



Republic of Namibia

MINISTRY OF EDUCATION, ARTS AND CULTURE

SENIOR PRIMARY PHASE

DESIGN AND TECHNOLOGY SYLLABUS

GRADE 5 - 7

For implementation in 2024

Ministry of Education, Arts and Culture
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Design and Technology syllabus Grade 5 – 7

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Table of contents

1.	INTRODUCTION	1
2.	RATIONALE	1
3.	AIMS.....	1
4.	INCLUSIVE EDUCATION	2
5.	LINKS TO OTHER SUBJECTS AND CROSS-CURRICULAR ISSUES.....	3
6.	APPROACH TO TEACHING AND LEARNING	5
7.	END-OF-PHASE COMPETENCIES.....	6
7.1	Safety precautions	6
7.2	Basic hand tools.....	6
7.3	Business opportunities in Design and Technology	6
7.4	Technology	7
7.5	Design and technology.....	7
7.6	Communication	7
8.	SUMMARY OF THE LEARNING CONTENT	8
9.	LEARNING CONTENT	9
9.1	Learning content for Grade 5	9
9.2	Learning content for Grade 6	12
9.3	Learning content for Grade 7	15
10.	ASSESSMENT	19
10.1	Types and methods of assessment.....	19
10.2	Grade descriptors	21
10.3	Assessment objectives.....	22
10.4	Continuous assessment: detailed guidelines.....	23
10.5	End-of-year examinations/test: detailed guidelines	26
10.6	Promotion marks.....	26
10.7	Specification grid.....	27
10.8	Assessment rubrics/criteria	28
Annexe 1:	Glossary of subject terms	30
Annexe 2:	List of materials and tools	33
Annexe 3:	Assessment record sheet for Grade 5	34
Annexe 4:	Assessment record sheet for Grade 6	35
Annexe 5:	Assessment record sheet for Grade 7	36

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.

Design & Technology require a lot of practical work and will therefore need to have at least one double period per cycle on the school timetable to allow enough time for practical activities in the class situation.

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 (2018)*. 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) and Road Safety. 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	• Safety precautions	• Structures • Materials • Energy	• Safety precautions	• Business in Namibia • Design and Technology	• Design and Technology • Communication
6	• Safety precautions	• Structures • Materials • Energy	• Safety precautions	• Business in Namibia • Design and Technology	• Design and Technology • Communication
7	• Safety precautions and first aid	• Structures • Materials • Energy	• Safety precautions and first aid	• Business in Namibia • Design and Technology	• Design and Technology • 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 and graphics.

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:

7.1 Safety Precautions

Learners should be able to 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.

7.2 Basic Hand tools

Learners should be able to demonstrate correct handling, care and maintenance of basic tools.

7.3 Business opportunities in Design and Technology

Learners should be able to 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.

7.4 Technology

Structures

Learners should be able to 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.

Mechanisms

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

Materials

Learners should be able to 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.

Energy

Learners should be able to identify, describe, demonstrate and apply different kinds of energy forms.

Electricity

Learners should be able to name, describe and apply electricity as a source of energy (electricity-in-practice)

7.5 Design and Technology

Learners should be able to 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.

7.6 Communication

Learners should be able to 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 should be able to demonstrate awareness regarding different careers especially in the fields of building construction, automotive, electrical and engineering.

8. SUMMARY OF THE LEARNING CONTENT

THEMES/TOPICS	GRADE 5	GRADE 6	GRADE 7
1. Safety precautions	• Safety precautions	• Safety precautions	• Safety precautions
2. Basic hand tools	• Basic hand tools	• Basic hand tools	• Basic hand tools
3. Businesses in Namibia	• Businesses in Namibia	• Businesses in Namibia	• Businesses in Namibia
4. Technology	• Structures • Mechanisms • Materials • Energy • Electricity	• Structures • Mechanisms • Materials • Energy • Electricity	• Structures • Mechanisms • Materials • Energy • Electricity
5. Principles of design and technology	• Principles of design and technology	• Principles of design and technology	• Principles of design and technology
6. Communication (drawing)	• Communication (drawing)	• Communication (drawing)	• Communication (drawing)

