MINISTRY OF EDUCATION AND TRAINING LESOTHO

MOHLOLING OA THUTO

GRADE 9

DESIGN AND TECHNOLOGY SYLLABUS

2018

TABLE OF CONTENTS

Acknowledgements ……iii

Introduction ……iv

Layout and presentation of the syllabus…… v

Syllabus aims ……vi

Assessment/Evaluation……vi

Overview ……ix

Activity Plan ……1

Acknowledgements

The Ministry of Education and Training acknowledges and appreciates professional contribution of the following participants during the development of Grade 9 Syllabus of Design and Technology

Mrs. Flora Mokhitli (NCDC)
Mr. Mpho Mphana (Molapo H.S.)
Mr. Phatsa Motšoane (NCDC)
Mr. Simon Mabitso (Leribe H.S.)
Mr. Sechaba Hlabanyane (Moshoeshoe II H.S.)
Mr. Emile Mokhethi (Lesotho H.S)
Mrs. Belina Koetle (Masianokeng H.S.)
Mr. Lebona Mongangane (Matsepe H.S)
Mr. Motloang Mosothoane (Bonhome H.S)
Mr. Ntite Putsoa (Mohale'sHoek H.S.)
Mr. Sello Lepeli (Botha-Bothe H.S.)
Mr. Likobiso Nkalai (St. Rose H.S)
Mr. Lichaba Sehau (Masitise H.S)
Mrs. 'Mamosebetsi Sepofane(Maseru Day H.S)
Mr. Charles Kopeka (TVD)
Mr. Mr. Mafata Tšiame (LCE)
Mr. Nthoesele Mohlomi (NCDC)

GRADE 9 SYLLABUS

DESIGN AND TECHNOLOGY

1. Introduction

Design and Technology syllabus focus on problem-solving design activities which culminate in using practical skills to create models and artefacts. Learners gain knowledge of, and practical experience in using, a range of materials which includes plastics, wood and metal and appropriate modern technologies. Leaners will also develop skills such as communication, initiative, resourcefulness, enquiry and ingenuity. Learners need to be creative in their current and future lives. We need learners who are action oriented and perseverant, promoting control and autonomy alongside originality and creativity.

This subject fosters understanding and application of creative concepts, principles, skills, attitudes and values in addressing everyday needs by promoting:

- individual expression, personal and aesthetic development through the practice and appreciation of the creative arts;
- understanding of the physical, socio-economic and technological environment as a prerequisite for learning and living;
- acquisition and application of creative skills in solving everyday life challenges;
- appropriate attitudes and values for a successful, creative culture.

The subject encourage learners to be:

- **confident** in working with information and ideas – their own and those of others
- **responsible** for themselves, responsive to and respectful of others
- **reflective** as learners, developing their ability to learn
- **innovative** and equipped for new and future challenges
- **engaged** intellectually and socially, ready to make a difference.

In Grade 9, the subject builds on and consolidates knowledge and skills acquired in the previous grades whilst introducing some new concepts and content appropriate to the age of learners. The syllabus has a particular focus on the development of creative thinking skills. Teachers are encouraged to use practical and learner-centred methods such as drawing and painting, design and other mini-projects. All of which practical and artistic skills can be displayed or exhibited for immediate or later fulfilment as reward.

Layout and presentation of the syllabus and definitions of terminology used

The syllabus is presented in **themes**, each one divided into a number of **learning outcomes** (the terms "learning objectives" or "learning intentions" are often used in other contexts; **learning outcome** has been retained here since teachers are familiar with this usage from the previous syllabus).

Learning outcome: a statement in measureable terms of what a learner should know, understand or be able to do by the end of a given segment of the syllabus.

For each targeted **learning outcome**, details are given of:

- The key **concepts, skills, values and attitudes** which underpin its successful attainment.
    - **Concept:** a general idea which emerges from a specific situation; once understood it can be applied to different contexts to promote understanding. For example, the concept of the family emerges from awareness of the familiar unit in which people live; it can be applied to groups of animals, plants or words which naturally belong together.
    - **Skills:** abilities which every learner is expected to acquire to help them learn and live well in society; they can be mental, physical or social.
    - **Values:** qualities which are considered to be important, worth preserving and transmitting to the younger generation. For example, Basotho consider honesty and respect to be essential values.
    - **Attitudes:** positions or opinions, what is appreciated or disliked by an individual or a group.
- A list of **suggested learning experiences**: teaching and learning activities designed to enable learners to achieve a given learning outcome. This is not exhaustive and the teacher is free to use other complementary activities.
- **What to assess**: in this column**,** the **learning outcome** is broken down into several specific, measurable and observable points against which the teacher can check the learners' progress. These focus on the process and characteristics of learning rather than the final outcome.
- A list of **suggested resources:** a list of possible items, materials, persons and others which may be used to help achieve a given learning outcome. This is designed to help all teachers, even though many or few resources may be available in their schools and communities

