



Republic of Namibia

MINISTRY OF EDUCATION

SENIOR PRIMARY PHASE

DESIGN AND TECHNOLOGY SYLLABUS

GRADES 5 - 7

For implementation 2016

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Design and Technology Syllabus Grades 5 – 7

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Table of Contents

1.	Introduction	4
2.	Rationale	4
3.	Aims	2
4.	Inclusive Education	2
5.	Links to Other Subjects and Cross-Curricular Issues	3
6.	Approach to Teaching and Learning	4
7.	End of phase competencies	5
8.	Summary of the Learning Content	7
9.	Learning Content	8
9.1	Learning Content for Grade 5	8
9.2	Learning Content for Grade 6	11
9.3	Learning content for Grade 7	15
10.	Assessment	21
10.1	Types and methods of assessment	21
10.2	Grade Descriptors	23
10.3	Assessment Objectives	24
10.4	Continuous Assessment: Detailed Guidelines	25
10.5	End of year examinations: Detailed guidelines	29
10.6	Promotion marks	29
10.7	Specification Grid	30
10.8	Assessment Rubrics/Criteria	31
Annexe 1:	Glossary of terms	33
Annexe 2:	Assessment record sheet for Grade 5	36
Annexe 3:	Assessment Record Sheet for Grade 6	37
Annexe 4:	Assessment Record Sheet for Grade 7	38
Annexe 5:	List of Materials and Tools	39

1. Introduction

This syllabus describes the intended learning and assessment for Design and Technology in the Senior Primary phase. As a subject, Design and Technology is within the technological area of learning in the curriculum, but has thematic links to other subjects across the curriculum. Learning about technology includes applying knowledge of how to work more efficiently using tools, materials and processes. Technology is a specific way of solving problems through planning, design, realisation and evaluation. Learners develop the necessary knowledge, skills and attitudes to perform tasks using appropriate technology.

This subject would need two (2) periods per week. The periods should be blocked as a double period.

2. Rationale

The presentation of Design and Technology at school is first and foremost an educational matter, with the overall goal being that learners attain proper adulthood in the society. As a result of the increasing industrialisation and mechanisation of modern times, technological knowledge and skills have become indispensable in everyday life.

The inclusion of Design and Technology in the learners' curriculum does not aim at vocational training in the narrow sense of the word. It simply provides the learner with a broad educational foundation for further specialised training. It also provides the learners with a clear understanding of technology and assists them in becoming better adapted and prepared for life.

The integration of entrepreneurial concepts and activities lays the foundation for the development of human resources as a basis for studies, occupations or self-employment. Design and Technology, together with entrepreneurial concepts and activities, empowers the individual to be creative and gain problem-solving skills.

The particular features of Design and Technology at this phase are to enable the learners to achieve technological literacy through the development of:

- technological knowledge and understanding
- technological capacity and
- an awareness of the significance of Design and Technology upon society.

Learners should develop a thorough knowledge of basic concepts which they can apply in a wide range of situations. They must also develop the broad-based skills that are so important for effective functioning in the world of work. They must learn to identify and analyse problems and to explore and test solutions in a wide variety of contexts. This firm conceptual base is at the heart of the Design and Technology curriculum and must be the focus on teaching and learning in the classroom.

3. Aims

The Design and Technology syllabus promotes the following aims in the curriculum:

- foster an awareness of local, regional and national needs of Namibia and contribute towards development
- equip learners to play an effective and productive role in the economic life of the nation
- promote positive attitudes towards the challenges of co-operation, work, entrepreneurship and self-employment.

4. Inclusive Education

Inclusive education is the right of every learner and promotes participation in, or access to, the full range of educational programmes and services offered by the education system in mainstream schools. It is based on the principle of supporting and celebrating the diversity found among all learners and removing all barriers to learning.

Basic education prepares the society, as envisaged in Namibia's Vision 2030, by promoting inclusivity. Learners experiencing barriers to learning and other individual needs will be included in a mainstream school and their needs will be attended to through differentiation of teaching methods and materials as required. Learners, who are so severely impaired that they cannot benefit from attending inclusive schools, will be provided for according to their needs in learning support units, resource units or resource schools until such time that they can join the inclusive school where applicable. The curriculum, teaching methods and materials are adapted for learners in these institutions.

The learner-centred approach to teaching is highly suitable for learners with special learning needs since it capitalises on what learners already know and can do, and then assists them to acquire new knowledge and skills. The curriculum framework for Inclusive Education specifies the competencies which learners with special learning needs should master. Individual learning support plan (ILSP) should be in place to guide and evaluate the individual learning process for learners with special learning needs.

Further guidelines on planning for learning and teaching in an inclusive classroom can be found in the curriculum framework for Inclusive Education (2014). These guidelines will help to equip all learners with knowledge, skills and attitudes to help them succeed in the world that is increasingly complex, rapidly changing and rich in information and communication technology.

Design and Technology in the Senior Primary phase promotes equal opportunity for males and females, enabling both to participate equally. Teachers should know and understand how to treat learners equally, and all materials should support gender fairness.

Including gender perspectives is important in all social themes in order to raise awareness of gender stereotyping, how limitations are set on gender equity, and how to promote gender equity in all spheres of life.

All teaching/learning materials should be analysed to ensure that they promote gender equity.

