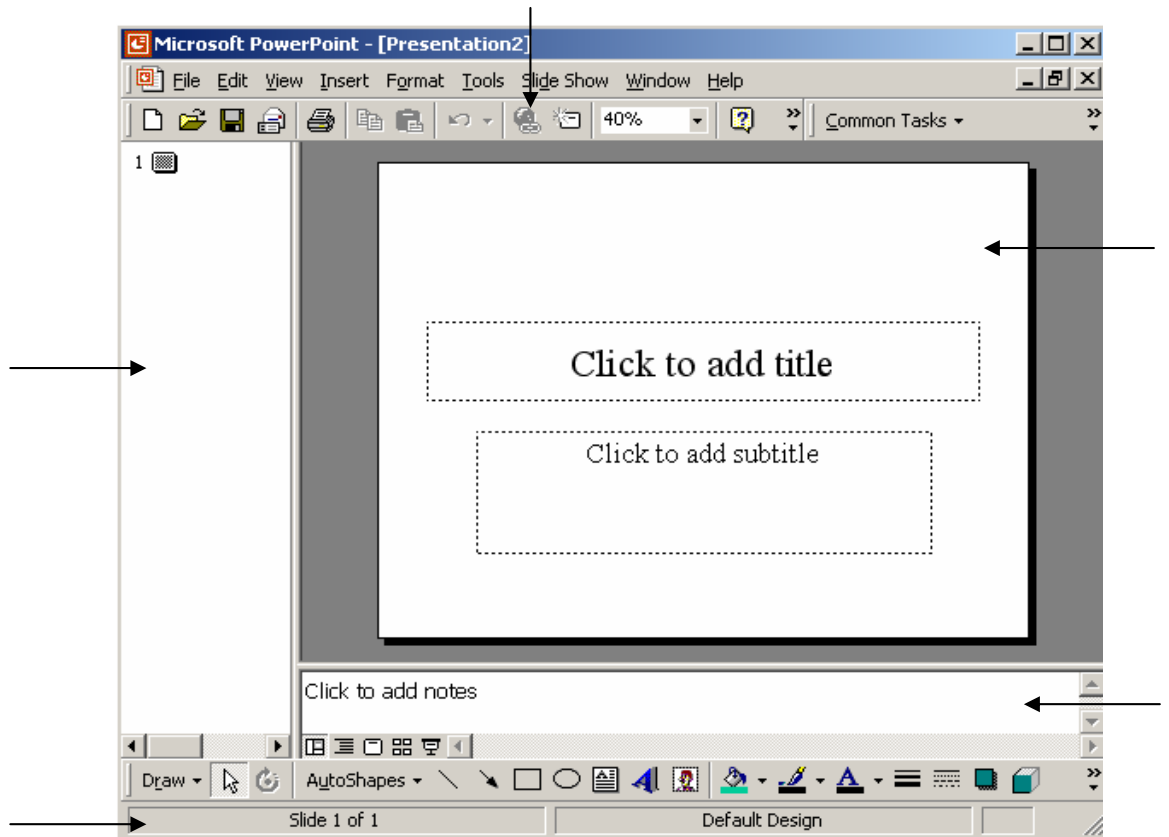
10 marks

2. What are the five different ways you can view a graphics presentation using the computer?

5 marks

3. Describe slide transition and give three examples of how it can be used.

5 marks

Total 20 marks

Computing

Option 9/10 Spreadsheets 1

Step 1 – Interpreting the unit learning outcomes

Outcome: Demonstrate an understanding of spreadsheets.

This outcome requires you to teach students about spreadsheets: their functions and uses in a range of situations, and how they work. Students must be provided with opportunities to read and understand the information contained in simple spreadsheets and how to use them to perform basic operations.

Outcome: Design, create and evaluate spreadsheet solutions to a range of problems.

This outcome requires you to teach students how to design and create spreadsheets for a particular purpose and give opportunities for students to create their own simple spreadsheets.

Outcome: Use ethical practices when dealing with information and spreadsheet applications.

This outcome requires students to use ethical practices when dealing with information so as to minimise potential risks to other computer users in regard to confidentiality, security, copyright violation, viruses, occupational health and safety.

Step 2 – Planning for assessment

At the end of the term, students must have a spreadsheet they have completed ready for assessment together with their design portfolio. The portfolio can be a combination of electronic and print documentation and might contain sample data to be included in the spreadsheet, initial work books and progressive work sheets and drafts with comments written by the teacher. Each time the student works on a spreadsheet work book they must 'save as' in their design brief personal folder so there is a record of their progress.

You will assess the spreadsheet along with the portfolio. The marking guide for the product and the performance standards for the design portfolio must be adapted and used to assess the student's work (see page 102).

A short test worth 20 marks will also be given to assess the unit.

Step 3 – Programming a learning sequence

This unit provides students with the opportunity to learn about different types of spreadsheet software and to master skills in producing various types of spreadsheets. Students also demonstrate problem solving skills through the design process to enable meaningful learning.

Sample program

Topic(s)	Activities	Assessment
Week 1–2 **Spreadsheets and their purpose**	• explore the features of spreadsheet software • examine features of applications • introduce spreadsheet tools • identify intended use of spreadsheets	
Week 3–4 **Create and save spreadsheets**	• start and close a spreadsheet application • specify data organisation • determine columns and rows • set cell attributes • create simple calculation formulas • enter and edit data	Create data or lists for storing information
Week 5–6 **Retrieve and manipulate data**	• filter lists • sort data • create chart(s)	
Week 7–8 **Edit and print spreadsheets**	• insert column or row • delete column or row • use fill down/across • save updated spreadsheet • set up page by adjusting margins, setting paper size • print preview and print	**Assessment task** Create a spreadsheet to solve a chosen problem
Week 9–10 **Spreadsheet project**	• continue working on a spreadsheet to provide a solution to a problem given by teacher.	**Assessment** Test (20 Marks)

Step 4 – Elaboration of activities and content

Students will be presented with a spreadsheet program and given opportunities to practise using the program. Spreadsheets are quite complex with set ways to enter data and formula.

All activities in this unit require student to have sufficient time for hands on practice. This means that you will have to give students as much time as much as possible on the computer using spreadsheet programs.

It is recommended that you provide sample files for practice sessions to reduce time loss, however students can collect their own data in groups and enter it into a spreadsheet. For example students can carry out a stock take

on the school canteen and find out how many drinks are left at the end of the school week.

The following spreadsheet has been constructed to keep a record of the drinks in the school canteen.