2. SYLLABUS AIMS

Design and Technology syllabus aims to:

- demonstrate technical entrepreneurial skills which relate to socio-economic and technological changes.
- apply technical methods in developing new ideas in solving problems, designing and producing artefacts.
- demonstrate technical knowledge and skills for survival, employment and self-reliance.
- develop positive attitudes to enhance confidence and responsibility for self-directed learning, innovation and further.
- develop technical skills to interpret and evaluate technical information.
- demonstrate technical knowledge and skills in craft, design and technology at junior secondary and senior secondary.
- apply technical knowledge and skills to promote the use of indigenous materials.
- demonstrate proper technical knowledge and skills in using basic hand and power tools for effective participation in social issues and activities.
- apply basic skills to investigate, analyse and draw conclusions in technical activities taking place and internationally.
- develop appropriate technical skills to enable the realisation of solutions to design problems
- develop knowledge of a range of materials and the appropriate manipulative skills
- develop an understanding of some aspects of technological activity
- develop appropriate graphical skills to enable full engagement in design activity
- develop awareness of possible hazards associated with practical workshop activities and to encourage habits of safe working.

ASSESSMENT/EVALUATION

4.1 PART 1 TECHNOLOGY

2 ½ hours, 100 marks

The paper is a formal, timed examination in which Learners will be required to show their knowledge and understanding of materials, processes and tools associated with the use of metal, plastic and wood in the production of artefacts made to satisfy needs. They will be expected to call upon experience of working these materials (see core content) and to demonstrate that their knowledge of at least one of the identified materials has been extended beyond that of the core experience.

Learners are expected to study all types of materials including metal, plastic and wood – local materials being part of materials studied. They should also have a good working experience of metal, plastic and wood, and some knowledge of the local material is expected. Learners will be expected to give evidence of regard for the environment and sustainability in their answers.

Part a (28% of Paper 1 marks)
Ten questions requiring short answers, based on a wide knowledge of materials, processes, tools, equipment terminology, graphic representation and interpretation.

Part b (72% of Paper 1 marks)
Section 1 Tools and materials
Section 2 Processes

4.2 PART 2 DESIGN PROJECT

The Design Project is completed by the learners in response to a project theme

The project will consist of two parts:
Part A The design folio
Part B The design artefact

The paper represents 50% of the marks available for the overall syllabus and is assessed out of a maximum of 100 marks.

Part A The design folio

The learners are expected to explore a theme set, in order to identify a design problem area which is then further analysed to identify a specific design brief. The design brief is developed and clarified by the learner to a point where the learner can manufacture an artefact. The record of the road map is kept in a folio.

The folio shows progression from the initial analysis of the theme through to a detailed design brief and specification. Once the problem brief has been clarified, the learner generates a range of ideas which are then evaluated by the learner to allow the development of a final proposed solution; details of materials, sizes and construction methods need to be included at this stage. This work then leads the learner to develop a detailed production plan (which could be presented in the form of a flow diagram) which is further elaborated by sketches to clarify some of the critical stages.

The folio should finally include a section on evaluation and testing which follows the completion of the artefact. The learner should identify a method which can be used to test the artefact and so allow the performance to be checked against the original specification which was set out at the design brief stage of the folio. Conclusions leading to proposals for further development are also expected.

The learner should use appropriate graphical methods throughout the folio, including shading and colour where appropriate. Sequential, exploded or enlarged sketches may help to clarify detail. Notes should generally be succinct and used where details are not clear from graphical representation.

To aid effective communication and to ensure the folio can provide comprehensive evidence for the assessment objectives, it is important that learners are advised to set out their folio in a clear and logical format.

Part B The design artefact

The learner is expected to complete the developed design solution (artefact) to demonstrate refined workmanship, sensitive use of materials and appropriate construction methods.

Learners need not restrict their design solutions to the three main materials identified in the syllabus (metal, plastic and wood). The syllabus encourages a wide knowledge of developing technologies which may, for example, include simple control systems, electronic circuits, pneumatics, and the general application of mechanical principles.