5. Links to Other Subjects and Cross-Curricular Issues

The cross-curricular issues include Environment Learning; HIV and AIDS; Population Education; Education for Human Rights and Democracy (EHRD); Information and Communication Technology (ICT). These have been introduced to the formal curriculum to be dealt with in each subject and across all phases, because each of the issues deals with particular risks and challenges in our Namibian society. All our learners need to:

- understand the nature of these risks and challenges
- know how they will impact on our society and on the quality of our people's lives now and in future
- understand how these risks and challenges can be addressed on a national and global level
- understand how each learner can play a part in addressing these risks and challenges in their own school and local community

The main risks and challenges have been identified as:

- the challenges and risks we face if we do not care for and manage our natural resources
- the challenges and risks caused by HIV and AIDS
- the challenges and risks to health caused by pollution, poor sanitation and waste
- the challenges and risks to democracy and social stability caused by inequity and governance that ignores rights and responsibilities
- the challenges and risks we face from globalisation

Since some subjects are more suitable to address specific cross-curricular issues, those issues will receive more emphasis in those particular syllabuses. In this syllabus the following are links to cross-curricular issues:

Grade	HIV and AIDS	Environmental Education	Human Rights and Democracy	Entrepreneurship Education	ICT
5	1.1 Safety precautions	1.4.1 Structures 1.4.3 Materials 1.4.4 Energy	1.1 Safety precautions	1.3. Business in Namibia 1.5. Design and Technology	1.5. Design and Technology 1.6. Communication
6	2.1 Safety precautions	2.4.1 Structures 2.4.3 Materials 2.4.4 Energy	2.1 Safety precautions	2.3. Business in Namibia 2.5. Design and Technology	2.5. Design and Technology 2.6. Communication
7	3.1 Safety precautions and first aid	3.4.1 Structures 3.4.3 Materials 3.4.4 Energy	3.1 Safety precautions and first aid	3.3. Business in Namibia 3.5. Design and Technology	3.5. Design and Technology 3.6. Communication

Information and Communication Technology – One of the features of a rapidly changing world is the accumulation of a vast amount of information and data. Technology has an impact on all aspects of modern life. Learners need to be equipped with the knowledge and skills to be competent and confident in assessing and working with various forms of information and data. The approach to information and communication technology focuses on the use of support material and equipment to access, process and use information in the most appropriate ways.

Where resources are available, schools should promote the use of information and communication technology to include skills such as word processing, graphics and CD-ROM referencing.

6. Approach to Teaching and Learning

The approach to teaching and learning is based on a paradigm of learner –centred education (LCE) described in ministerial policy documents and the LCE conceptual framework. This approach ensures optimal quality of learning when the principles are put into practice.

The aim is to develop learning with understanding, and the knowledge, skills and attitudes to contribute to the development of society. The starting point for teaching and learning is the fact that the learner brings to the school a wealth of knowledge and social experience gained continually from the family, the community, and through interaction with the environment. Learning in school should involve, build on, extend and challenge the learner's prior knowledge and experience.

Learners learn best when they are actively involved in the learning process through a high degree of participation, contribution and production. At the same time, each learner is an individual with his/her own needs, pace of learning, experience and abilities. The teacher must be able to sense the needs of learners, the nature of the learning to be done, and how to shape learning experience accordingly. Teaching strategies must therefore be varied but flexible within well-structured sequence of lessons.

The teacher should decide, in relation to the learning objectives and competencies in Design and Technology to be achieved when:

- it is best to convey content directly
- it is best to let learners discover or explore information for themselves
- learners need directed learning
- there is a particular progression of skills or information that needs to be followed
- learners can be allowed to find their own way through a topic or area of content.

Work in groups, in pairs, individually, or as a whole class must therefore be organised as appropriate to the task in hand. Co-operative and collaborative learning should be encouraged whenever possible. In such cases, tasks must be designed so that pair or group work is needed to complete it, otherwise the learners will not see any relevance in carrying out tasks together. As the learners develop personal, social and communication skills, they can gradually be given increasing responsibility to participate in planning and evaluate their work, under the teacher's guidance.

Local content and context: Design and Technology emphasises the re-use of locally available resources (recyclable materials) to conserve the environment and the content has been adapted to suit the local context.

7. End of phase competencies

On entry to the Senior Primary phase, all learners are expected to have developed the following skills/competencies:

- Basic drawing skills
- An awareness of entrepreneurship; and
- Initiative to design creative project work.

On completion of the Senior Primary phase of education in Design and Technology, learners are expected to be able to demonstrate their creativity through competence in simple technological processes of investigating and exploring product ideas, making choices about design and/or materials and using appropriate basic hand tools and equipment, in order to make and evaluate a product.

On completing Grade 7 Design and Technology in the Senior Primary phase, learners are expected to be able to demonstrate the following competencies:

1. Safety Precautions

Learners should identify unsafe conditions with emphasise on HIV and AIDS in work places. They should name, store and use appropriate Hand Tools correctly. Apply and maintain tools correctly. They should organise, explain and manage work place (procedures) to maximise safety.

2. Basic Hand tools

Learners demonstrate correct handling, care and maintenance of basic tools.

3. Business opportunities in Design and Technology

Learners report on different ideas for businesses in their local environment. They investigate, explain and report on successful Namibian businesses. They investigate and explain on characteristics of successful Namibian entrepreneurs. Learners should be able to compare, differentiate between advantages and disadvantages of employment and self employment.

4. Technology

4.1 Structures

Learners describe, collect examples and give properties of natural and man-made structures. They will identify and differentiate various natural structures. They construct basic man-made structures by using recycled and locally available materials.

4.2 Mechanisms

Learners will identify, explain and demonstrate the basic use of commonly available levers, linkages and pulley drives in their local environment.

4.3 Materials

Learners will identify different products and production processes of resistance materials and apply their specific usage according to their properties. They should be able to **show** awareness of different career opportunities.

4.4 Energy

Learners will identify, describe, demonstrate and apply different kinds of energy forms.

4.5 Electricity

Learners name, describe and apply electricity as a source of energy (Electricity-in-practice)

5. Design and Technology

Learners will discuss, explain, and describe the concept “technology” and “design”. They should identify common problems and needs in their environment and solve them by means of eight stages of the design process.

6. Communication

Learners identify, apply various drawing instruments and demonstrate freehand skills, geometrical constructions and two dimensional figures. They will master the basic instruments and skills required to make drawings needed for their projects.

NB: Learners demonstrate awareness regarding different careers especially in the fields of building construction, automotive, electrical and engineering.