	A	B	C	D
1	Name of drink	Bought	Sold	Number left
2	Fanta	115	75	+B2 – C2
3	Vita Juice	130	67	+B3 – C3
4	Pure Azz	127	110	+B4 – C4
5	Orchy	120	102	+B5 – C5

Design brief ideas for a spreadsheet solution:

- Produce a simple budget for the week using a spreadsheet solution.
- Carry out a census of student numbers in classes and present the findings on a spreadsheet.
- Conduct a survey of traffic passing the school and present the findings on a spreadsheet.

These design brief ideas require the students to design a simple spreadsheet solution for a chosen problem. Students identify a problem and then follow the design process when designing their solution to the problem. You must provide students with detailed specifications for the design brief. See page 109 in the Presentation Graphic unit for an example of how to set out a design brief.

Integration

Spreadsheets are useful tools for Business Studies, Agriculture projects and Mathematics.

Sample test

Study the following diagram and answer the questions that follow.
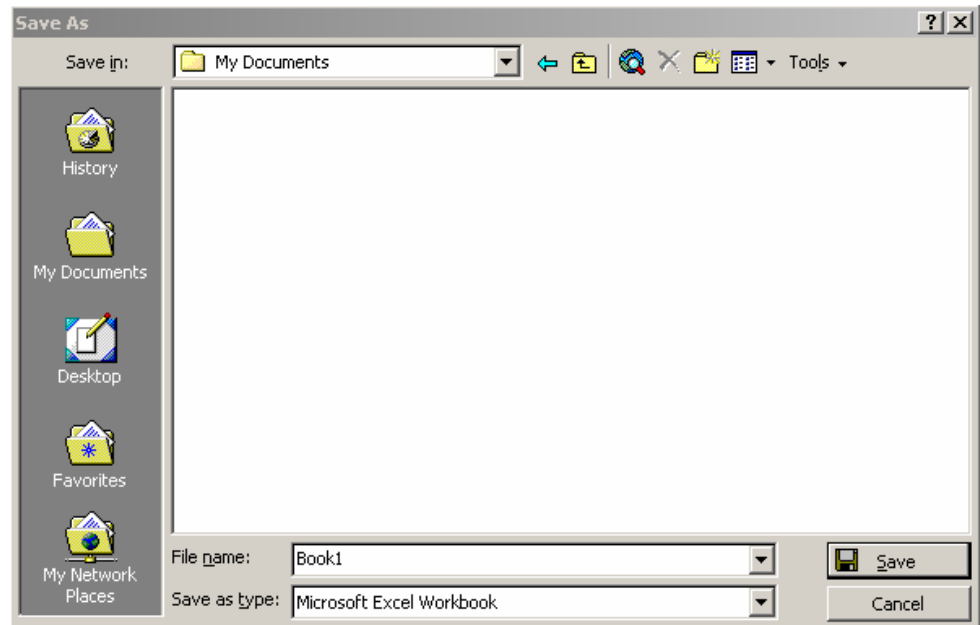
1. Which menu item was used to open this window?   2 marks

2. Name the button you would click to save this file?   2 marks

3. Name the folder that this spreadsheet will be saved to if the button in (b) is clicked.   2 marks

4. What would happen if the cancel button were clicked?   2 marks

5. Name the icon you will click if you wanted to save your file to a computer on your network?   2 marks

The diagram below shows a common object that always pops up when you are working in Excel. Study the diagram and answer the questions that follow (2 marks each).

6. What is the name of this object?

7. Which menu item on the menu bar do you think the user clicked on resulting in this object popping up

8. What conclusion can you draw from this message?

9. What would you do if you want to hide this object from appearing?
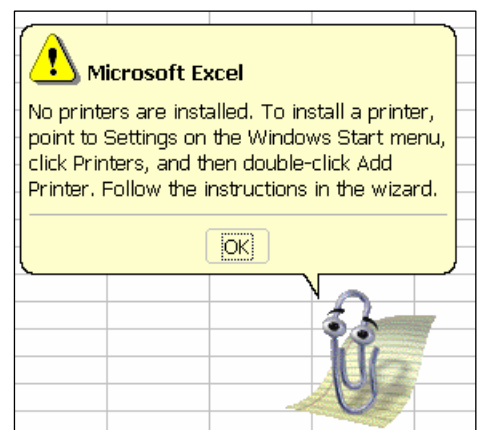
How many worksheets does a workbook contain when you first start excel?

2 marks

Total 20 marks

Computing

Option 10 Databases

Access to a computer with database applications required

Step 1 – Interpreting the unit learning outcomes

Outcome: Use database programs.

This outcome requires you to teach students to use a database program and show them how databases can be used to retrieve information in response to a query or the problem that has been set. Where possible students should be provided with opportunities to become familiar with more than one database application.

Outcome: Design, create and evaluate simple databases.

This outcome requires you to teach students the process of designing and constructing a simple database and to provide opportunities for students to evaluate the effectiveness of the database by using them to retrieve information.

Outcome: Justify decisions made when creating and querying databases.

This outcome requires you to teach students how to create databases and how to find information from databases. Students should be provided with opportunities to use a variety of skills and techniques to search for information in databases so that they understand that there are various ways of querying databases and some ways are more efficient than others, and therefore they can justify the procedures they have chosen.

Step 2 – Planning for assessment

At the end of the term, students must have a simple database they have completed ready for assessment together with their design portfolio. The portfolio can be a combination of electronic and print documentation and should contain sample data to be included in the database, procedures used for searching for information, reflection on the procedures used and initial drafts. Each time the student works on a document they must 'save as' in their design brief personal folder so there is a record of their progress.

You will assess the database along with the design portfolio. The marking guide for the product and the performance standards for the design portfolio should be adapted to this unit and used to assess the student's work (see pages 96 and 102)

A short test worth 20 marks will also be given to assess the unit.

Step 3 – Programming a learning sequence

In this unit students will learn about creating and using databases. Students will learn the basic structure of a database and learn to query a database

created by themselves or the teacher. The syllabus units list the topics and skills that must be taught and learned during this unit. Students are create and use a database using specific skills and techniques. You must make sure adequate time is provided for students to complete the database outlined in the design brief.

Sample program

Topic(s)	Activities	Assessment

Week 1– 4
Setting up databases
	• definition of databases
	• brainstorm when they are used, why are they useful and who finds them useful
	• manage data
	• create database objects
	  - tables
	  - forms
	  - fields
	  - records
	• identify intended use
	• create and save databases
	• specify data organisation
	• name fields
	• set field attributes
	• enter data in a consistent form
	• edit data as needed.	