DESIGN AND TECHNOLY
OVERVIEW

Learning Outcomes at the end of Grade 9, Learners should be able to:

1. **DRAWING**
   - 1.0 apply freehand techniques
   - 1.1 construct solids in orthographic projection
   - 1.2 construct pictorial drawing
   - 1.3 construct sectioned views
   - 1.4 construct surface development
   - 1.5 construct an ellipse
   - 1.6 produce geometric construction
   - 1.7 apply scale
2. **DESIGN**
   - 2.0 apply design content
   - 2.1 make model
3. **MATERIALS**
   - 3.0 classify wood
   - 3.1 analyse timber technology
   - 3.2 identify types of wood
   - 3.3 identify types of metals
   - 3.4 classification of plastics
4. **TOOLS**
   - 4.0 identify and use tools
5. **PRACTICAL PROCESSES and SAFETY**
   - 5.0 apply practical processes
   - 5.1 observe safety codes and practical

ACTIVITY PLAN				
1. DRAWING				
Learning Outcomes: at the end of Grade 9 students should be able to:	**Concepts, Skills, values and attitudes**	**Suggested learning and teaching experiences**	**What to assess: the teacher should assess learners' ability to:**	**Resources**
1.0 apply freehand techniques.	**Concept** -Freehand techniques .casing -Freehand sketching of tools and joints in the following: .orthographic Projection .isometric Projection .oblique Projection -Rendering **Skills** Manipulation Effective Communication Creativity Tidiness Design Workmanship Imagination Analysis **Values and attitudes** Patience Honesty Awareness	**Teacher:** -demonstrates freehand of tools and joints in: . orthographic . oblique .isometric -demonstrate rendering: .shadowing .toning .texturing **Learners:** -sketch tools and joints in orthographic -sketch tools and joints in oblique -sketch tools in isometric -apply shadow on sketches -apply tone on the sketches -apply texture on the sketches	sketch tools and joints in orthographic sketch tools and joints in oblique sketch tools in isometric apply shadow on sketches apply tone on the sketches apply texture on the sketches	Soft Pencils Pencil Sharpener Rubber Plain Sheets Square Grids Isometric Grids Coloured Pencil

Learning Outcomes: at the end of Grade 9 students should be able to:	**Concepts, Skills, values and attitudes**	**Suggested learning and teaching experiences**	**What to assess: the teacher should assess learners' ability to:**	**Resources**
1.1 construct solids in orthographic projection.	**Concept** First angle projection of complex solids - 3 planes - types of lines **Skills** Effective Communication Analysis Interpretation Critical Thinking Decision Making Identification Co-Ordination Observation **Values and attitudes** Patience Competence Tidiness Confidence Commitment Competitiveness	**Teacher:** -demonstrates first angle symbol - discusses and demonstrates: first angle projection of complex solids . inclined shapes . arc and circles -3 planes in First angle projection .placement of views on three planes -types of lines .hidden lines . centre lines . projection lines . break lines **Learners:** -draw first angle projection symbol -draw front view, top view and end view of solids using different types of lines	draw first angle projection symbol draw front view top view and end view of solids using different types of lines	Set Squares T-Square Glass Box Interactive Smart Board White Board Block Models Overhead Projectors Projector Computer

Learning Outcomes: at the end of Grade 9 students should be able to:	**Concepts, Skills, values and attitudes**	**Suggested learning and teaching experiences**	**What to assess: the teacher should assess learners' ability to:**	**Resources**
1.2 construct pictorial drawing.	**Concepts** Cabinet oblique projection .angle .scale **Skills** Effective Communication Analysis Interpretation Critical Thinking Decision Making Identification Co-Ordination Observation **Values and attitudes** Patience Competence Tidiness Confidence Commitment Competitiveness	**Teacher:** -discusses oblique projection .oblique box -angle .45 degrees angle on the inclined side -scale .full distance on the inclined side -demonstrates three principal axis .vertical axis .horizontal axis .inclined axis **Learners:** -construct oblique box showing .three principal axis .vertical axis .horizontal axis .inclined axis .45° angle on the inclined side .full distance on the inclined side. -construct blocks within oblique box	construct oblique box showing three principal axis .vertical axis .horizontal axis .inclined axis .45 degrees angle on the inclined side .full distance on the inclined side. construct blocks within oblique box	Set Squares T-Square Interactive Smart Board White Board Block Models Overhead Projectors Projector Computer
Cont.	**Concept** -Isometric projection .angle **Skills**	**Teacher:** - demonstrates isometric projection three principal axis using 30° angle	construct three principal axis using 30° and 60° set squares construct isometric box	Drawing instruments Models Text books

	Interpretation Decision Making Problem Solving Critical Thinking Observation Imagination Coordination **Values and Attitude** Tidiness Workmanship Awareness Confidence Commitment	-demonstrates the completion of isometric box -demonstrate isometric projection on shaped blocks **Learners**: -construct three principle axis using 30° and 60° set squares -construct isometric box -construct isometric projection of shaped blocks	construct isometric projection of shaped blocks	Projector Computer Smart board
Cont.	**Concept** Two point perspective .horizontal line .two vanishing points .orthogonal lines **Skills** Imagination Interpretation Creativity Critical Thinking Artistry Problem Solving Effective Communication **Values and attitudes:** Cooperation Awareness Responsibility Honesty	**Teacher:** -discusses two perspective in everyday life -discusses and explains importance of horizontal line in relation to vanishing point -demonstrates two point perspective using: . horizontal line .two vanishing point . orthogonal lines **Learner:** -draw two point perspective by: .horizontal line and place two vanishing points .perpendicular line to the horizontal line which is a corner of an object. .orthogonal lines from the corner of an object.	draw two point perspective by: horizontal line and place two vanishing points perpendicular line to the horizontal line which is a corner of an object. orthogonal lines from the corner of an object.	Drawing tools Field trip Books Handouts