9. LEARNING CONTENT

9.1 Learning Content for Grade 5

THEMES/TOPICS	LEARNING OBJECTIVES <i>Learners will:</i>	COMPETENCIES <i>Learners should be able to:</i>
1. Safety precautions	• know safety precautions • understand HIV and AIDS	• list certain dangers: - when working with electrical household appliances - when being negligent and lacking concentration • role play the given dangers in the class • explain the concepts HIV and AIDS • describe how HIV can be transmitted
2. Basic hand tools	• know basic hand tools	• identify the following hand tools: - ruler, pencil, scribe, try-square, hammer, pliers, screw drivers, saws, files and snips
3. Businesses in Namibia	• explore business opportunities in Namibia with regard to Design and Technology	• identify business opportunities within Design and Technology • list characteristics of a successful business • justify the selection of a specific business idea from their environment
4. Technology 4.1 Structures	• know natural structures	• define structures • identify natural structures • collect examples of natural structures • give simple properties of natural structures

THEMES/TOPICS	LEARNING OBJECTIVES <i>Learners will:</i>	COMPETENCIES <i>Grade 5 learners should be able to:</i>
4.2 Mechanisms	understand the <i>levers</i>	- explain the term lever - demonstrate the basic use of levers with practical applications
4.3 Materials	know products made from different materials including recyclable materials	- identify different materials used in making products - identify different products made from wood, metal and plastic - investigate products made from local raw materials
4.4 Energy	- understand the concept <i>energy</i> - know the sun as the main energy source	- describe the concept energy - identify how the sun is used as a source of energy - give examples of elementary uses of the sun as an energy source
4.5 Electricity	be aware of the uses and dangers of electricity	list the uses and dangers of electricity
5. Principles of design and technology	understand the concept "design and technology"	define and discuss "design and technology"

9.2 Learning Content for Grade 6

THEMES/TOPICS	LEARNING OBJECTIVES <i>Learners will:</i>	COMPETENCIES <i>Learners should be able to:</i>
1. Safety precautions	• know safety precautions • be aware of dangers when working with tools and equipment (with HIV and AIDS in mind)	• name general safety measures towards the care and storage of tools and equipment • identify safety gear • identify hazards, breakages and accidental spillages in the workplace • role play an awareness campaign on HIV and AIDS
2. Basic hand tools	• know how to handle tools correctly • know how to care for and maintain tools	• state the correct handling of the following hand tools: - rule, pencil, scribe, try-square, hammer, pliers, screw drivers, saws, files and snips • apply the correct usage of tools • explain the importance of caring for the listed tools
3. Business opportunities in Design and Technology in Namibia	• explore employment opportunities and entrepreneurship opportunities in Design and Technology	• differentiate between employment and self-employment by using examples within the Namibian context • identify and explain the characteristics of successful entrepreneurs • investigate and report on successful Namibian entrepreneurs

THEMES/TOPICS	LEARNING OBJECTIVES <i>Learners will:</i>	COMPETENCIES <i>Grade 6 learners should be able to:</i>
4. Technology 4.1 Structures	• know different man-made structures and their properties	• identify various man-made structures • list properties of man-made structures • list weaknesses and strengths of man-made structures
4.2 Mechanisms	• know levers and their uses • Explain <i>linkages</i> in daily use	• identify levers and their uses • explain the term “linkage” • explain the advantages of mechanical linkages • identify mechanical linkages in daily use
4. 3 Materials	• understand the production of materials	name and describe the production processes of: - wood: cutting of trees (felling), sawing logs into timber (conversion); drying of wood (seasoning) - paper/carton: pulping and drying - metals: mining, crushing and melting - plastic: refinery
4.4 Energy	• understand potential and kinetic energy	• explain potential and kinetic energy
4.5 Electricity	• know different effects and uses of electricity	• name different effects of electricity: - heat / thermal - light - magnetic • describe the uses of electricity