Week 5 – 6
Retrieve and manipulate data
	• open existing database
	• sort
	  - ascending
	  - descending
	• search for specific data by field
	• use find and replace
		Assessment
		Theory Test

Week 7 – 8 Edit data	Student work on an existing databases created by the teacher to: • add records to a file • add fields to a record • delete records from a database file • delete a field from a record	Assessment task 1: Create an information database
Week 9 Database output	Students to use a database prepared by the teacher and view database in: • list/table view • form view • report view	Assessment task 2 Save all drafts and data for inclusion in your folder or portfolio.
Week 10 Printing information in databases	• adjust margins • set paper size • print preview and print	Complete data base.

Step 4 – Elaborations of content and activities

Students should be given the opportunity to become familiar with, and use a database program. All activities in this unit require students to have sufficient time for hands on practice. It is recommended students use the computers as much as possible. Data is needed for this unit and you should have this available at the beginning of the unit for students to manipulate and work with.

Design brief ideas for a database solution

- A directory listing for students in the class
- Processing sales information from a survey done in Business Studies to predict business trends and putting the information in a data base.

These design brief ideas require the students to design a simple database solution for a chosen problem. Students identify a problem and then follow the design process when designing their solution to the problem. You must provide students with detailed specifications for the design brief. See examples in the Presentation Graphics and Word Processing units of how to set out a design brief.

Sample Test Option 2: Database

Study the diagram below and answer the questions that follow
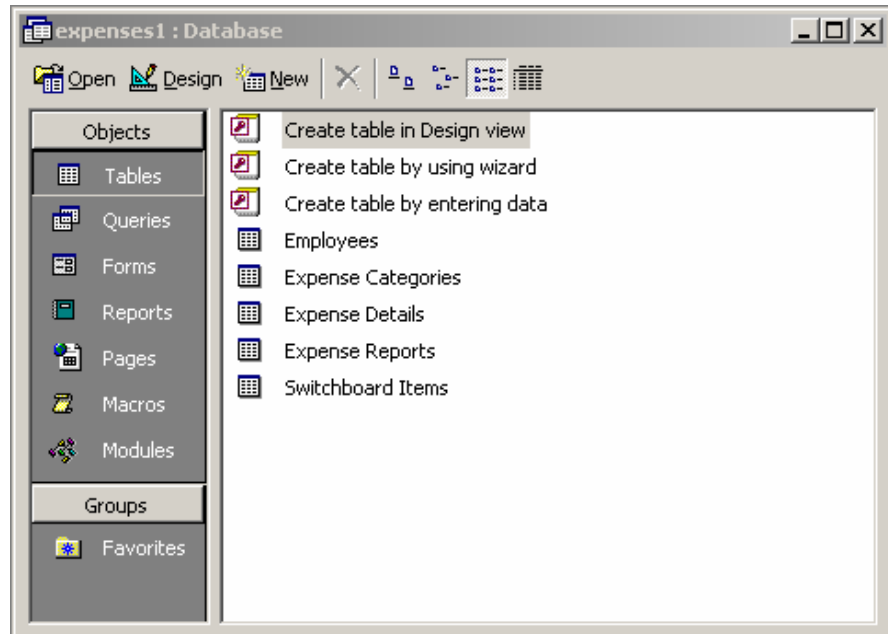
1. What is the name of this database?   2 marks

2. How many tables does this database have?   2 marks

3. Name the object you would use if you wanted to ask for certain information from the database?   2 marks

4. Name the object you would use to output certain information from the database?   2 marks

5. Which object would you work with to perform tasks repeatedly?

                                                                    2 marks

6. Define the following terms:

    - Database

    - Table

    - Form

    - Information

    - Data

                                                                    10 marks

                                                           Total 20 marks

Computing

Option Information Management

Access to a computer with database, word processing and spreadsheet applications is required. A searchable database is also needed. Use of electronic encyclopedias is optional but recommended.

Step 1 – Interpreting the unit learning outcomes

Outcome: Use problems-solving processes when accessing and retrieving information using computers.

This outcome requires you to teach students how to find useful information using electronic encyclopedias, or other CD ROMs. It requires you to teach students how to systematically find information use problem solving processes so that relevant information can be found quickly and efficiently.

Outcome: Organise, analyse and evaluate information from electronic sources.

Using computers to access information in response to problem requires you to design activities that provide the opportunity for students to access, organise, compare and evaluate information from different sources and come up with appropriate answers or solutions.

Outcome: Describe ethical practices used when accessing and retrieving information.

This outcome requires students to check protocols, procedures and policies of their school and system regarding the use of computers.

Step 2 – Planning for assessment

At the end of the term, students must present information they have collected for a purpose by using a variety of retrieval methods together with their design portfolio. The portfolio can be a combination of electronic and print documentation and should show the steps undertaken in the process of accessing and retrieving information, a wide range of information that has been retrieved, with the final presentation consisting of relevant and useful information which meets the requirements of the design brief. Each time the student works on a document they must 'save as' in their design brief personal folder so there is a record of their progress.

You will assess the appropriateness of the information and methods used to retrieve information along with the design portfolio. The marking guide for the product and the performance standards for the design portfolio must be adapted to this unit and used to assess the student's work (see pages 96 and 102).

A short test worth 20 marks will also be given to assess the unit.

Step 3 – Programming a learning sequence

In this unit students will learn how to access/retrieve information using a variety of sources. Students will learn how to use CD ROMS and spreadsheets to find information. The emphasis of the unit is on developing skills at accessing information.

Sample program

Topic(s)	Activities	Assessment
Week 1–2 Accessing and retrieving information	• identify a need for information • identify appropriate resources • use catalogues	
Week 3–4 Search for information	• define search parameters • use databases • use information retrieved from different sources	Assessment task 1 Research Project on chosen topic of interest.
Week 5–6 Organising information	• identify useful information from search • take notes/paraphrase from search • cite electronic sources for bibliography • copy and paste or use the annotation tools in the electronic reference source	
Week 7–8 Analysing information	• compare information from at least two sources • identify trends in data • evaluate for accuracy, relevance, appropriateness, comprehensiveness, and bias • prepare reports on analysis using a computer application (word processor and presentation graphic tools)	Assessment task Prepare information for portfolio.
Week 9–10 Presentation of report or oral presentation	Students submit their printed presentation Presentation of their work to the class.	Completion of assessment portfolio. Test

Step 4 – Elaborations of activities

Students should have access to a variety of electronic reference software or databases and be given time to familiarise themselves with their features and to learn how to use them. Teachers may construct a set of guidelines that will help students to accomplish this.

