



PROVINCE OF THE
EASTERN CAPE
EDUCATION

DIRECTORATE:
CURRICULUM FET PROGRAMMES
LESSON PLANS
TERM 3
MECHANICAL TECHNOLOGY
GRADE: 10

FOREWORD

The following Grade 10 Lesson Plans were developed by Subject Advisors during May 2009. Teachers are requested to look at them, modify them where necessary to suit their contexts and resources. It must be remembered that Lesson Plans are working documents, and any comments to improve the lesson plans in this document will be appreciated. Teachers are urged to use this document with the following departmental policy documents: Subject Statement; LPG 2008; SAG 2008; Examination Guidelines 2009 and Provincial CASS Policy / Guidelines.

Lesson planning is the duty of each and every individual teacher but it helps when teachers sometimes plan together as a group. This interaction not only helps teachers to understand how to apply the Learning Outcomes (LOs) and Assessment Standards (ASs) but also builds up the confidence of the teachers in handling the content using new teaching strategies.

It must please be noted that in order to help teachers who teach across grades and subjects, an attempt has been made to **standardise lesson plan templates** and thus the new template might not resemble the templates used in each subject during the NCS training. However, all the essential elements of a lesson plan have been retained. This change has been made to assist teachers and lighten their administrative load.

Please note that these lesson plans are to be used only as a guide to complete the requirements of the Curriculum Statements and the work schedules and teachers are encouraged to develop their own learner activities to supplement and /or substitute some of the activities given here (depending on the school environment, number and type of learners in your class, the resources available to your learners, etc).

Do not forget to build in the tasks for the Program of Assessment into your Lesson Plans.

Strengthen your efforts by supporting each other in clusters and share ideas. Good Luck with your endeavours to improve Teaching, Learning and Assessment.

SUBJECT: Mechanical Technology		GRADE: 10		LESSON PLAN 1		TERM 3		TIME: 16 hours	
CORE CONTENT: ENGINEERING MATERIAL <ul style="list-style-type: none">Properties of material									
LEARNING OUTCOME 1:		LEARNING OUTCOME 2:		LEARNING OUTCOME 3:		LEARNING OUTCOME 4:			
Technology, Society and the Environment		Technological Process		Knowledge and understanding		Application of Knowledge			
10.1.1 Describe the interrelationship between technology, society and the environment.		10.2.1 Identify, investigate, define and analyse problems in a given real-life situation against the initial design.		10.3.1 Demonstrate an understanding of the Occupational Health and Safety (OHS) Act where applicable.		10.4.1 Apply all relevant safety measures.			
10.1.2 Describe human rights issues		10.2.2 Generate and/or design possible solutions for problems.		10.3.2 Describe the functions of appropriate basic tools and equipment.		10.4.2 Select, use and care for appropriate basic tools and equipment.			
10.1.3 Describe, explain and respond to basic medical emergencies in context, taking cognisance of health issues such as HIV/Aids.		10.2.3 Make or improve products according to a selected design.		10.3.3 Explain the reason for using certain engineering materials when taking environmental aspects into consideration.	X	10.4.3 Distinguish between various materials according to their properties.	X		
10.1.4 Identify indigenous knowledge systems of different cultures.	X	10.2.4 Evaluate a final product		10.3.4 Understand appropriate terminology and procedures used in the subject.		10.4.4 Use instructions or basic drawings and apply different cutting methods to make an artefact.			
10.1.5 Describe entrepreneurship and its influence on society and environment.		10.2.5 Present assignments by means of a variety of communication media.		10.3.5 Explain the uses of semi-permanent joining applications.		10.4.5 Use working instructions and apply basic semi permanent joining methods.			
				10.3.6 Distinguish between different types of forces found in engineering components by graphically determining the nature of these forces.		10.4.6 Perform basic tests to verify various mechanical principles.			