Learning Outcomes: at the end of Grade 9 students should be able to:	**Concepts, Skills, values and attitudes**	**Suggested learning and teaching experiences**	**What to assess: the teacher should assess learners' ability to:**	**Resources**
1.3 construct sectioned views.	**Concepts** Sectioning -horizontal cutting plane -vertical cutting plane **Skills** Effective Communication Critical Thinking Analysis Identification Interpretation Tidiness Workmanship **Values and attitudes** Patience Confidence Awareness Tolerance Co-Operation	**Teacher:** -explain sectioning -discusses horizontal cutting plane -discusses vertical cutting plane -demonstrates angle of the hatching lines and spacing -demonstrates sectioned views of the block showing .front view .top view .side views **Learners:** -identify sectioned views of the block -draw sectioned views showing .front view .top view .side views -draw hatching lines at angle of 45 degrees	identify sectioned views of the block draw sectioned views showing .front view .top view .side views draw hatching lines at angle of 45 degrees	Set Squares Drawing Paper T-Squares Blocks Interactive Smart Board White Board Block Models Overhead Projectors Projector Computer

Learning Outcomes: at the end of Grade 9 students should be able to:	**Concepts, Skills, values and attitudes**	**Suggested learning and teaching experiences**	**What to assess: the teacher should assess learners' ability to:**	**Resources**
1.4 construct surface development.	**Concept** Surface development -methods .parallel line .radial line **Skills** Decision Making Identification Analysis Interpretation Tidiness Matching Problem Solving **Values And Attitudes** Awareness Workmanship Patience Confidence Tidiness	**Teacher:** discusses and demonstrates surface development methods: -parallel line .upright . truncated -radial line .upright . truncated **Learners:** construct surface development: -methods parallel line .upright . truncated radial line .upright . truncated	construct surface development using parallel line .upright . truncated radial line .upright . truncated	Drawing instruments Textbook Internet Projector Smart board

Learning Outcomes: at the end of Grade 9 students should be able to:	Concepts, Skills, values and attitudes	Suggested learning and teaching experiences	What to assess: the teacher should assess learners' ability to:	Resources
1.5 construct an ellipse.	**Concept** Paper Trammel Pins And String Concentric Circles **Skills** Creativity Problem Solving Effective Communication Artistry Tidiness Matching Decision Making **Values And Attitude** Tidiness Workmanship Awareness Confidence Commitment	**Teacher:** -defines and explains an ellipse -demonstrates the construction of an ellipse using paper trammel -demonstrates the construction of an ellipse using pins and string. - demonstrates the construction of an ellipse using concentric circles - explains major axes and minor axes -explains focal points **Learners:** -draw major and minor axis - locate focal points - use paper trammel to construct an ellipse. -use pins and string to construct an ellipse - draw two concentric circles - divide the two circles into 12 equal parts - locate points of locus - draw a smooth curve to obtain an ellipse.	draw major and minor axis locate focal points use paper trammel to construct ellipse use pins and string to construct ellipse use concentric circles to construct an ellipse.	Paper Pins String Campus Pencil 60° and 30° set-square

Learning Outcomes: at the end of Grade 9 students should be able to:	**Concepts, Skills, values and attitudes**	**Suggested learning and teaching experiences**	**What to assess: the teacher should assess learners' ability to:**	**Resources**
1.6 produce geometric construction.	**Concepts** Plain Geometry -construction .lines .angles .tangents -bisect .lines .angles -circle and its parts -circles in contact -inscribe **Skills** Observation Creativity Effective Communication Artistry Tidiness Decision Making **Values And Attitude** Tidiness Workmanship Awareness Confidence Commitment	**Teacher:** -discusses bisection of lines and angles -demonstrates bisection of: .lines .angles -demonstrates construction of: .lines .angles .tangents .circles and its parts .inscribed figures **Learner:** -bisect lines and angles - construct: .angles .tangents .circles and its parts .inscribe figures	bisect lines and angles construct: .angles .tangents .circles and its parts .inscribe figures	Internet Drawing Equipment Charts