8. Summary of the Learning Content

Theme/Topic	Grade 5	Grade 6	Grade 7
1. Safety precautions	1. Safety precautions	1. Safety precautions	1. Safety precautions
2. Basic hand tools	2. Basic hand tools	2. Basic hand tools	2. Basic hand tools
3. Business in Namibia	3. Business in Namibia	3. Business in Namibia	3. Business in Namibia
4. Technology	4.1 Structures 4.2 Mechanisms 4.3 Materials 4.4 Energy 4.5 Electricity	4.1 Structures 4.2 Mechanisms 4.3 Materials 4.4 Energy 4.5 Electricity	4.1 Structures 4.2 Mechanisms 4.3 Materials 4.4 Energy 4.5 Electricity
5. Principles of design and technology	5. Principles of design and technology	5. Principles of design and technology	5. Principles of design and technology
6. Communication (drawing)	6. Communication (drawing)	6. Communication (drawing)	6. Communication (drawing)

9. Learning Content

9.1 Learning Content for Grade 5

Theme/Topic	LEARNING OBJECTIVES <i>Learners will:</i>	COMPETENCIES <i>Learners should be able to:</i>
1. Safety precautions	<ul style="list-style-type: none"> • be introduced to safety precautions • be introduced to the dangers concerning HIV and Aids. 	<ul style="list-style-type: none"> • List certain dangers: <ul style="list-style-type: none"> - when working with electrical household appliances - during role play in a class situation - when being negligent and lacking concentration • identify certain dangers relating to injuries, with emphasize on HIV and Aids precautions
2. Basic hand tools	<ul style="list-style-type: none"> • be introduced to basic hand tools 	<ul style="list-style-type: none"> • identify the following hand tools: <ul style="list-style-type: none"> - ruler, pencil, scribe, try-square, hammer, pliers, screw drivers, saws, files and snips
3. Businesses in Namibia	<ul style="list-style-type: none"> • explore business opportunities in Namibia with regard to Design and Technology 	<ul style="list-style-type: none"> • Identify business opportunities within Design and Technology: <ul style="list-style-type: none"> - gather business information - do market research • list characteristics of a successful business • justify the selection of a specific business idea from their environment

THEME/TOPIC	LEARNING OBJECTIVES <i>Learners will:</i>	COMPETENCIES <i>Learners should be able to:</i>
4. Technology 4.1 Structures 4.2 Mechanisms 4.3 Materials	<ul style="list-style-type: none"> • be introduced to natural structures • be introduced to “levers” • be introduced to products made from different materials including recyclable materials 	<ul style="list-style-type: none"> • identify natural structures • collect examples of natural structures • give simple properties of natural structures • explain the term “lever” • demonstrate the basic use of levers with practical applications. • identify different products made from: <ul style="list-style-type: none"> - recyclable materials - paper (different thicknesses for different purposes including carton) - wood: solid wood (natural and related resources as in forestry), wood products (manufactured board) - metals: aluminium, brass, lead - plastics: polyvinyl chloride (PVC) • identify and report on materials used in the natural environment. • identify and report on materials used in products within their natural environment • investigate products made from local raw materials

THEME/TOPIC	LEARNING OBJECTIVES <i>Learners will:</i>	COMPETENCIES <i>Learners should be able to:</i>
4.4 Energy	<ul style="list-style-type: none"> • be introduced to the concept “Energy” • be introduced to the sun as the main energy source 	<ul style="list-style-type: none"> • describe the concept “energy” • identify how the sun is used as a source of energy source • give examples of elementary uses of the sun as an energy source
4.5 Electricity	<ul style="list-style-type: none"> • be made aware of the dangers of electricity 	<ul style="list-style-type: none"> • list the dangers of electricity
5. Principles of design and technology	<ul style="list-style-type: none"> • be introduced to the concept “design and technology “ 	<ul style="list-style-type: none"> • define and discuss “design and technology “
6. Communication (Drawing)	<ul style="list-style-type: none"> • be introduced to: <ul style="list-style-type: none"> - drawing instruments - line types • be introduced to appropriate drawing techniques for geometrical constructions 	<ul style="list-style-type: none"> • identify and use the following drawing instruments: <ul style="list-style-type: none"> - pencil, eraser, ruler, compasses, A-3 drawing paper • use various types of lines to construct objects and draw (graphically) two dimensional figures: <ul style="list-style-type: none"> - triangles - squares - rectangles - cycles

9.2 Learning Content for Grade 6

THEME/TOPIC	LEARNING OBJECTIVES <i>Learners will:</i>	COMPETENCIES <i>Learners should be able to:</i>
1. Safety precautions	<ul style="list-style-type: none"> • follow safety precautions and correct handling of: <ul style="list-style-type: none"> - tools - equipment • be aware of dangers when working with tools and equipment (with HIV and AIDS in mind.). 	<ul style="list-style-type: none"> • name general safety measures towards the care and storage of tools and equipment. • apply appropriate safety gear • identify: <ul style="list-style-type: none"> - hazards - breakages - accidental spillages • organise/manage workplace to maximise their safety and output. • role play an awareness campaign on HIV and AIDS
2. Basic hand tools	<ul style="list-style-type: none"> • handle tools correctly • use the listed tools correctly • care for and maintain tools 	<ul style="list-style-type: none"> • state the correct handling of the following hand tools: <ul style="list-style-type: none"> - ruler, pencil, scribe, try-square, hammer, pliers, screw drivers, saws, files and snips • apply the correct usage of tools appropriately • explain the importance of caring for the listed tools.