				10.3.7 Explain the effect of inferior maintenance on operating systems.		10.4.7 Identify signs of wear on components of mechanical systems due to friction.	
				10.3.8 Describe the functions and control of components used in different operating systems, such as mechanical, hydraulic and pneumatic systems.		10.4.8 Demonstrate competency on basic systems and control.	
				10.3.9 Describe the operating principles of heat engines		10.4.9 Demonstrate an understanding of the main functions of the components required for the internal combustion engines.	
TEACHING ACTIVITIES		LEARNERS ACTIVITIES		RESOURCES		ASSESSMENT	DATE COMPLETED
THEORY: Introduction of indigenous knowledge of different cultures in the use of material.		Interacting in discussion, take notes		Text books, handouts, chalk board and charts to interact with learners		Question / answers, Research / Assignment	
Taking into consideration during the manufacturing processes, environmental issues like waste management and pollution		Taking notes, group work to discuss the impact on the environment / pollution and waste management to control as recycle material		Text books, handouts, chalk board media		Assignment / investigation	
Identify and describe the properties and uses of various engineering material its Demonstrate an understanding of the properties of steel		Take noted and tabulate the material according to its properties and uses. In groups discuss and compare the material according to its properties.		Text book, handouts, chalk board, different types of material (steel)		Research / Assignment Questions and Answers Test	
PRACTICAL Demonstrate how to determine the properties of material through experiments (scratch test)		Learners collect different types of material (steel) for testing (strength, hardness, etc)		Practical workshop, experiment facilities and equipment		Task based / investigation	
Homework:							
Enrichment/Expanded Opportunities:							
Teacher Reflections:							

SIGNATURES:

TEACHER

DATE

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SUBJECT: Mechanical Technology		GRADE: 10		LESSON PLAN 2		TERM 3		TIME: 20 hours	
CORE CONTENT: SYSTEMS & CONTROL <ul style="list-style-type: none">Basic operating systems									
LEARNING OUTCOME 1:		LEARNING OUTCOME 2:		LEARNING OUTCOME 3:		LEARNING OUTCOME 4:			
Technology, Society and the Environment		Technological Process		Knowledge and understanding		Application of Knowledge			
10.1.1 Describe the interrelationship between technology, society and the environment.		10.2.1 Identify, investigate, define and analyse problems in a given real-life situation against the initial design.		10.3.1 Demonstrate an understanding of the Occupational Health and Safety (OHS) Act where applicable.		10.4.1 Apply all relevant safety measures.			
10.1.2 Describe human rights issues		10.2.2 Generate and/or design possible solutions for problems.		10.3.2 Describe the functions of appropriate basic tools and equipment.		10.4.2 Select, use and care for appropriate basic tools and equipment.			
10.1.3 Describe, explain and respond to basic medical emergencies in context, taking cognisance of health issues such as HIV/Aids.		10.2.3 Make or improve products according to a selected design.		10.3.3 Explain the reason for using certain engineering materials when taking environmental aspects into consideration.		10.4.3 Distinguish between various materials according to their properties.			
10.1.4 Identify indigenous knowledge systems of different cultures.		10.2.4 Evaluate a final product		10.3.4 Understand appropriate terminology and procedures used in the subject.		10.4.4 Use instructions or basic drawings and apply different cutting methods to make an artifact.			
10.1.5 Describe entrepreneurship and its influence on society and environment.		10.2.5 Present assignments by means of a variety of communication media.		10.3.5 Explain the uses of semi-permanent joining applications.		10.4.5 Use working instructions and apply basic semi permanent joining methods.			
				10.3.6 Distinguish between different types of forces found in engineering components by graphically determining the nature of these		10.4.6 Perform basic tests to verify various mechanical principles.			