Learning Outcomes: at the end of Grade 9 students should be able to:	Concepts, Skills, values and attitudes	Suggested learning and teaching experiences	What to assess: the teacher should assess learners' ability to:	Resources
1.7 apply scale.	**Concept** -Plain scale .division of lines .representative fraction .length of scale .full scale .enlargement scale .reduction scale .metric units **Skills** Problem Solving Creativity Imagination Tidiness Cooperation **Values And Attitudes** Tidiness Workmanship Awareness Confidence	**Teacher:** -explains the concept of scaling -demonstrates division of lines -explains representative fraction/RF -explains length of the scale -demonstrates construction of: .full scale .enlargement scale .reduction scale -explains metric units table **Learners:** -demonstrate scaling -divide line into equal divisions -workout representative fraction -workout length of scale -construct: .full scale .enlargement scale .reduction scale -apply metric table to construct plain scales	demonstrate scaling divide line into equal divisions workout representative fraction workout length of scale construct: .full scale .enlargement scale .reduction scale apply metric table to construct plain scales	Solid objects Models Drawing equipment Scale rule

2. DESIGN				
Learning Outcomes: at the end of Grade 9 students should be able to:	**Concepts, Skills, values and attitudes**	**Suggested learning and teaching experiences:**	**What to assess: The Teacher should assess learners' ability to:**	**Resources**
2.0 apply design content.	**Concept** -definition of design -design and technology in society -factors influencing design -design process . need .identify problem .research the problem .determine requirement for brief .analysis .breaking the problem down .collecting ideas .collect data for possible solution . development .synthesis of information and ideas leading to development of proposed	**Teacher** -defines design -brainstorms the role of design in society . transport . infrastructure . health . communication . environment . banking . economy . e-learning . agriculture -brainstorms how design factors influence design .fashion . competition . appearance .socio-culture . quality . time . raw materials to be used . technology . environment . socio-economic . population . plant and machineries	define design brainstorm the role of design in society .transport . infrastructure . health . communication . environment . banking . economy . e-learning . agriculture brainstorm how design factors influence design .fashion . competition . appearance .socio-culture . quality . time . raw materials to be used . technology . environment . socio-economic . population . plant and machineries	Internet Existing products Textbooks People Magazines News paper Local places

Cont.	**Skills** Observation Creativity Effective Communication Artistry Tidiness Decision Making **Values And Attitude** Tidiness Workmanship Awareness Confidence Commitment	-discusses and elaborates design process . need .identify problem .research the problem .determine requirement for brief . analysis .breaking the problem down .collecting ideas .collect data for possible solution . development .synthesis of information and ideas leading to development of proposed **Learners** -define design -brainstorming the role of design in society . transport . infrastructure . health . communication . environment . banking . economy . e-learning . agriculture -brainstorm how design factors influence design . fashion . competition . appearance	discusses and elaborates design process . need .identify problem .research the problem .determine requirement for brief . analysis .breaking the problem down .collecting ideas .collect data for possible solution . development .synthesis of information and ideas leading to development of proposed	

Cont.		.socio-culture . quality . time . raw materials to be used . technology . environment . socio-economic . population . plant and machineries -discuss and elaborate design process . need .identify problem .research the problem .determine requirement for brief . analysis .breaking the problem down .collecting ideas .collect data for possible solution . development .synthesis of information and ideas leading to development of proposed		

Cont.	**Concept** aesthetics .shape and form **Skills** Creativity Analysis Tidiness Workmanship Critical Thinking Decision Making Interpretation Artistry Effective Communication **Values And Attitudes** Awareness Competence Patience	**Teachers** - discusses aesthetics . use of lines .shape 2D .form 3D . proportion -demonstrates the use of . colour . texture **Learners** -draw shapes and forms in cognisant of .lines .proportion .colour .texture	draw shapes and forms cognizant of .lines .proportion .colour .texture	Charcoal Paper Cloth Pencil Paints
Cont.	**Concept** Information gathering .planning .data collection .factors influencing design **Skills** Analysis Observation Critical Thinking Decision Making Interpretation	**Teacher** discusses and explains: -planning for data collection -methods of data collection: .questionnaire .interview .observation .looking at existing documents -factors influencing design: environment . situation .population .time	develop a plan of action for collecting relevant data on the given task to collect data. apply suitable data collection methods to collect data. describe factors that influence design. draw simple budget on consumables. identify consumables to be used; their prices and affordability	Gantt chart

Cont.	Effective Communication **Values And Attitudes** Honesty Awareness Confidence Commitment	.material - drawing simple budget on consumables for design artefact. **Learners** -develop a plan of action for collecting relevant data on the given task to collect data. -draw simple budget on consumables. identify consumables to be used; their prices and affordability -apply suitable data collection methods to collect data -describe factors that influence design		
Cont.	**Concept** Anthropometrics and ergonomics .anthropometric data in design .ergonomics **Skills** Analysis Workmanship Critical Thinking Decision Making Interpretation Effective Communication **Values And Attitudes** Awareness Competence Patience	**Teacher** -discusses and explains anthropometrics and ergonomics **Learners** -relate anthropometric data and ergonomics using models or charts -apply anthropometric data and ergonomics on design artefacts	relate anthropometric data and ergonomics apply anthropometric data and ergonomics on design projects	Internet Furniture