THEME/TOPIC	LEARNING OBJECTIVES <i>Learners will:</i>	COMPETENCIES <i>Learners should be able to:</i>
3. Business opportunities in Design and Technology in Namibia.	<ul style="list-style-type: none"> • learn about employment opportunities and entrepreneurship opportunities in Design and Technology 	<ul style="list-style-type: none"> • differentiate between employment and self employment by using examples within the Namibian context • investigate and report on successful Namibian entrepreneurs • identify and explain the characteristics of successful entrepreneurs
4. Technology 4.1 Structures 4.2 Mechanisms	<ul style="list-style-type: none"> • know different forms of natural and man-made structures • know properties of natural and man-made structures • know levers and its uses • be introduced to “linkages” in daily use • know examples of linkages in daily use 	<ul style="list-style-type: none"> • identify various natural and man-made structures • list properties of natural and man-made structures • list weaknesses and strengths of natural and man-made structures • Identify levers and its uses • explain the term “linkage” • explain the advantages in: <ul style="list-style-type: none"> • mechanical linkages • identify various linkages in daily use: <ul style="list-style-type: none"> - mechanical linkages

THEME/TOPIC	LEARNING OBJECTIVES <i>Learners will:</i>	COMPETENCIES <i>Learners should be able to:</i>
4. 3 Materials	<ul style="list-style-type: none"> • understand the production of materials <ul style="list-style-type: none"> - carton - Wood - metal - plastic 	<ul style="list-style-type: none"> • name and describe the production processes of <ul style="list-style-type: none"> - paper <ul style="list-style-type: none"> ○ pulping ○ drying - wood <ul style="list-style-type: none"> ○ felling trees sawing logs into timber (conversion) ○ drying of wood (seasoning) - metals <ul style="list-style-type: none"> ○ mining ○ crushing ○ melting - plastic <ul style="list-style-type: none"> ○ refinery
4.4 Energy	<ul style="list-style-type: none"> • understand potential and kinetic energy 	<ul style="list-style-type: none"> • demonstrate the use of potential and kinetic energy
4.5 Electricity	<ul style="list-style-type: none"> • be introduced to different effects of electricity 	<ul style="list-style-type: none"> • name different effects of electricity: <ul style="list-style-type: none"> - heat / thermal - light - magnetic • describe the uses for electricity

THEME/TOPIC	LEARNING OBJECTIVES <i>Learners will:</i>	COMPETENCIES <i>Learners should be able to:</i>
5. Principles of design and technology	<ul style="list-style-type: none"> • understand the concept “design” 	<ul style="list-style-type: none"> • identify common problems / needs in his / her community • identify the concepts: <ul style="list-style-type: none"> - design brief - specifications - possible solutions • apply creative thinking in solving problems or meeting needs • develop ideas about how problems / needs can be solved (possible solution)
6. Communication (drawing)	<ul style="list-style-type: none"> • be introduced to freehand drawings by using grid paper. • be introduced to appropriate drawing techniques for geometrical constructions. 	<ul style="list-style-type: none"> • apply freehand sketching techniques to draw: <ul style="list-style-type: none"> - horizontal lines - vertical lines - diagonal lines - circles • draw two dimensional figures freehand • apply the bisecting of sides and angles of: <ul style="list-style-type: none"> - triangles, squares, rectangles • draw and construct: <ul style="list-style-type: none"> - circumscribed circles - inscribed circles

9.3 Learning content for Grade 7

THEME/TOPIC	LEARNING OBJECTIVES <i>Learners will:</i>	COMPETENCIES <i>Learners should be able to:</i>
1. Safety precautions	<ul style="list-style-type: none"> • understand the correct use of tools • apply safety measures (NOSA) • understand the dangers of open wounds and bleeding with emphasis on HIV and Aids 	<ul style="list-style-type: none"> • inspect and maintain tools regularly store tools and equipment correctly (files, planes, saws) • apply appropriate safety measures when working with hand tools and electrical power tools. • recognise the need for precautionary measures by: <ul style="list-style-type: none"> - using gloves - use of running water during treatment of wounds - dealing with open wounds • properly dispose of waste material after treatment • explain how personal health affects business productivity
2. Basic hand tools	<ul style="list-style-type: none"> • revise kinds of basic hand tools • revise correct application (demonstration) • revise care and maintenance and use 	<ul style="list-style-type: none"> • identify the following hand tools: <ul style="list-style-type: none"> - ruler, pencil, scribe, try-square, hammer, pliers, screw drivers, saws, files and snips • apply the safe application of the following hand tools: <ul style="list-style-type: none"> - ruler, pencil, scribe, try-square, hammer, pliers, screw drivers, saws, files and snips • apply care and maintenance of the listed hand tools

THEME/TOPIC	LEARNING OBJECTIVES <i>Learners will:</i>	COMPETENCIES <i>Learners should be able to:</i>
3. Businesses in Namibia	<ul style="list-style-type: none"> • be introduced to employment and self-employment • know ways to become an entrepreneur 	<ul style="list-style-type: none"> • compare employment and self-employment • compare advantages and disadvantages of entrepreneurs vs. cooperation in the local environment • establish ways and assess their own possibilities to become entrepreneurs • evaluate and report on their own business ideas. • differentiate between demands and knowledge / skills necessary to start a business
4. Technology 4.1 Structures 4.2 Mechanism	<ul style="list-style-type: none"> • understand different forms and properties of man-made and natural structures • apply linkages in daily use • be introduced to pneumatic systems • be introduced to: <ul style="list-style-type: none"> - pulley - chain drives. 	<ul style="list-style-type: none"> • identify man-made and natural structures • give various properties of man-made and natural structures • construct basic structures • relate to different career opportunities • use linkages in models • give examples of basic pneumatic systems • describe the basic operation principle of pneumatics • identify pulley drives: <ul style="list-style-type: none"> - pulley drives - chain drives • relate to different career opportunities

THEME/TOPIC	LEARNING OBJECTIVES <i>Learners will:</i>	COMPETENCIES <i>Learners should be able to:</i>
4. 3. Materials	<ul style="list-style-type: none"> • realise the importance of materials according to their uses (human needs) 	<ul style="list-style-type: none"> • identify different materials and manufactured products and apply their specific use according to their properties: <ul style="list-style-type: none"> - wood <ul style="list-style-type: none"> ○ hardwood (good quality, durable, high value furniture) ○ soft wood (as roof trusses) ○ plywood (furniture) - metal <ul style="list-style-type: none"> ○ aluminium (light in weight, corrosion resistant) ○ copper (ductile, good conductor of heat and electricity, corrosion resistant) ○ mild steel (malleable, general work) - plastic <ul style="list-style-type: none"> ○ polyvinyl chloride (PVC)(as water pipes, plasticity)
4.4 Energy	<ul style="list-style-type: none"> • understand how to apply potential and kinetic energy to perform work 	<ul style="list-style-type: none"> • apply potential and kinetic energy to perform work