This unit is a research unit, which requires students to search for information from various sources. It is important that ethical issues relating to use of information is emphasised.

Integration

Teachers are encouraged to collaborate with other teachers when teaching this unit. For example in Social Science students might be required to do case studies on conflict. The Social Science teacher could organise with the computing teachers to have the students cover this unit at about the same time.

Sample design brief: Find and present information on (a topic)

Specifications

- Access information about the topic using at least two different retrieval methods.
- Evaluate the accuracy, relevance and appropriateness of the information.
- Present the information on the topic using an appropriate application.
- Prepare a brief report on the steps taken in accessing the information using a word processing program.

Investigation

- What information is required?
- What sources of information are available?
- Which would be the most appropriate source to obtain the information for the topic?
- Is it easy to use?

Drafts

- Open a blank document.
- Word process findings from the investigation.
- Save drafts for your portfolio.
- Format the document, use a spell check and save.

Producing

- Select the information that will be used for the final presentation.
- Collate the important information.
- Add the text and graphics and experiment with different fonts and font sizes to make the presentation interesting.
- Edit the document making sure that references are included.
- Save all the drafts and final document electronically.
- Print the final document.

Evaluation/testing

Consider these questions and write an honest comment about your product:

- Did you use appropriate sources of information?
- Was the information appropriate for the purpose?
- How could you have done better?

Computing

Option Word Processing 2

Access to a computer and word processing applications is required.

Step 1 – Interpreting the unit learning outcomes

Outcome: Use appropriate skills and techniques for word processing documents.

This outcome requires you to teach students more advanced word processing skills and techniques so that they can create quality word processed documents.

Outcome: Design, create and evaluate word processed documents for a range of tasks.

This outcome requires you to teach students how to create documents using a word processing application. Students should be provided with opportunities to use a variety of word processing skills and techniques so that they understand that there are a variety of techniques and processes that can be used when word processing and some ways are more efficient than others, and therefore they are able to justify the procedures they have chosen.

Outcome: Use ethical practices when dealing with information and computer technology.

This outcome requires students use ethical practices when dealing with information so as to minimise potential risks to other computer users in regard to confidentiality, security, copyright violation and viruses.

Step 2 – Planning for assessment

At the end of the term, students must develop word processed documents containing tables, lists and pictures using a range of more advanced word processing skills, and a design portfolio. The portfolio can be a combination of electronic and print documentation and may be in the form of a folder with typed initial ideas, unformatted drafts, and experiments with graphics, columns, Word Art, and the final formatted documents. Remember to back up work that is to be used for assessment purposes. Each time the student works on a document they must 'save as' in their design brief personal folder so there is a record of their progress.

You will assess the word processed document/s along with the design portfolio. The marking guide for the product and the performance standards for the design portfolio must be used to assess the student's work (see pages 96 and 102).

Step 3 – Programming a learning sequence

The syllabus units list the topics and skills that must be taught and learned during this unit. Students are required to create word processed documents using or advanced skills and techniques. You must make sure adequate time is provided for students to complete the documents outlined in the design brief.

Sample program

Topic(s)	Activities	Assessment
Week 1– 4 Review of word processing skills	• create various documents to demonstrate word processing skills such a use of margins, fonts, headings • use headers and footers	**Assessment task** Document creation
Week 5 Formatting	Apply advanced formats such as • line spacing • indents • font effects and underlining to text and paragraphs	
Week 6 Printing	• use page set-up dialogue box to adjust margins, paper size and orientation • include automatic codes for page numbering and file path • print multiple copies or specific page ranges of a document • use print dialogue box to print to a different printer, set printer specific options	
Week 7–8 Tables and lists	Insert and format tables, including • adding, sizing rows and columns • applying changes to borders and shading • using autosum and sort options Create • bulleted lists • numbered lists • format bullets and numbers including outline numbering	**Assessment task** Document creation
Week 9–10 Graphics	• draw figures using the drawing tools • use clip art and word art • format pictures from a file • use equation editor to produce mathematical notation	Finalise document for assessment Test

Step 4 – Elaboration of activities

All activities in this unit require student to have sufficient time for hands on practice which means that you will have to provide opportunities for students to use computers as much as possible.

It is important for you to note that all practice activities need constant monitoring and evaluation. You should attempt to mark all practice activities as much as possible.

Sample design brief: Produce a word processed document using a word processing program
Specifications
• use three different fonts • use three different font sizes • include headers and footers • include page numbers • formatting must include • line spacing • indents • font effects • underlining • include a table with three columns and four rows, some of which are shaded • include a bulleted list and a numbered list • insert a diagram or a picture.
Drafts
• Open a blank document. • Do different designs of a document on different pages. • Add the text and graphics and experiment with different fonts and font sizes. • Save drafts for your portfolio. • Choose the format you like best and save.
Producing
• Edit the document including using spell check. • Print.
Evaluation/testing
Consider these questions and write an honest comment about your product • Does the document suit the purpose for which it was developed? • How could you have made it better?

Integration

This unit may be integrated with other subjects especially if students are given a research topic as well as other documents to create such as stories and letters etc. Teachers are encouraged to collaborate with other teachers when teaching this unit. For example a language teacher may ask the students to do a project. Subject teachers could organise with the computing teachers to have the students cover this unit at about the same time. In this case there should be consultation between the subject areas concerned.

Computing

Option The Internet

Access to a computer with internet connections and browsers such as Internet Explorer or Netscape is required.

Step 1 – Interpreting the unit learning outcomes

Outcome: Demonstrate knowledge and understanding of the internet.

This outcome requires students to give students the opportunity to explore the internet and research its history.

Outcome: Search the internet for information.

This outcome requires you to teach students how to find useful information using the internet. It requires you to teach students how to systematically find information use problem solving processes so that relevant information can be found quickly and efficiently.

Outcome: Justify decisions made when accessing information from the internet.

This outcome requires you ensure that students critically analyse information gathered on the internet just as they would for any other text. They should be aware that material posted on the World Wide Web is not necessarily subject to the conventional editorial checks and processes generally applied to print-based publications. When evaluating information students might consider:

- the intended audience of the site
- bias in the presentation of information, or in the information itself including commercial or political motives
- accuracy of information
- balanced points of view.

Outcome: Describe ethical practices used when accessing and retrieving information from the internet

This outcome requires students to check protocols, procedures and policies of their school and system regarding the use of the Internet and be aware of unacceptable practices in regard to using particular internet sites.