THEMES/TOPICS	LEARNING OBJECTIVES <i>Learners will:</i>	COMPETENCIES <i>Grade 6 learners should be able to:</i>
5. Principles of design and technology	understand the concept <i>design</i>	- identify common problems / needs in the local environment - describe the steps of design folder: - design brief - specifications - possible solutions - develop a design folder using the design steps - apply creative thinking in solving problems or meeting needs
6. Communication (drawing)	- know freehand drawings - understand appropriate drawing techniques for geometrical constructions	- apply freehand sketching techniques to draw: - horizontal lines - vertical lines - diagonal lines - circles - draw freehand sketches of three dimensional figures - apply the bisecting of sides and angles of: - triangles - squares - rectangles - construct: - circumscribed circles - inscribed circles

9.3 Learning content for Grade 7

THEMES/TOPICS	LEARNING OBJECTIVES <i>Learners will:</i>	COMPETENCIES <i>Learners should be able to:</i>
1. Safety precautions	• know safety measures according to National Occupational Safety Association (NOSA) • understand the dangers of open wounds and bleeding with emphasis on HIV and AIDS	• apply appropriate safety measures when working with hand tools and electrical power tools • design safety posters to create awareness on safety precautions • recognise the need for precautionary measures by: - using gloves - use of running water during treatment of open wounds and bleeding • explain how to properly dispose of waste material after treatment • explain how personal health affects business productivity
2. Basic hand tools	• know the correct application (demonstration) of basic hand tools • know care and maintenance the basic hand tools	• apply the safe application of the following hand tools: - ruler, pencil, scribe, try-square, hammer, pliers, screw drivers, saws, files and snips • apply care and maintenance of the listed basic hand tools
3. Businesses in Namibia	• understand employment and self-employment • understand ways to become an entrepreneur	• 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 • differentiate between demands and knowledge / skills necessary to start a business

THEMES/TOPICS	LEARNING OBJECTIVES <i>Learners will:</i>	COMPETENCIES <i>Grade 7 learners should be able to:</i>
4. Technology 4.1 Structures	understand different forms and properties of structures	- compare man-made and natural structures - give various properties of man-made and natural structures - construct basic structures - relate to different career opportunities
4.2 Mechanism	- know linkages in daily use - understand pneumatic systems - know pulley and chain drives	- use linkages in models - give examples of basic pneumatic systems - describe the basic operation principle of pneumatic systems - identify pulley drives and chain drives - relate to different career opportunities
4.3. Materials	know the importance of materials according to their types and uses (human needs)	- identify different materials and manufactured products: - wood: hardwood, soft wood and manufactured boards - metal: ferrous, non-ferrous and alloys - plastic: thermoplastics and thermosetting - describe their specific use according to their properties
4.4 Energy	understand how to apply potential and kinetic energy to perform work	apply potential and kinetic energy to perform work
4.5 Electricity	- understand the term and different effects of electricity - know the difference between conductors and insulators - understand voltage, current and resistance	- describe the term electricity - distinguish between static and current electricity - define and state the difference between conductors and insulators - use the units of measurements and symbols to calculate: - voltage (V), - current (I) and

	• know about electrician as career opportunity	- resistance (R) (in a simple circuit) • relate to different career opportunities
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THEMES/TOPICS	LEARNING OBJECTIVES <i>Learners will:</i>	COMPETENCIES <i>Grade 7 learners should be able to:</i>
4.5 Electricity (cont)	- understand the molecular theory of magnetism - know the value of electricity-in-practice	- 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)
Design and technology 5.1 Principles of design and technology	understand the link between design and technology	- demonstrate various ways of integrating design and technology - describe the concepts: - aesthetics - ergonomics - functionality
5.2 Making/realisation	know stages in the design process	- list, describe and apply the design stages: - development of final idea - planning for production - making of product - testing and evaluation
6. Communication (drawing)	- understand and use freehand sketching techniques in project work - know appropriate drawing equipment to draw graphical and geometrical constructions - know graphs, charts and flow chart diagrams	- draw freehand three dimensional sketches appropriate to project work. - identify and use: - drawing board - T-square 45° and 30/60° set squares - compass - protractor - measure sides and 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 are 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 semester, 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 grade 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 grade 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 grade. When letter grade are awarded, it is essential that they reflect the learner's actual level of achievement in relation to the competencies. In grade 4 to 12 letter grade are related to percentages. The relation between the grade awarded and competencies are shown below:

Grade	% Range (Gr. 4-12)	Grade Descriptors
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 semester, activities should assess not more than two skills in the first and second semester.

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 of 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.

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 semester's work.

The Continuous Assessment (CA) marks for the first semester is converted to a mark out of 100 (weighted mark). Only this mark should be used for the report at the end of semester 1. Learners should not write an examination at the end of the first semester, but only an end-of-term test which is part of the CA and part of the weighted term mark.

Summary of continuous assessment tasks

Continuous assessment Grade 5				
Components	Semester 1		Semester 2	
	Number & marks	Total	Number & marks	Total
Practical investigations	2 × 20	40	1 × 30	30
Topic tasks	3 × 15	45	3 × 15	45
Topic tests	2 × 20	40	1 × 10	10
End-of-term test	1 × 30	30		
Term marks		155		85
Weighted term mark		$(155 \div 1.55)$ 100		

Continuous assessment Grade 6					
Components		Semester 1		Semester 2	
		Number & marks	Total	Number & marks	Total
Practical investigations		2 × 30	60	1 × 30	30
Design folder	Analysis and Brief			5	
	Specification			5	
	Exploration of ideas			10	
	Total				20
Topic tasks		2 × 20	40	1 × 10	10
Topic tests		2 × 20	40	1 × 10	10
End-of-term test		1 × 30	30		
Term marks			170		70
Weighted term mark			(170 ÷ 1.7) 100		

Continuous assessment Grade 7					
Components		Semester 1		Semester 2	
		Number & marks	Total	Number & marks	Total
Practical investigations		2×20	40	2×20	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		1×10	10	1×10	10
Topic tests		2×20	40	1×10	10
End-of-term test		1x30	30		
Term marks			120		130
Weighted term mark			(120÷1.2) 100		

10.5 End-of-year examinations/test: detailed guidelines

In Grade 6 and 7 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 test for Grade 5 should consist of work done in the second semester only, while the end-of-year examination for Grade 6 and 7 will consist of all work done during the year.

WRITTEN END OF YEAR EXAMINATION/TEST			
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 Grade 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 Grade 5			
	Semester 1	Semester 2	Total
Term mark	155	85	240
CA mark	(240 ÷ 2.4)		100
End-of-year examination			100
Promotion Mark	(CA Mark + End-of-year Examination) ÷ 2 (200÷2)		100
Promotion Mark for Grade 6			
	Semester 1	Semester 2	Total
Term mark	170	70	240
CA mark	(240 ÷ 2.4)		100
End-of-year examination			100
Promotion Mark	(CA Mark + End-of-year examination) (200÷2)		100
Promotion Mark for Grade 7			
	Semester 1	Semester 2	Total
Term mark	120	130	250
CA mark	(250 ÷ 2.5)		100
End-of-year examination			100
Promotion Mark	(CA Mark + End-of-year examination) (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 Grade 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 SUBJECT TERMS