THEME/TOPIC	LEARNING OBJECTIVES <i>Learners will:</i>	COMPETENCIES <i>Learners should be able to:</i>
4.5 Electricity	<ul style="list-style-type: none"> • understand the term and different effects of electricity • learn basic concepts such as: <ul style="list-style-type: none"> - conductors - insulators • understand the terms: <ul style="list-style-type: none"> - voltage - current - resistance • understand the molecular theory of magnetism • realise the value of electricity-in-practice • know about electrician as career opportunity 	<ul style="list-style-type: none"> • describe the term electricity • distinguish between the effects of electricity • define and state the difference between <ul style="list-style-type: none"> - conductors - insulators • use the units of measurements and symbols to calculate: <ul style="list-style-type: none"> - voltage (V), - current (I) and - resistance (R) (in a simple circuit) • describe the molecular theory of magnets (like poles repels, unlike poles attract) • draw / sketch magnetic fields • apply the concept “electricity-in-practice” (through practical uses of electrical toys or appliances) • relate to different career opportunities

THEME/TOPIC	LEARNING OBJECTIVES <i>Learners will:</i>	COMPETENCIES <i>Learners should be able to:</i>
6. Communication (Drawing)	<ul style="list-style-type: none"> • understand and use freehand sketching techniques in project work • be introduced to appropriate drawing equipment to draw graphical and geometrical constructions • be introduced to graphs, charts and flow chart diagrams 	<ul style="list-style-type: none"> • draw freehand three dimensional sketches appropriate to project work. • identify and use: <ul style="list-style-type: none"> - drawing board - T-square - 45° and 30/60° set squares - compass - protractor • measure: <ul style="list-style-type: none"> - sides - angles • demonstrate simple data on graphs, charts, and flow diagrams.

10. Assessment

A learner-centred approach in teaching uses a broad range of knowledge and skills which are relevant to the knowledge-based society. The competencies in the syllabus state what understanding and skills a learner must demonstrate as a result of a teaching-learning process, and which will be assessed. However, it is intended that the curriculum be learning-driven, not assessment and examination driven. Assessment and examination are to support learning.

10.1 Types and methods of assessment

Continuous assessment

In order to capture the full range and levels of competence, a variety of formal and informal continuous assessment situations is needed to give a complete picture of the learner's progress and achievements in all subjects. Continuous assessment must be clear, simple and manageable, and explicitly anchored in a learner-centred principles and practice. Teachers must elicit reliable and valid information of the learner's performance in the competencies. The information gathered about the learners' progress and achievements should be used to give feedback to the learners about their strong and weak points, where they are doing well and why, where and how they need to try more. The parents should be regularly informed about the progress of their child in all subjects, be encouraged to reward achievements, and give suggestions as to how they can support their learning activities.

Formative assessment

Formative assessment is any assessment made during the school year in order to improve learning and to help shape and direct the teaching-learning process. Assessment has a formative role for learners if and when:

- it is used to motivate them to extend their knowledge and skills, establish sound values, and to promote healthy habits of study
- assessment tasks help learners to solve problems intelligently by using what they have learned
- the teacher uses the information to improve teaching methods and learning materials

Summative assessment

It is an assessment made at the end of the school year based on the accumulation of the assessment marks of the learner throughout the year in a given subject, together with any end-of-year examinations. The result of summative assessment is a single end-of-year promotion grade.

Informal and formal methods

The teacher must assess how well each learner masters the competencies described in the subject syllabus and from this gain a picture of the all-round progress of the learner. To a large extent, this can be done in an informal way through structured observation of each learner's progress in learning and practice situations while they are investigating things, interpreting phenomena and data, applying knowledge, communicating, making value judgements, and in their participation in general.

When it is necessary to structure assessment more formally, the teacher should as far as possible use the same sort of situation as ordinary learning and practice situations to assess the competency of the learner. The use of formal written and oral tests can only assess a limited range of competencies and therefore should not take up a great deal of time. Short tests in any subject should be limited to part of a lesson and only exceptionally use up a whole lesson. End-of-year tests should only be written in the first lesson of the day so that teaching and learning can continue normally for the rest of the time. No end-of-term examinations may be written.

Evaluation

Information from informal and formal continuous assessment is to be used by the teacher to know where it is necessary to adapt methods and materials to the individual progress and needs of each learner. At the end of each main unit of teaching, and at the end of each term, the teacher, together with the learners, should evaluate the progress in terms of tasks completed, participation, what the learners have learnt, and what can be done to improve the working atmosphere and achievements of the class.

Criterion-referenced assessment

When grades are awarded in continuous assessment, it is essential that they reflect the learner's actual level of achievement in the competencies, and are not reflected to show where other learners are achieving or to the idea that a fixed percentage of the learners must always be awarded a grade A, B, C and so on (norm-referencing). In criterion-referenced assessment, each assessment task must have an assessment rubric with criteria descriptors for what the learner must demonstrate in order to be awarded the grade. It is important that teachers in each department/section work together to have a shared understanding of what the criteria descriptors mean and how to apply them in continuous assessment, so that grades are awarded correctly and consistently across subjects. Only then will the assessment results be reliable.