Step 2 – Planning for assessment

At the end of the term, students must present information they have collected for a purpose by using the internet as a source to produce a document/s containing a variety of information, images and diagrams together with their design portfolio.

The marking guide for the product and the performance standards for the design portfolio must be adapted to this unit and used to assess the student's work (see page 96 and 102).

A short test worth 20 marks will also be given to assess the unit.

Step 3 – Programming a learning sequence

In this unit students will learn how to access/retrieve information using the internet. Students will learn the basic structure of search engines, how to use them to find sources of information, and how to use search web sites on the internet. The emphasis of the unit is on developing skills at accessing information.

Sample program

Topic(s)	Activities	Assessment
Week 1–2 Knowledge of the internet and communication processes	• hardware and software requirements • using modems and web browsers • development of the internet and how it works • issues relating to content, control, censorship and copyright	
Week 3–4 Tools and applications	• role, function and purpose of an ISP (internet service provider) • identify appropriate search engines • practise using search engines • identify appropriate internet website resources • define search parameters • use search engines to produce web sites for finding information on the research project • find information from different web sites • protection eg spyware, anti-virus software	Assessment task 1 Research Project on chosen topic of interest.
Week 5–10 Skill and techniques	• use bookmarks, favourites • navigate using hyperlinks • search for specific content • dpwnload/copy form internet sites • identify useful information from search • take notes/paraphrase from search • cite electronic sources for bibliography • copy and paste or use the annotation tools in the electronic reference source • compare information from at least two web site sources • evaluate for accuracy, relevance, appropriateness, comprehensiveness, and bias	Assessment task Prepare information for portfolio.

Step 4 – Elaborations of activities

This unit is a research unit, which requires students to search for information from various sources. It is important that ethical issues relating to use of information is emphasised in this unit

No one controls or verifies the vast majority of information posted on the Internet. With a little money and 30 minutes, almost anyone can publish a basic Web page. Although some sites have editorial staff and experts to ensure accuracy and quality, many do not. Choosing quality Web sites to use in your classroom can be very time consuming.

You can make this easier and more successful, however, by using

 COCOA P:

C = Coverage

O = Objectivity

C = Currency

O = Origin (Author)

A = Accuracy

P = Purpose

Strategies for using the internet

- Ensure that all students have an understanding of how to access the Internet and how to perform basic functions, eg searching, sending and receiving e-mail. Construct a set of guidelines that will help students to accomplish this such as step by step instructions on how to use a search engine.

- Ensure that all students have plenty of time to explore and familiarise themselves with the technologies, navigation tools, e-mail facilities and texts on the Internet It is likely that students will have varying degrees of expertise in searching for information and navigating the Internet. Students will also have varying experiences and familiarity with the way texts are presented on the World Wide Web.

- Students with more experience in using the Internet may have information that will benefit the whole class. Provide opportunities for students to share their experiences, interests, information and understandings. As well as planning lessons to instruct students in these skills, pairing students, and peer tutoring on the computer can enable more experienced students to assist other students.

- Ensure that students critically analyse information gathered on the Internet just as they would for any other text. They should be aware that material posted on the World Wide Web is not necessarily subject to the conventional editorial checks and processes generally applied to print-based publications.

- Ensure that software and hardware (computer, modem) are maintained in good working order

- Ensure that all students are given equal opportunities to use the computer.

Assessing student work containing material from the internet

- Students can download large quantities of information from the internet. By itself this information provides very little evidence of student effort or student achievement. Students must make judgments about the validity and safety of information when working from the world wide web. They must consider the purpose of the text, identify bias, consider the validity of arguments presented and the nature and quality of the evidence provided.

- When assessing student work that includes material drawn from the Internet, therefore, it is important to recognise how students have accessed the particular information, what value they place on it and how they have used it for the particular topic being studied in class. It is useful to look for evidence of critical evaluation, and the development of students' capacities to access, manipulate, create, restore and retrieve information.

Sample design brief: Find and present information from the internet on (a topic)
Specifications
• find information about the topic using a range of different web sites   • evaluate the accuracy, relevance and appropriateness of the information   • present the information on the topic using an appropriate application   • prepare a brief report on the steps taken in accessing the information using a word processing program.
Investigation
• What information is required?   • What sources of information are available?   • Which would be the most appropriate websites to obtain the information for the topic?   • Are they easy to use?
Drafts
• Open a blank document.   • Copy information from the web pages.   • Save drafts for your portfolio.
Producing
• Select the information that will be used for the final presentation.   • Collate the important information.   • Edit the document making sure that references are included.   • Save all the drafts and final document electronically   • Print the final document.

Evaluation/testing

Consider these questions and write an honest comment about your product:

- Did you use appropriate websites?

- Was the information appropriate for the purpose?

- How could you have done better?

Integration

This content in this unit may be used for other subjects especially if students are given a research topic. For example in Social Science students might be required to do case studies on conflict. Information found by using the internet in this unit could be used for the case studies.