Learning Outcomes: at the end of Grade 9 students should be able to:	**Concepts, Skills, values and attitudes**	**Suggested learning and teaching experiences:**	**What to assess: The Teacher should assess learners' ability to:**	**Resources**
2.1 make models.	**Concepts** Modelling -rationale -scale -material -proportionality -quality **Skills** Problem Solving Decision Making Critical Thinking Effective Communication Invention Workmanship Interpretation Design Innovation Analysis Creativity **Values And Attitudes** Honesty Loyalty Integrity Commitment Competence Patience Tidiness Awareness Tolerance	**teacher:** **-**discusses and demonstrates modelling: . looking at scale and its significance .proportionality .arrangement of material to obtain quality -discusses the purpose of prototype/model -model is made with cheap, small and mostly available materials. -discuss issue of investment on products: materials used and short term **Learners:** -discuss the purpose of prototype/model -produce a model of an artefact based on .scale .proportionality .quality -discuss issue of investment on products .materials used .short term	discuss the purpose of prototype/model produce a model of an artefact based on .scale .proportionality .quality discuss issue of investment on products .materials used .short term	Available material 3D modelling-software Computer Tools Adhesives

3. MATERIALS

WOOD

Learning Outcomes: at the end of Grade 9 students should be able to:	**Concepts, Skills, values and attitudes**	**Suggested learning and teaching experiences:**	**What to assess: The Teacher should assess learners' ability to:**	**Resources**
3.0 classify wood.	**Concept** -softwoods -hardwood .botanical structure shape of leaves shape of crown type of seed .anatomical structure grains cell structure rays colour texture .forms boards planks squares strips **Skills** Classifying Analysis Critical Thinking Interpretation **Values And Attitudes** Confidence Awareness	**Teacher:** discusses and elaborates on: softwood -botanical structure -anatomical structure -forms of wood hardwood -botanical structure -anatomical structure -forms of wood **Learners:** identify and classify softwood: -botanical structure -anatomical structure -state forms of wood hardwood: -botanical structure -anatomical structure -state forms of wood	identify and classify softwood: botanical structure anatomical structure state forms of wood hardwood: botanical structure anatomical structure state forms of wood	Study tour Textbooks Samples of branches and leaves Samples of wood

Learning Outcomes: at the end of Grade 9 students should be able to:	**Concepts, Skills, values and attitudes**	**Suggested learning and teaching experiences:**	**What to assess: The Teacher should assess learners' ability to:**	**Resources**
3.1 analyse timber technology.	**Concept** structure of a tree -main parts of a tree -cross section of a tree trunk **Skills** Critical Thinking Identification Analysis Interpretation **Value And Attitudes** Awareness Confidence	**Teacher** discusses and explains: -main parts of a tree .crown .trunk .roots -cross section of a tree trunk .parts and their uses **Learners:** -draw and label main parts of a tree -draw and label the cross section of a tree trunk -state parts and their uses	draw and label main parts of a tree draw and label the cross section of a tree trunk state parts and their uses	Charts Tree trunk Tree Internet

Cont.	**Concept** felling of timber -felling techniques -tools used for felling -methods of transporting logs **Skills** Decision Making Problem Solving Effective Communication Observation Manipulation Matching Workmanship **Values And Attitudes** Competence Risk Taking Cooperation Confidence Responsibility Tidiness	**Teacher:** discusses and explains -definition of felling -felling technique .'V' cut -tools used for felling .axes .two man cross cut saw .wedge .power driven chain saw .Harvester machine -methods of transporting logs .animal .rail .water .road .air **Learners:** describe -felling of timber -felling techniques .'V' cut mention -tools used for felling -methods of transporting logs	describe felling of timber felling techniques .'V' cut mention tools used for felling methods of transporting logs	Study tour Axes Two man cross cut saw Power driven chain saw Wedge Video

Cont.	**Concept** Conversion of timber -methods of conversion -tools **Skills** Decision Making Problem Solving Effective Communication Observation Classifying **Values And Attitudes** Competence Risk Taking Cooperation Accountability Tidiness Workmanship	**Teacher:** discusses and explains -conversion of timber -methods of conversion .through and through .quarter sawing .tangential sawing advantages and disadvantages of each method -tools used in conversion of timber .cross cut saw .circular saws .horizontal and vertical band saw .vertical log frame saws. **Learners:** describe; -conversion of timber -methods of conversion mention: -advantages and disadvantages of each method -tools used for conversion of timber	describe conversion of timber and methods of conversion mention advantages and disadvantages of each method tools used for conversion	Textbooks Study tour Cross cut saw Circular saws Horizontal and vertical band saw Vertical log frame saws.