10.2 Grade descriptors

The learner's level of achievement in relation to the competencies in the subject syllabus is shown in letter grades. When letter grades are awarded, it is essential that they reflect the learner's actual level of achievement in relation to the competencies. In grades 1 to 3, letter grades are related to a six-point performance scale, while in grade 4 to 12, letter grades are related to percentages. The relation between the grades awarded and competencies are shown below:

Grade	% Range (Gr. 4-12)	Competency Descriptions
A	80%+	Achieved Competencies exceptionally well. The learner is outstanding in all areas of competency
B	70-79%	Achieved Competencies very well. The learner's achievement lies substantially above average requirements and is highly proficient in most areas of competency.
C	60-69%	Achieved Competencies well. The learner has mastered the competencies and can apply them in unknown situations and contexts.
D	50-59%	Achieved Competencies satisfactorily. The learner's achievement corresponds to average requirements. The learner may be in need of learning support in some areas.
E	40-49%	Achieved the minimum number of Competencies to be considered competent. The learner may not have achieved all the competencies, but the learner's achievement is sufficient to exceed the minimum competency level. The learner is in need of learning support in most areas.
U	0-39%	Not achieved the minimum number of Competencies. The learner has not been able to reach a minimum level of competency, even with extensive help from teacher. The learner is seriously in need of learning support.

10. 3 Assessment objectives

The Design and Technology assessment objectives are:

A. Knowledge with understanding
B. Design problem solving
C. Design communication
D. Realisation

A. Knowledge with understanding

Learners should be able to:

- Demonstrate the ability to state facts, recall and name items, recall and describe processes;
- Demonstrate the ability to apply and relate knowledge to basic design and manufacturing;
- Make reasoned arguments and anticipate consequences about outcomes of the design and realisation process;
- Demonstrate a crucial awareness of the interrelationship between design and the needs of society.

B. Design problem solving

Learners should be able to:

- design issues and draw up a design specification;
- Generate a range of outlined solutions to a design problem, giving consideration to the constraints of time, Identify clearly, from a particular situation, a specific need for which a solution is required and compose a design brief;
- Analyse a problem by considering any relevant functional, aesthetic, human, economic and environmental skills and resources;
- Test and refine the functional and aesthetic effectiveness of design solutions.

C. Design communication

Learners should be able to:

- recognise information in one form and where necessary change it into a more applicable form;
- prose and communicate ideas graphically;
- develop ideas and represent details of form, shape, construction, movement, size and structure through graphical presentation.

D. Realisation

Learners should be able to:

- plan and organise the work procedure involved in the realisation of a solution;
- select from a range of resources, those appropriate for the realisation of the product;
- demonstrate appropriate manipulative skills by showing an understanding of materials and their characteristics in relation to their use;
- demonstrate appropriate manipulative skills by showing the ability to correctly and efficiently use instruments and tools in the realisation of a product.

10. 4 Continuous Assessment: Detailed Guidelines

Types of continuous assessment

Continuous assessment should be planned and programmed at the beginning of the year, and kept as simple as possible. Marks given for class and homework activities should be recorded for continuous assessment.

In Design and Technology, in the Senior Primary phase, the continuous assessment tasks are as follows:

Practical investigation: These are assessments of practical skills done during a practical activity where learners are required to plan and carry out investigations and collect report, and analyse information. Except for one major investigation or project during the first or second term, activities should assess not more than two skills and should count 20 marks in the first, second and third term.

Project: All the relevant stages in the design folder should be taken into account

Grade 5: Learners are expected to experiment with the concepts using wood/burnt match sticks for example. This informal Continuous Assessment activity does not contribute towards the CA mark.

Grade 6: Learners are expected to experiment with the concepts of the design folder individually.

Grade 7: Learners should have a completed design folder plus a finished product based on the specific design folder.

NB: It is not compulsory to use the design folder compiled in grade 6, meaning if a learner opted for another product in Grade 7, he/she should complete a new and appropriate design folder for that specific product. Should a learner move to another school, the continuous assessment mark for the work already completed should accompany the learner.

Topic tasks: These are activities that most teachers already use in day-to-day teaching. These are assessed and recorded activities that could introduce a topic or be used during the teaching of a topic and /or revising a topic. Topic tasks may well involve locating information, conducting surveys, analysing information or presenting information. However, not all assessment objectives need to be present in every topic task. The greatest emphasis should be placed on assessment objectives A and C to meet the weighting shown in the specification grid. The topic task should count 15 marks when entered into the mark sheet.

Topic tests: After completing a topic in the syllabus, it is necessary to conduct a test, indicating the achievement of learners in these topics. The results could be used to analyse mastery of learners' achievement and to do remedial work as it required.

End-of-term tests: This is a comprehensive test of the whole term's work

Summary of continuous assessment tasks

Continuous assessment Grade 5						
Components	Term 1 (D&T)		Term 2		Term 3	
	Number & marks	Total	Number & marks	Total	Number & marks	Total
Practical investigations	1×20	20	1×20	20	1×30	30
Topic tasks	2×15	30	2×15	30	2×15	30
Topic tests	1×20	20	1×20	20	1×10	10
End-of-term test	1×30	30	1×30	30		
Term mark		100		100		70
Weighted term marks		100		100		(70÷7×10) 100

Continuous assessment Grade 6							
Components		Term 1		Term 2		Term 3	
		Number & marks	Total	Number & marks	Total	Number & marks	Total
Practical investigations		1x30	30	1x30	30	1x30	30
Design folder	Analysis and Brief					5	
	Specification					5	
	Exploration of ideas					10	
	Total						20
Topic tasks		1x20	20	1x20	20	1x10	10
Topic tests		1x20	20	1x20	20	1x10	10
End-of-term test		1x30	30	1x30	30		
Term mark			100		100		70
Weighted term marks			100		100		(70÷7x10) 100

Continuous assessment Grade 7							
Components		Term 1		Term 2		Term 3	
		Number & marks	Total	Number & marks	Total	Number & marks	Total
Practical investigations		2x20	40	2x20	40		
Design folder	Analysis and Brief					5	
	Specification					5	
	Exploration of ideas					10	
	Development of solution					10	
	Planning of Production					10	
	Total						40
Product	Quality of Product					20	
	Evaluation					5	
	Fitness for Purpose					5	
	Total						30
Topic tasks		1x10	10	1x10	10		
Topic tests		1x20	20	1x20	20	1x10	10
End-of-term test		1x30	30	1x30	30		
Term mark			100		100		80
Weighted term mark			100		100		(80÷8x10) 100

10.5 End of year examinations: Detailed guidelines

Internal end-of-year examinations will be written. The purpose of these examinations is to focus on how well learners can demonstrate their thinking, communication and problem-solving skills related to the areas of the syllabus which are most essential for continuing in the next grade. Preparing for and conducting these examinations should not take up more than two weeks altogether right at the end of the year. The purpose of the examination is to assess how far each learner can demonstrate their achievement in reaching the competencies.