Option Unit 3 – Sample Test

Below is diagram of the Google Website screen. Study the diagram and complete the questions that follow.
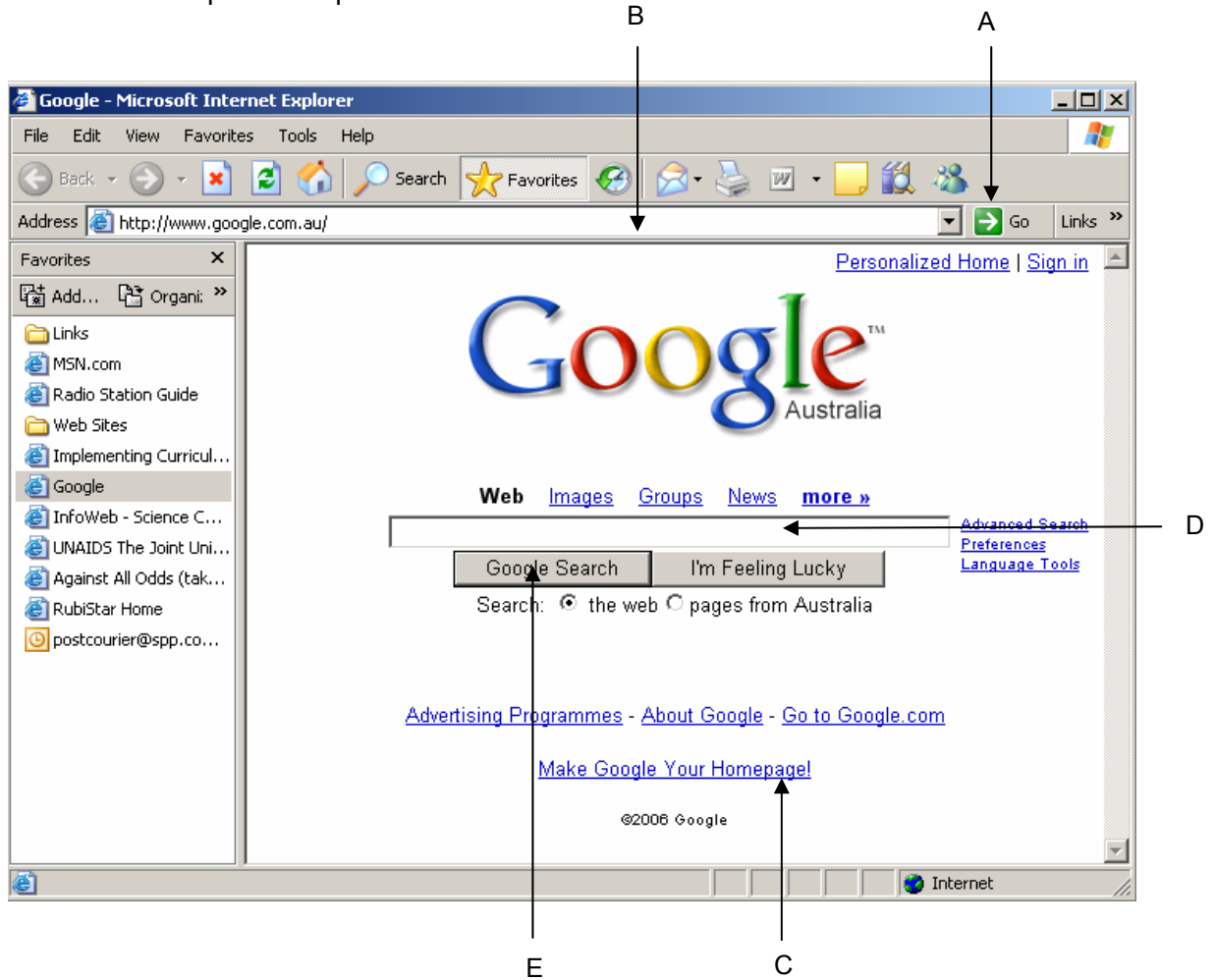
1. Which part of the screen (A, B, C, D or E) will you click on if you want

    - To type the address of the website you want to visit
    - To ask Google to start searching the web
    - To type in the word or phrase you want Google to search for
    - To go to a particular website
    - Display the Google webpage when you start internet explorer

    10 marks

2. Write down the steps you would follow if you want to search for information on the topic "Effects of Globalisation" assuming that Google is not your home page and the web browser program is not currently running. (Hint: *There are five steps you need to identify*)

    10 marks

Recording and reporting

All schools must meet the requirements for maintaining and submitting student records as specified in the *Grade 10 Assessment, Examination and Certification Handbook*.

Recording and reporting student achievement

When recording and reporting student achievement you must record the achievement of the students in each unit and then, at the end of the year make a final judgment about the overall achievement, or progress towards achievement, of the broad learning outcomes. To help you do this, descriptions of the levels of achievement of the broad learning outcomes are provided in the Broad Learning Outcome Performance Standards.

When reporting to parents, the school will determine the method of recording and reporting. In an outcomes based system, student results should be reported as levels of achievement rather than marks.

Remember that the final school-based mark will be statistically moderated using the external exam results. The students overall level of achievement may change.

Levels of achievement

The level of achievement of the broad learning outcomes is determined by the students' performance in the assessment tasks. Marks are given for each assessment task with a total of 100 marks for each 10 week unit, or 50 marks for each five week unit. The marks show the student's level of achievement in the unit, and therefore *progress* towards achievement of the broad learning outcomes.

There are four levels of achievement:

- Very high achievement
- High achievement
- Satisfactory achievement
- Low achievement

A very high achievement means overall, that the student has an extensive knowledge and understanding of the content and can readily apply this knowledge. In addition, the student has achieved a very high level of competence in the processes and skills and can apply these skills to new situations.

A high achievement means overall that the student has a thorough knowledge and understanding of the content and a high level of competence in the processes and skills. In addition, the student is able to apply this knowledge and these skills to most situations.

A satisfactory achievement means overall that the student has a sound knowledge and understanding of the main areas of content and has achieved an adequate level of competence in the processes and skills.

A low achievement means overall that the student has a basic knowledge and some understanding of the content and has achieved limited or very limited level of competence in the processes and skills.

Below the minimum standard means overall that the student has provided insufficient evidence to demonstrate achievement of the learning outcome.

Total marks	Very High Achievement	High Achievement	Satisfactory Achievement	Low Achievement	Below minimum standard
700	630 – 700	490 – 629	350 – 489	200 – 349	0 – 199
600	540 – 600	420 – 539	300 – 419	120 – 299	0 – 119
500	450 – 500	350 – 449	250 – 349	100 – 249	0 – 99
400	360 – 400	280 – 359	200 – 279	80– 199	0 – 79
300	270 – 300	210 – 269	150 – 209	60 – 149	0 – 59
200	180– 200	140 – 199	100 – 139	40 – 99	0 – 39
100	90 – 100	70 – 89	50 – 69	20 – 49	0 – 19
50	45 – 50	35 – 44	25 – 34	10 – 24	0 – 9

Sample format for recording assessment task results over two years for Design and Technology

Grade 9					
Assessment method	**Term**	**Assessment task**		**Marks**	**Student marks**
Design Portfolio	1	Produce a design portfolio showing all the **steps** undertaken in the making of the product.		20	
	2			20	
	3			20	
	4			20	
Product	1	Make a product which meets the requirement of the design brief		60	
	2			60	
	3			60	
	4			60	
Written response	1	Short test		20	
	2			20	
	3				
				20	
	4			20	
			Total marks Grade 9	**400**	

Grade 10					
Assessment method	**Term**	**Assessment task**		**Marks**	
Design Portfolio	1	Produce a design portfolio showing all the **steps** undertaken in the making of the product.		20	
	2			20	
	3			20	
Product	1	Make a product which meets the requirement of the design brief		60	
	2			60	
	3			60	
Written response	1	Short test		20	
	2			20	
	3			20	
			Total marks Grade 10	**300**	
			Total Marks Grade 9 and 10	**700**	

Broad learning outcomes and levels of achievement

Levels of achievement in Grade 9 and Grade 10 are recorded and reported against the broad learning outcomes. There are six broad learning outcomes in Design and Technology. The performance standards for the levels of achievement are described in the following table.