				forces.			
				10.3.7 Explain the effect of inferior maintenance on operating systems.		10.4.7 Identify signs of wear on components of mechanical systems due to friction.	
				10.3.8 Describe the functions and control of components used in different operating systems, such as mechanical, hydraulic and pneumatic systems.	X	10.4.8 Demonstrate competency on basic systems and control.	X
				10.3.9Describe the operating principles of heat engines		10.4.9 Demonstrate an understanding of the main functions of the components required for the internal combustion engines.	
TEACHING ACTIVITIES		LEARNERS ACTIVITIES		RESOURCES		ASSESSMENT	DATE COMPLETED
Theory: -The teacher describes the functions of components applicable to different operating systems and the control thereof, such as mechanical, hydraulics, and pneumatic systems. - Sketches must be stressed -Put learners into groups - Explain group roles, assessment criteria for role play		Take notes, listen and observe, do exercises and interact during discussion Learners experiment using (gr.9) technology set on hydraulics.		Textbooks, handouts, Chalk board, charts on systems of control using demonstration models		Task based, question and answers, Assignment,	
- Teacher demonstrates an understanding of the different systems and control namely: demonstrating the mechanical advantages when using a pulley system, levers and linkages. Guide, Observe & assess task		Making use of demonstrating kits to perform mechanical advantages like pulleys, levers and linkages		Gr.9 technology kit (Mechanical systems and control)		Task based Experiments	
Practical : The teacher demonstrates competencies on basic systems and controls in the workshop on the machinery		Learners demonstrate an understanding of the different systems and control, by removing, assessing and assembling models.		Equipment and machinery in the workshop (engines or gearboxes)		Task based, investigation	
Making use of electronics to experiment circuits. Create activities for learners to demonstrate their understanding.		Making circuits to experiment the use and understanding of warning lights and gauges .		Demonstration models		Task based	
Homework:							
Enrichment/Expanded Opportunities:							
Teacher Reflections:							

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ASSESSMENT TASK

A. Assignment Task

As a group design a hydraulic / Pneumatic system with all the components labeled.

Explained the operation using colour coding and arrows

Look for catalogues of several manufacturers of hydraulics & pneumatic components to help you complete this task.

During presentation you should also demonstrate the functions of most components.

The task should be of a (grade 10) standard

B.

- i. Describe the function of the flat belt and V-Belts.
- ii what is the purpose of multi-groove pulley?.
- iii Name 3 groups of gears and give an example of each group
- iv Describe the functions of the ff. parts
 - Sender unit in water jackets
 - a. Water temperature gauge
 - b. Bi-metal strip
 - c. Fuel tank
 - d. Oil gauge
 - e. Float in fuel tank
 - f. Oil pressure warning light

Compare work with a friend when task is completed.

SUBJECT: Mechanical Technology		GRADE: 10		LESSON PLAN 3		TERM 3		TIME: 8 hours	
CORE CONTENT: MAINTENANCE <ul style="list-style-type: none">Basic maintenance on operating systems									
LEARNING OUTCOME 1: Technology, Society and the Environment		LEARNING OUTCOME 2: Technological Process		LEARNING OUTCOME 3: Knowledge and understanding		LEARNING OUTCOME 4: Application of Knowledge			
10.1.1 Describe the interrelationship between technology, society and the environment.		10.2.1 Identify, investigate, define and analyse problems in a given real-life situation against, the initial design.		10.3.1 Demonstrate an understanding of the Occupational Health and Safety (OHS) Act where applicable.		10.4.1 Apply all relevant safety measures.			
10.1.2 Describe human rights issues		10.2.2 Generate and/or design possible solutions for problems.		10.3.2 Describe the functions of appropriate basic tools and equipment.		10.4.2 Select, use and care for appropriate basic tools and equipment.			
10.1.3 Describe, explain and respond to basic medical emergencies in context, taking cognisance of health issues such as HIV/Aids.		10.2.3 Make or improve products according to a selected design.		10.3.3 Explain the reason for using certain engineering materials when taking environmental aspects into consideration.		10.4.3 Distinguish between various materials according to their properties.			
10.1.4 Identify indigenous knowledge systems of different cultures.		10.2.4 Evaluate a final product		10.3.4 Understand appropriate terminology and procedures used in the subject.		10.4.4 Use instructions or basic drawings and apply different cutting methods to make an artefact.			
10.1.5 Describe entrepreneurship and its influence on society and environment.		10.2.5 Present assignments by means of a variety of communication media.		10.3.5 Explain the uses of semi-permanent joining applications.		10.4.5 Use working instructions and apply basic semi permanent joining methods.			
				10.3.6 Distinguish between different types of forces found in engineering components by graphically determining the nature of these forces.		10.4.6 Perform basic tests to verify various mechanical principles.			
				10.3.7 Explain the effect of inferior	X	10.4.7 Identify signs of wear on	X		