The end of year examination for Grade 5 should consist of work done in the second and third terms only, while the end of year examination for Grades 6 and 7 will consist of all work done during the whole year.

WRITTEN EXAMINATION			
Grade	Description of papers	Duration	Marks
5	Section A: Short answer compulsory questions (25 marks) Section B: Question 1: Structured questions (25 marks) Question 2: Graphic questions (25 marks) Question 3: Structured questions (25 marks)	1½ hours	100
6	Section A: Short answer compulsory questions (25 marks) Section B: Question 1: Structured questions (25 marks) Question 2: Graphic questions (25 marks) Question 3: Graphic questions (25 marks)	1½ hours	100
7	Section A: Short answer compulsory questions (25 marks) Section B: Question 1: Structured questions (25 marks) Question 2: Graphic questions (25 marks) Question 3: Design questions (25 marks)	1½ hours	100

10.6 Promotion marks

A promotion mark will be awarded at the end of each year based on the average of the continuous assessment mark and the mark obtained at the end of year examination. In Grades 5 – 7, continuous assessment contributes 50% and end of year examination 50% of the summative mark.

The weighting of each assessment component is as follows:

Component	Description	Marks	Weighting
Written examination	Section A:	25	12,5%
	Section B: Question 1	25	12,5%
	Question 2	25	12,5%
	Question 3	25	12,5%
Continuous assessment	Topic Tasks, Topic Tests, Practical Investigations, Project, End of Term Test	100	50%
	Total marks	200	100%

The promotion mark is calculated as follows:

Promotion Mark for Grades 5, 6 And 7				
	Term 1	Term 2	Term 3	Total
Weighted term mark	100	100	100	300
CA mark	(300 ÷ 3)		100	
End-of-year examination			100	
Promotion Mark	(CA Mark + End-of-Year Examination) ÷ 2 (200÷2)		100	

10. 7 Specification Grid

The specification grid below indicates the weighting allocated to each objective for both Continuous assessment and for the Examination

Section	Assessment objectives				
	A. Knowledge with Understanding	B. Application	C. Investigation/Analysis & Evaluation	D Judgement & Decision Making	Total
	%	%	%	%	%
A	16	3	4	2	25
B	37	11	16	11	75
Overall	53	14	20	13	100

10.8 Assessment Rubrics/Criteria

Assessment Grid for Final Portfolio (and Product) in Grades 6 and 7

Low Range	Medium Range	High Range	
Analysis and Brief:			5
An analysis with aspects of the problem considered and a skeleton brief only 0 - 1	Relatively sound analysis with a range of aspects of the problem considered and a full brief 2 - 3	A wide ranging analysis with many of the aspects of the problem considered and a clearly expressed brief 4 - 5	
Specifications: List certain specifications that you'd need in your final product			5
An unclear specification 0 - 1	A statement of some of the specific requirements 2 - 3	A concise and comprehensive specification 4 - 5	
Exploring Ideas: Look at existing products in a local environment			10
Little variety of ideas with a tendency to concentrate on a single concept 0 - 3	A fair range of ideas with some ideas examined. 4 - 5	A wide range of ideas combined with imaginative interpretation. 7 - 10	
Developing Solutions:			10
An undeveloped idea lacking in attention to detail 0 - 3	A developed idea with sufficient attention to detail only 4 - 6	Through and thoughtful development with attention to fine detail 7 - 10	

Planning for Production:			10
Consideration of processes, lacking in detail, no overall plan 0 - 3	Some awareness of main processes involved a single plan 4 - 6	Good insight into processes involved, clear and detailed planning 7 - 10	
Low Range	Medium Range	High Range	
Quality of Product: Overall judgement required how range of skills contained has been applied.			20
Product marred by limited skills 0 - 7	Competent, some minor inaccuracies, blemishes, some degree of mastery 8 - 13	Precise, accurate, well finished. Mastery of most aspects, refinement of detail 14 - 20	
Evaluation and Testing:			5
General overall appraisal with little reverence to specification 0 - 1	Main aspects of specification critically appraised some objectivity 2 - 3	Detailed appraisal related to specification, objective tests applied where possible, and modifications proposals 4 - 5	
Fitness for Purpose:			5
An incomplete solution failing to satisfy the brief 0 - 1	Completed solution fulfilling the brief in part only 2- 3	Completed solution fulfilling the brief 4 - 5	

Annexe 1: Glossary of terms

Word	Meaning
Acquaint	To make somebody aware of or familiar with something
Aesthetics	How something looks, especially when considering how pleasing it is
Analyse	Examine information in detail to discover patterns or relationships
Axonometric	To describe a method of drawing a 3-dimensional object so that the vertical and horizontal axes are drawn to scale but the curves and diagonals appear distorted
Calculate	A numerical answer is required – work should be shown
Classify	To assign things or people to classes or groups
Communication (graphical)	The exchange of information between individuals, by means of speaking or using a system of signs or behaviour (drawing)
Compare	Find resemblance and differences
Conceptualise	To arrive at a concept or generalisation as a result of things seen, experienced or believed
Define	A literal statement is required
Demonstrate	To show or prove something clearly and convincingly
Describe	Write down what you do, or what you would see, in as much detail as possible
Determine	Use the information given to work out the answer
Discuss	Give a critical account of the points involved in the topic
Display	To make something visible or available for others to see
Distinguish	Show the difference between one or more variables
Ergonomics	The study of how a workplace and the equipment used there can best be designed for comfort, safety, efficiency and productivity
Evaluate	Use the information provided to make a judgement about something
Explain	Give a description for or motivate your answer
Give/State/Write down	Write down your answer
Hydraulic	Relating to or operated by a device in which pressure applied to a piston is transmitted by fluid to a larger piston, giving rise to a larger force