Broad Learning Outcome Performance Standards					
Broad Learning Outcomes	**Very High Achievement**	**High Achievement**	**Satisfactory Achievement**	**Low Achievement**	**Below Minimum Standard**
Use the design process to produce appropriate solutions	Independently use the design process to design a range of solutions and select and justify the most appropriate option	Independently use the design process to design solutions and select the most appropriate option	Use the design process to produce appropriate solutions	Use the design process to produce a solution with teacher direction	Has failed to meet the minimum standard required
2 Apply safe and appropriate codes and practices in the classroom	Independently identify, select and proficiently apply appropriate safe codes and practices in the classroom	Independently select and apply safe codes and practices in the classroom	Apply safe practices in the classroom	Apply safe practices in the classroom with direction	Has failed to meet the minimum standard required
3 Apply knowledge and understanding of processes through identifying, selecting and using various materials or systems	Demonstrate extensive knowledge and understanding of processes through independently identifying, selecting and using correctly a wide range of tools, materials and systems	Demonstrate knowledge and understanding of processes through identifying, selecting and using correctly a range of tools, materials and systems	Apply knowledge and understanding of some processes through identifying, selecting and using various materials or systems	Identify Select and use limited materials or systems	Has failed to meet the minimum standard required
4 Demonstrate a range of practical skills and techniques	Demonstrate a wide range of practical skills and techniques appropriate at all times to the situation	Demonstrate a range of practical skills and techniques appropriate to the situation	Demonstrate a range of practical skills and techniques	Demonstrate practical skills and techniques with help	Has failed to meet the minimum standard required
5 Evaluate the appropriateness of materials or systems used to produce a product	Provide detailed justification for selection of materials and systems and detailed evaluation of their effectiveness for production of the product	Provide justification for selection of materials and systems and evaluation of their effectiveness for production of the product	Provide some justification for selection of materials or systems and identify whether of not materials were appropriate for production of the product	Identify whether of not materials were appropriate for production of the product	Has failed to meet the minimum standard required
6 communicate ideas and information in a variety of ways	Communicate complex ideas and information effectively using an extensive range of written, oral and graphic forms	Communicate ideas and information using a broad range of written, oral and graphic forms	Communicate information using written, oral and graphic forms	Communicate information using a limited range of either written, oral or graphic forms	Has failed to meet the minimum standard required

Steps for awarding final student level of achievement

1. Assess unit tasks using unit performance standards and assessment criteria.
2. Record results for each task in each unit.
3. Add marks to achieve a unit result and a term result.
4. Add term marks to get a year result.
5. Determine the overall achievement using the achievement level grid.
6. Report results using the broad learning outcome performance standards.

Example of reporting using the Broad Learning Outcomes performance descriptors

---

Student: Sam

Subject: Design and Technology

School-based assessment– High achievement

This means Sam can:

- Independently use the design process to design solutions and select the most appropriate option
- Independently select and apply safe codes and practices in the classroom
- Demonstrate knowledge and understanding of processes through identifying, selecting and using correctly a range of tools, materials and systems
- Demonstrate a range of practical skills and techniques appropriate to the situation
- Provide justification for selection of materials and systems and evaluation of their effectiveness for production of the product
- Communicate ideas and information using a broad range of written, oral and graphic forms.

Resources

Design and Technology subjects have particular resource needs. Schools must have the appropriate materials, tools and equipment to teach subjects such as Practical Skills and Home Economics.

Essential resources for Practical Skills	
Technical Drawing	Magazines, books, signs around the school And local community, visual resources, Drawing instruments
Working with Wood and timber technologies	Timber, tools and equipment, posters
Village technologies or	Timber, tools and equipment, posters, cane, bamboo, knife, colouring.
Building Construction	Timber, tools and equipment, posters, samples of building plan
Metal, Concrete, Electrical, Integrated etc	Metal, tools and equipment, posters, dry cell/battery, wires.
Welding option	Welders, tools and equipment, safety gear such as welding shield, goggles protective clothing
Essential resources for Fibres and Fabrics	
Magazines, books, posters, sample materials, sewing machines, sewing equipment such as scissors, needles, fabrics, tape measure, pins	
Essential resources for Food Technologies	
Magazines, books, posters, guest speakers, Kitchen equipment (pots, pans etc) oven, cook top	
Essential resources for Computing	
Computers (at least one per three students) application software, hardware, peripheral devices	

You should be always trying to adapt, improvise, make or write material that will be useful for lessons. Collections of newspapers, magazines, pamphlets, brochures, posters can be very useful. There are many resources in schools which can be useful for more than one subject. One of the biggest resources is other teachers, especially teachers with local area knowledge.

Selecting and using resources

Selecting and using appropriate resources is a very important part of your task. Resources can help students learn more effectively by:

- helping to gain and maintain interest in a lesson

- encouraging mental involvement and the use of different senses while learning
- making learning more meaningful by linking in with previous knowledge
- catering for students who learn best through different senses – for example, some students learn best through listening, while others learn best through seeing, touching, tasting, or a combination of these four ways
- helping in the recall of information
- making explanations of difficult concepts and skills clearer
- encouraging independent learning.

Types of resources

Print materials

- Text books, reference books,
- Magazines
- diagrams, maps, charts, graphs
- Posters
- Worksheets, information sheets
- Pamphlets, brochures.

Audio visual material

- Television and radio broadcasts,
- Computer software, interactive video
- Overhead transparencies

Materials

- Local materials
- Local timbers
- Second hand clothes shops (for material and samples)
- Native plants
- Pictures, photographs
- Chalk/whiteboard, felt boards,
- Documents and reports
- Personal items
- Made or found objects
- Junk materials.

Natural and human resources

- Farms, plantations, shops, trade stores, supermarkets
- Factories, sawmills, processing plants
- Built structures – buildings, bridges, dams, power stations
- Natural environment sites – rivers, beaches, rock pools, forests, cliffs, caves

- Local workers, business people, government officers
- Community elders
- Teachers
- Parents.

It is important to relate people to topics being taught. For example when doing Home Economics use a range of people such as a chef, the owner of a second hand clothes store, a dietician or a mother who makes a living selling food she has made from her garden. .