Cont.	**Concept** Seasoning of timber -reasons for seasoning -methods of seasoning .advantages and .disadvantages of each method -calculation of moisture content **Skills** Interpretation Analysis Observation Classifying **Values And Attitudes** Honesty Awareness Confidence	**Teacher:** -discusses and explains: .seasoning of timber .reasons for seasoning .methods of seasoning -air -kiln -demonstrates calculation of moisture content **Learners:** -describe: .seasoning of timber .reasons for seasoning .methods of seasoning -calculate moisture content	describe seasoning of timber, reasons for seasoning and methods of seasoning calculate moisture content	Textbooks Study tour Charts

Learning Outcomes: at the end of Grade 9 students should be able to:	**Concepts, Skills, values and attitudes**	**Suggested learning and teaching experiences:**	**What to assess: The Teacher should assess learners' ability to:**	**Resources**
3.2 identify types of wood.	**Concept** -hardwood -softwood **Skills** Classifying Identification Observation Matching Interpretation Analysis **Values And Attitudes** Awareness Confidence Competence	**Teacher:** identify types of wood -hardwood .beech .elm .african Mahoganies .meranti .oak .teak .rosewood .african walnut -softwood .scots pine .douglas fir .red cedar .SA pine **Learner:** identify types of wood: -hardwood .beech .elm .african Mahoganies .meranti .oak .teak .rosewood .african walnut -softwood .scots pine .douglas fir .red cedar .SA pine	identify types of wood: hardwood .beech .elm .African mahoganies .meranti .oak .teak .rosewood .African walnut softwood .scots pine .douglas fir .red cedar .SA pine	Samples of wood Text books Internet

METALS				
Learning Outcomes: at the end of Grade 9 students should be able to:	**Concepts, Skills, values and attitudes**	**Suggested learning and teaching experiences:**	**What to assess: The Teacher should assess learners' ability to:**	**Resources**
3.3 identify types of metals.	**Concepts** -ferrous metals -non-ferrous metals -alloys -forms **Skills** Classifying Identification Observation Matching Interpretation Analysis **Values And Attitudes** Awareness Confidence Competence	**Teacher:** identify types of metals -ferrous metals .mild steel .medium carbon steel .high carbon steel .cast iron .wrought iron -non- ferrous metals .copper .aluminium .tin .zinc .lead .alloys brass bronze duralumin -describes forms of metals .round rod .squares .flats .hexagons .octagons .sheets .round tubes .square tubes	identify types of metals ferrous metals mild steel medium carbon steel high carbon steel cast iron wrought iron non- ferrous metals copper aluminium tin zinc lead alloys brass bronze duralumin state forms of metals round rod squares flats hexagons octagons sheets round tubes	Samples of metal Text books Internet Study tour

Cont.		.rectangular tubes .angles **Learners:** identify types of metals -ferrous metals .mild steel .medium carbon steel .high carbon steel .cast iron .wrought iron -non- ferrous metals .copper .aluminium .tin .zinc .lead .alloys brass bronze duralumin -state forms of metals .round rod .squares .flats .hexagons .octagons .sheets .round tubes .square tubes .rectangular tubes .angles	square tubes rectangular tubes angles	

PLASTICS				
Learning Outcomes: at the end of Grade 9 students should be able to:	**Concepts, Skills, values and attitudes**	**Suggested learning and teaching experiences:**	**What to assess: The Teacher should assess learners' ability to:**	**Resources**
3.4 classification of plastics.	**Concept** -Types .thermosets .thermoplastics -forms **Skills** Classifying Identification Matching **Values And Attitudes** Awareness Confidence Competence	**Teacher:** -identify types of plastics .thermo-setting .melamine formaldehyde .phenol formaldehyde .polyester resin .urea formaldehyde .thermoplastics .nylon .polyvinyl chloride .polystyrene .acrylic .Polythene -describes forms of plastics .powders .pastes .granules .liquids .semi-finished products **Learners:** identify types of plastics .thermo-setting .melamine formaldehyde .phenol formaldehyde .polyester resin .Urea formaldehyde	identify types of plastics thermo-setting melamine formaldehyde phenol formaldehyde polyester resin urea formaldehyde thermoplastics nylon polyvinyl chloride polystyrene acrylic polythene state forms of plastics powders pastes granules liquids semi-finished products	Samples of plastics Text books Internet Study tour

		.thermoplastics .nylon .polyvinyl chloride .polystyrene .acrylic .Polythene -state forms of plastics .powders .pastes .granules .liquids .semi-finished product		