Term	Meaning
Acquaint	Make somebody aware of or familiar with something
Aesthetics	The visual and sensory aspects of design that make things look appealing
Alphabet of lines	A set of lines used to convey different information in technical drawings
Appliances	Devices used in households for specific functions, such as washing machines and microwaves
Basic hand tools	Simple tools used by hand, like hammers, screwdrivers, and pliers
Bisecting	Dividing something into two equal parts
Business ideas	Creative concepts for products or services that can be turned into a profitable business
Chain drives	A mechanism that uses a chain to transmit power and motion
Circumscribed circles	Circles drawn to touch all the corners of a shape
Classify	Assign things or people to classes or groups
Communications	Sharing ideas and information between people or devices
Conductors	Materials that allow electricity to flow easily
Conversion	Changing raw materials into usable forms, like turning wood into lumber
Cooperation	Working together towards a common goal or task
Current	The flow of electric charges in a circuit
Current electricity	Flow of electric charge through a circuit
Design and technology	A subject involving creating, designing, and making things using skills and creativity
Design brief	A clear statement outlining the goals and requirements of a design project
Electricity	A form of energy resulting from the movement of electrons.
Electricity-in-practice	Practical applications of electrical concepts in various devices
Electromagnet	A temporary magnet created by passing electric current through a coil of wire
Employment	Being hired to work for someone else and receiving a salary or wages
Energy	The ability to do work or create change
Entrepreneur	A person who starts and manages a business, often taking on financial risks
Ergonomics	Designing for comfort and ease of use, considering human interaction

Term	Meaning
Evaluation	Assessing the design's success, often through testing and feedback
Felling	Cutting down trees
Ferrous metals	Metals containing iron, like steel
First Aid	Initial medical assistance for injuries or illnesses
Freehand drawings	Drawings made without the use of tools or aids
Functionality	How well something performs its intended purpose.
Geometrical Constructions	Creating shapes and lines using only a compass and straight edge
Hardwood	Wood from deciduous trees, often dense and strong.
Hazards	Potential sources of danger or harm
HIV and AIDS	Human Immunodeficiency Virus and Acquired Immunodeficiency Syndrome, diseases that weaken the immune system
Horizontal lines	Lines that run straight across from side to side
Inscribed circles	Circles drawn inside a shape to touch its sides
Insulators	Materials that resist the flow of electricity
Kinetic energy	Energy of motion
Levers	Simple machines with a pivot point used to lift or move things
Like Poles	The same ends of magnets that repel each other
Linkages	Mechanisms that connect different parts and transmit motion
Magnetic field	The area around a magnet where its influence can be felt.
Magnetism	The force that attracts or repels objects with certain properties
Maintenance	Keeping things in good condition through regular cleaning, repairs, and checks
Man-made structures	Things built by people, like houses and bridges.
Manufactured boards	Wood products made by binding together wood particles or fibers
Mechanism	The methods, procedures or processes in how something works or is done
Melting	Changing a solid material into a liquid by heating it.
Mining	Extracting minerals or other valuable materials from the earth
Models	Small-scale representations used to visualize and test ideas

Term	Meaning
Natural Structures	Things created by nature, like trees and rocks
NOSA (National Occupational Safety Association)	An organisation focused on promoting health and safety in the workplace
Pneumatic systems	Systems that use air pressure to create movement, like in pneumatic tools
Potential energy	Stored energy due to an object's position
Pulley drive	A system that uses pulleys to transfer motion and power
Pulping	To crush into a soft, wet, shapeless mass
Recyclable materials	Materials that can be used again after being processed, like plastic bottles
Refinery	A facility where raw materials are processed and purified
Resistance	The opposition to the flow of electric current
Role play	Pretending to be someone else or acting out a situation to understand it better
Seasoning	Drying and treating wood to reduce moisture content.
Self-employment	Working for oneself, often as a freelancer or starting a small business
Sketching	Drawing quickly to capture the essence of an idea or object
Softwood	Wood from coniferous trees, usually lighter and less dense than hardwood
Specifications	Detailed descriptions of how something should be designed and made
Static electricity	Electric charges that build up on objects and stay in one place
Structures	Objects built to support loads, like buildings, bridges, and towers
Switch	A device to open or close a circuit, controlling the flow of electricity
Technology	Scientific knowledge used in practical ways in industry, for example in designing new machines
Thermoplastics	Plastics that can be melted and reshaped multiple times
Thermosetting plastics	Plastics that harden permanently after being heated and moulded
Three-dimensional sketches	Drawings that show depth and three-dimensional aspects of an object