Use people who make good role models, for example a businesswoman rather than a businessman. It is important for students to know about people who are a success in non-traditional roles.

It is important to take students outside the school to expose them to the 'real world'. There is usually something in every topic which can be done outside.

General guidelines for selecting and using resources

The effectiveness of the resource very much depends on whether it is suitable for the knowledge or skill to be learned and the attitude of the students. Classroom organisation is the key to using resources successfully. You need to:

- Prepare thoroughly. Make sure that you are familiar with the resource so that you use it with confidence and assurance. If equipment is involved, check that it is in working order, make sure that you know how to operate it and that it is available when required.
- Use the resource at the right place and time in the lesson. The resource should fit in with the flow and sequence of the lesson. It should serve a definite teaching purpose.
- Should the resource be radio, film, video or television, introduce the program by outlining the content. You might also set some questions to guide listening or viewing. Follow-up after using the resource by discussing and drawing appropriate conclusions.

References

The following text books were used when writing activities for all the subjects, therefore they can be used as resources books as well.

Baker G and Bowen T, (2005) *First Byte, Using Information and Communication Technology*, Oxford University Press, Australia

Compton L and Warren C, (2004) *Food – Food Technology BK1* Oxford University Press, Australia

Compton L and Warren C, (2004) *Food – Food Technology BK2* Oxford University Press, Australia

Glaister R, (2005), *Catering towards a Career*, Pearson Education, Australia

Hart B, Martin J, Mitchell P, Rodoreda J, Tierney P, Young R, (2005), *Basic Building and Construction Skills*, Pearson Education, Australia

Heath G, McKenzie H, Tully L, (2001) *Food Solutions – Food and Technology, Unit 1and2* ,Pearson Education, Australia

Heath G, McKenzie H, Tully L, (2001) *Food Solutions – Food and Technology, Unit 3and4*, Pearson Education, Australia

Norman, P, A. (1999) *Home Economics for Papua New Guinea 2*, Longman, South Melbourne.

Panousieris, R (1993) Technology in Action. Heinemann Education, Melbourne.

Quilang M.T, (1975) *Handicraft Handbook,* Papua New Guinea.

Ridgewell T. (2004), *Textiles and Design in Action,* Pearson Education, Australia

Seppanem G, (2003), *Textiles and Sew On, An Introduction to Textiles Studies for Secondary Studies*, Oxford University Press, Australia

Wilson R.C, (1997), *Basic Technical Drawing, A Graphic Approach* Third Edition, Australia

Glossaries

Assessment glossary

Syllabus outcomes, criteria and performance standards, and examination questions have key words that state what students are expected to be able to do. A glossary of key words has been developed to help provide a common language and consistent meaning in the syllabus and teacher guide documents.

Using the glossary will help teachers and students understand what is expected in responses to examinations and assessment tasks.

Using the glossary will help teachers and students understand what is expected in responses to examinations and assessment tasks.

Account	Account for: state reasons for, report on. Give an account of: narrate a series of events or transactions
Analyse	Identify components and the relationship between them; draw out and relate implications
Apply	Use, utilise, employ in a particular situation
Appreciate	Make a judgment about the value of
Assess	Make a judgment of value, quality, outcomes, results or size
Calculate	Ascertain/determine from given facts, figures or information
Clarify	Make clear or plain
Classify	Arrange or include in classes/categories
Compare	Show how things are similar or different
Construct	Make; build; put together items or arguments
Contrast	Show how things are different or opposite
Critically (analysis/evaluate)	Add a degree or level of accuracy depth, knowledge and understanding, logic, questioning, reflection and quality to (analyse/evaluation)
Deduce	Draw conclusions
Define	State meaning and identify essential qualities
Demonstrate	Show by example
Describe	Provide characteristics and features
Discuss	Identify issues and provide points for and/or against
Distinguish	Recognise or note/indicate as being distinct or different from; to note differences between
Evaluate	Make a judgment based on criteria; determine the value of
Examine	Inquire into

Explain	Relate cause and effect; make the relationships between things evident; provide why and/or how
Extract	Choose relevant and/or appropriate details
Extrapolate	Infer from what is known
Identify	Recognise and name
Interpret	Draw meaning from
Investigate	Plan, inquire into and draw conclusions about
Justify	Support an argument or conclusion
Outline	Sketch in general terms; indicate the main features of
Predict	Suggest what may happen based on available information
Propose	Put forward (for example a point of view, idea, argument, suggestion) for consideration or action
Recall	Present remembered ideas, facts or experiences
Recommend	Provide reasons in favour
Recount	Retell a series of events
Summarise	Express, concisely, the relevant details
Synthesise	Putting together various elements to make a whole

Design and Technology glossary

Adjust	Put into the correct order or arrange
Competent	Having the necessary ability, skill and knowledge
Contemporary	Present time or modern
Context	Explains the content and the purpose of the task or project
Conversion	Something being changed or converted
Data	Facts or information used in deciding or discussion
Database	Large store of computerised information
Delete	Remove
Design brief	Outlines the task or project that student's will be expected to complete
Design portfolio	Systemically way of keeping records that reflects student's learning
Dimension	Measurement of any sort
Edit	Arrange data for processing by a computer
Ethical	Morally correct

Embellish	Making it beautiful by adding ornaments
Ergonomic	Study of work and working conditions in order to improve people's efficiency
Fundamental	Forming the basis or foundation
Hardware	Parts of the computer that you can actually touch, hold and move with care
Hygiene	Practice of cleanliness as a way of maintaining good health to prevent disease
Innovative	Introducing or using new ideas, techniques etc
Isometric drawing	One drawing that lets you see the project from the front, end and plan (three views)
Justify	Support an argument or conclusion
Lactating	Providing of milk in the breasts of women
Modify	To change
Module	A small unit that is separately made and put together to construct a building or a piece of furniture
Multi-national	large Company that does business in many countries
Nutrient	Providing nourishment or goodness
Orthographic drawing	Detailed drawings completed using tools such as rulers and set squares
Peripheral device	A device attached to a computer that transfers information into and out of a computer
Polymer	Natural or artificial compound made up of large molecules which are themselves made from combinations of small molecules
Portable	Can easily be carried around
Preserving	Putting aside for later use
Progressive	On-going
Prototype	Small model that looks the same as the design for the project
Regulation	Set of rules or laws
Retrieve	Get possession of something again
Specification	Outlines directions
Software	A series of instructions that tells the hardware what to do
Technology	Resources and tools which are used appropriately and skilfully to Improve the quality of life
Thawing	Pass on to a liquid stage after frozen