4. TOOLS

Learning Outcomes: at the end of Grade 9 students should be able to:	Concepts, Skills, values and attitudes	Suggested learning and teaching experiences:	What to assess: The Teacher should assess learners' ability to:	Resources
4.0 identify and use tools.	**Concept** -Identify: .marking tools .cutting tools .holding tools .driving tools -use: .marking tools .cutting tools .holding tools .driving tools -construction: .marking tools .cutting tools .holding tools .driving tools **Skills** Effective –Communication Creativity Tidiness Workmanship Imagination Manipulation	**Teacher** teacher explains and demonstrates the use of the following tools -marking tools .measuring rules .try square .bradawl/awl .marking gauge .mortise gauge .sliding bevel .engineer's try square .scriber .centre punch .spring divider .felt -tip pen -cutting tools .tenon saw .dovetail saw firmer chisel mortise chisel coping saw hacksaws tin snips hot wire cutter -holding tools .vice .bench hook	explains and demonstrates the use of marking tools cutting tools holding tools driving tools discuss construction in relation to materials and parts of marking tools cutting tools holding tools driving tools	Measuring Rules Try Square Bradawl/Awl Marking Gauge Mortise Gauge Sliding Bevel Engineer's Try Square Scriber Centre Punch Spring Divider Felt-Tip Pen Tenon Saw Dovetail Saw Firmer Chisel Mortise Chisel Coping Saw Hacksaws

	Values And Attitudes Patience Confidence Awareness	.sash clamp .G- clamp .folding bar -driving .Mallets .hammers .screw drivers -discusses construction in relation to materials and parts: .marking tools .cutting tools .holding tools .driving tools **Learners:** -explains and demonstrates the use of: .marking tools .cutting tools .holding tools .driving -discuss construction in relation to materials and parts of: .marking tools .cutting tools .holding tools .driving tools		Tinsnips Hot Wire Cutter Bench Hook Sash Clamp G- Clamp Folding Bar Mallets Hammers Screw Drivers

5. PRACTICAL PROCESSES

Learning Outcomes: at the end of Grade 9 students should be able to:	Concepts, Skills, values and attitudes	Suggested learning and teaching experiences:	What to assess: The Teacher should assess learners' ability to:	Resources
5.0 apply practical processes.	**Concept:** -preparation of materials -setting and marking out -shaping .deforming .wastage and addition - joining and assembling **Skills** Decision –Making Responsibility Self-Esteem Analysis Coordination Workmanship **Values And Attitudes** Tidiness Competence Commitment Patience Confidence experimentation	**Teacher:** -discusses and demonstrates : -preparation of materials: .wood .metal .plastic - use of tools for : . setting and marking out .holding .cutting . driving -shaping .deforming -wood .bending .kerfing .steaming .laminating -metal .bending .hollowing .forging .twisting -plastics .bending	demonstrate safe and proper use of tools in practical processes. preparation of materials setting and marking out shaping, forming or deforming wastage or addition joining and assembly mention and explain tools and their uses	Setting, Measuring And Marking Out Tools Holding Tools Cutting Tools Driving Tools Shaping Tools Deforming And Reforming Tools Special Treating Equipment Adhesives Screws Nails Finishes Material

		.single curvature .double curvature .wastage and addition -wood .drilling .planning .sawing .screwing .fastening .bolts and nuts .gluing .nailing .jointing -metal .soldering .shearing .gluing .screwing .pop riveting . fastening .bolt and nuts -plastics .drilling .sawing .filing .gluing .screwing .pop riveting		Videos Bolt And Nuts Pop Rivets

		Learners: -demonstrate safe and proper use of tools in practical processes .preparation of materials .setting and marking out .shaping, forming or deforming .wastage or addition .joining and assembly -mention and explain tools and their uses		

Learning Outcomes: at the end of Grade 9 students should be able to:	**Concepts, Skills, values and attitudes**	**Suggested learning and teaching experiences:**	**What to assess: The Teacher should assess learners' ability to:**	**Resources**
5.1 observe safety codes and practices.	**Concept** Safety -Safety codes -safety hazards -Safe practices **Skills** Awareness Analysis Observation Tidiness Critical Thinking Cooperation **Values And Attitudes** Responsibility Confidence Respect Honesty Tolerance	**Teacher** -discusses safety codes . conduct . clothing . handling . machine use discusses the safety hazards .breathing hazards .skin hazards .eye hazards -demonstrates and discusses safe practices . application of safety codes .safety signs and symbols **Learners** -discuss safety codes -identify safety hazards and suggest preventive measures -apply safe working practices -identify safety signs and symbols -draw safety signs and symbols	discuss safety codes identify safety hazards and suggest preventive measures apply safe working practices identify safety signs and symbols draw safety signs and symbols	Tools Safety gear Machinery Charts Audio visual