Identify	Find out what is unique about a material or situation
Interpret	Reasoning or some reference to theory, depending on the context
Investigate	Examine a problem in a systematic way
Lever	A handle used to operate a vehicle or piece of machinery
Linkage	A device that links two or more objects
List	Give a number of points, generally each of one word
Media	The various means of mass communication thought of as a whole, including radio, television, magazines and newspapers, together with the people involved in their production
Mechanism	The methods, procedures or processes in how something works or is done
Natural	Present in or produced by nature, rather than being artificial or created by people, for example a tree or a spider web
Oblique	Sloping or joining something at an angle that is not a right angle
Pictorial	Containing illustrations or photographs as opposed to written text (three dimensional sketches)
Pneumatics	The mechanical properties of air and other gases
Principle	The basic way something works
Pulley	A mounted rotating wheel with a grooved rim over which a belt or chain can move to change the direction of a pulling force
Recognise	Be aware of a fact or problem
Recycle	To process used or waste materials so that they can be used again
Relate	Find the relationship between one or more variables
Report	To give information about something that has happened
Research	Methodical investigation into a subject in order to discover facts, to establish or revise a theory, or to develop a plan of action based on the facts discovered
Scale	A ratio representing the size of an illustration or reproduction, especially a map or a model, in relation to the object it represents
Select	Choose from a number of alternatives
Sketch	In case of diagrams, make a simple, freehand drawing and in graph work, the shape and/or position of the curve should be given

SME's	Small and medium scale enterprises
Specification	A detailed description of a particular object, especially one detailed enough to provide something with the information needed to make that object
Sprocket	A projecting tooth on a wheel or cylinder that engages with the links of a chain or with perforations in a film to make the chain move forward
Structures	The way in which the parts of something are connected together, arranged or organised
Technology	Scientific knowledge used in practical ways in industry, for example in designing new machines
Triangulation	A navigation technique that uses the trigonometric properties of triangles to determine a location or course by means of compass bearings from two points a known distance apart
Trusses	To support or strengthen a roof, bridge or elevated structure with a network of beams and bars
Wasting	Take away or remove

Annexe 2: Assessment record sheet for Grade 5

ASSESSMENT RECORD SHEET: DESIGN AND TECHNOLOGY				Grade 5 (...)				Year.....							
School:.....				Teacher:.....											
Name of Learner	Term	Practical Investigation		Topic Task		Topic Test		End of Term Test	Term Mark		Weighted Term Mark	Total	CA Mark (300/3)	End-of-year Examination	Promotion Mark (200/2)
		20	30	15	15	10	20	30	100	70	100	300	100	100	100
	1														
	2														
	3														
	1														
	2														
	3														
	1														
	2														
	3														
	1														
	2														
	3														
	1														
	2														
	3														
	1														
	2														
	3														

Done by: Checked by:

Annexe 3: Assessment Record Sheet for Grade 6

ASSESSMENT RECORD SHEET: DESIGN AND TECHNOLOGY								Grade 6 (....)			Year.....						
School:								Teacher:									
Name of learner	Term	Practical investigation	Topic task		Topic test		End-of-term test	Design folder			Term mark	Weighted term mark	Total	CA mark (300/3)	End-of-year examination	Promotion mark (200/2)	
			10	10	10	20		30	Analysis/Brief	Specifications							Ideas
		30	10	10	10	20	30	5	5	10	100	70	100	300	100	100	100
	1																
	2																
	3																
	1																
	2																
	3																
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	3																
	1																
	2																
	3																
	1																
	2																
	3																
Done by:								Checked by:									

Annexe 4: Assessment Record Sheet for Grade 7

ASSESSMENT RECORD SHEET: DESIGN AND TECHNOLOGY								Grade 7 (...)								Year.....						
School:								Teacher:.....														
Name of Learner	Term	Practical Investigation		Topic Task		End-of-term Test	Design folder					Product			Term Mark		Weighted Term Mark	Total	CA Mark (300/3)	End-of-year Examination	Promotion Mark(200/2)	
		20	20	10	10		20	30	Analysis/ Brief	Specifications	Ideas	Development	Planning	Quality	Evaluation	Fitness						100
	1																					
	2																					
	3																					
	1																					
	2																					
	3																					
	1																					
	2																					
	3																					
	1																					
	2																					
	3																					

Done by: Controlled by:

Annexe 5: List of Materials and Tools

Tools to select from so as to provide for the learners' needs:

- Selection of paper and card
- Basic drawing equipment: Rotering A-3 drawing board (college board), ruler, compasses, pencils, rubber, set squares (30 and 45 degrees)
- Colouring pencils, markers
- Modelling equipment: scissors, craft knives and adhesive tape
- Selection of available wood, metals and plastics
- Marking out tools: Tri-square, divider, scribe, punches, measuring tape, steel rule
- Holding devices: vice, G-clamps,
- Hammers: , mallets, claw hammer,
- Posters/brochures of tools and equipment
- Selection of abrasive papers, paints, polishes, adhesives, brushes, cleaning materials
- Fitting and Fixing: nails, screws, nuts and bolts, rivets and dowels
- Protective clothing: eye goggles, dust masks, apron
- Cutting Tools: saws (tenon saw, hack saw, coping saw), snips, trimming knives, files, scrapers, jack planes, chisels, drill bits, rasps, combination pliers, side cutters.
- Other bench tools: pincer, screwdriver sets, hand drill, spanners, rivet gun,



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