Term	Meaning
Two-dimensional sketches	Drawings that represent a flat, two-dimensional view of an object
Unlike Poles	Opposite ends of magnets that attract each other
Vertical lines	Lines that runs straight up and down.
Voltage	The force that pushes electric charges through a circuit

ANNEXE 2: LIST OF MATERIALS AND TOOLS

The following list encompasses a variety of tools and equipment options for meeting the needs of learners:

Classification of tools, equipment and materials	Items
Additional workbench tools	pincers, screwdriver sets, hand drill, spanners, rivet gun
Cutting tools	saws (tenon saw, hack saw, coping saw), snips, trimming knives, files, scrapers, jack planes, chisels, drill bits, rasps, combination pliers, side cutters
Different types of hammers	mallets, claw hammer, ball-peen hammer
Essential drawing materials	rotoring A-3 drawing board (college board), ruler, compasses, pencils, eraser, set squares (30 and 45 degrees), protractor, T-square and variety of paper and card types
Finishing materials	paints, polishes, brushes, cleaning materials
Fitting and fastening materials	nails, screws, nuts and bolts, rivets, dowels, variety of abrasive papers and adhesives
Hardware	assortment of wood, metals, and plastics
Holding devices	bench vice, G-clamps
Measuring and marking out tools	try-square, divider, scribe, punches, measuring tape, steel rule, measuring tape
Modelling tools	scissors, craft knives, adhesive tape
Posters	safety displaying posters, brochures showcasing tools and equipment
Safety attire	safety goggles, dust masks, apron
Safety equipment	first aid kit,
Stationaries	coloured pencils, crayons, markers, chalks and rulers

ANNEXE 3: ASSESSMENT RECORD SHEET FOR GRADE 5

Assessment record sheet: Design and Technology												Grade 5.....			Year.....			
School:.....												Teacher:.....						
Name of Learner	Semester	Practical Investigation			Topic Task			Topic Test			End of Term Test	Term Mark S1	Weighted Term Mark S1 (155÷1.55)	Term Mark S2	Total Term marks (155+85)	CA Mark (240÷2.4)	End-of-year Examination	Promotion Mark (200÷2)
		20	20	30	15	15	15	20	20	10	30	155	100	85	240	100	100	100
	1																	
	2																	
	1																	
	2																	
	1																	
	2																	
	1																	
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	1																	
	2																	
	1																	
	2																	
	1																	
	2																	
	1																	
	2																	

Controlled by HOD/Principal:

Date:

ANNEXE 4: ASSESSMENT RECORD SHEET FOR GRADE 6

Assessment record sheet: Design and Technology											Grade 6.....			Year.....						
School:											Teacher:									
Name of learner	Semester	Practical investigation		Topic task			Topic test			End-of-term test	Design folder			Term mark S1	Weighted term mark S1 (170÷1.7)	Term mark S2	Total Term marks (170+70)	CA mark (240÷2.4)	End-of-year examination	Promotion mark (200÷2)
		30	30	20	20	10	20	20	10		30	Analysis/Brief	Specifications							
	1																			
	2																			
	1																			
	2																			
	1																			
	2																			
	1																			
	2																			
	1																			
	2																			
	1																			
	2																			
	1																			
	2																			

Controlled by HOD/Principal: Date:

ANNEXE 5: ASSESSMENT RECORD SHEET FOR GRADE 7

Assessment record sheet: Design and Technology									Grade 7.....					Year.....										
School:									Teacher:.....															
Name of Learner	Semester	Practical Investigation		Topic Task	Topic Test			End-of-term Test	Design folder					Product			Term mark S1	Weighted term mark S1 (120÷1.2)	Term mark S2	Total term marks (120+130)	CA Mark (250÷2.5)	End-of-year Examination	Promotion Mark(200÷2)	
		20	20	10	20	20	10		30	Analysis/ Brief	Specifications	Ideas	Development	Planning	Quality	Evaluation								Fitness
		5	5	10	10	10	20		5	5	5	120	100	130	250	100								100
	1																							
	2																							
	1																							
	2																							
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