				maintenance on operating systems.		components of mechanical systems due to friction.	
				10.3.8 Describe the functions and control of components used in different operating systems, such as mechanical, hydraulic and pneumatic systems.		10.4.8 Demonstrate competency on basic systems and control.	
				10.3.9 Describe the operating principles of heat engines		10.4.9 Demonstrate an understanding of the main functions of the components required for the internal combustion engines.	
TEACHING ACTIVITIES		LEARNERS ACTIVITIES		RESOURCES		ASSESSMENT	DATE COMPLETED
Theory: Explain the importance of maintenance and the impact it has on operating systems, identify signs of wear		Take notes, interact in discussion		Text books, handouts, Chalk board, charts on maintenance / frictions		Task based, question and answers, Assignment,	
Explain how to perform routine maintenance using different types of lubricants (oil and grease)		Adhere to instructions on the different routines. Take notes		Textbooks, handouts, Chalk board, charts on maintenance / frictions		Task based, question and answers, Assignment	
Practical: Demonstrate the different friction methods: wear, causes, preventative measures to follow. Demonstrate an understanding of routine maintenance on a vehicle or Lathe machine.		Adhere to instructions by carry out routine maintenance on workshop equipments, machinery or vehicles.		Workshop: equipment and facilities, text books and posters Vehicles for life demonstration		Task based / Practical demonstrations Check list / observation sheet	
Homework:							
Enrichment/Expanded Opportunities:							
Teacher Reflections: e							

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SUBJECT: Mechanical Technology		GRADE: 10		LESSON PLAN 4		TERM 3		TIME: 16 hours	
CORE CONTENT: HEAT ENGINE <ul style="list-style-type: none">Operating principles of internal combusting engines									
LEARNING OUTCOME 1: Technology, Society and the Environment		LEARNING OUTCOME 2: Technological Process		LEARNING OUTCOME 3: . Knowledge and understanding		LEARNING OUTCOME 4: Application of Knowledge			
10.1.1 Describe the interrelationship between technology, society and the environment.	X	10.2.1 Identify, investigate, define and analyse problems in a given real-life situation against the initial design.		10.3.1 Demonstrate an understanding of the Occupational Health and Safety (OHS) Act where applicable.		10.4.1 Apply all relevant safety measures.			
10.1.2 Describe human rights issues		10.2.2 Generate and/or design possible solutions for problems.		10.3.2 Describe the functions of appropriate basic tools and equipment.		10.4.2 Select, use and care for appropriate basic tools and equipment.			
10.1.3 Describe, explain and respond to basic medical emergencies in context, taking cognisance of health issues such as HIV/Aids.		10.2.3 Make or improve products according to a selected design.		10.3.3 Explain the reason for using certain engineering materials when taking environmental aspects into consideration.		10.4.3 Distinguish between various materials according to their properties.			
10.1.4 Identify indigenous knowledge systems of different cultures		10.2.4 Evaluate a final product		10.3.4 Understand appropriate terminology and procedures used in the subject.		10.4.4 Use instructions or basic drawings and apply different cutting methods to make an artefact.			
10.1.5 Describe entrepreneurship and its influence on society and environment.		10.2.5 Present assignments by means of a variety of communication media.		10.3.5 Explain the uses of semi-permanent joining applications.		10.4.5 Use working instructions and apply basic semi permanent joining methods.			
				10.3.6 Distinguish between different types of forces found in engineering components by graphically determining the nature of these forces.		10.4.6 Perform basic tests to verify various mechanical principles.			
				10.3.7 Explain the effect of inferior maintenance on operating systems.		10.4.7 Identify signs of wear on components of mechanical systems due to friction.			

				10.3.8 Describe the functions and control of components used in different operating systems, such as mechanical, hydraulic and pneumatic systems.		10.4.8 Demonstrate competency on basic systems and control.	
				10.3.9 Describe the operating principles of heat engines	X	10.4.9 Demonstrate an understanding of the main functions of the components required for the internal combustion engines.	X
TEACHING ACTIVITIES		LEARNERS ACTIVITIES		RESOURCES		ASSESSMENT	DATE COMPLETED
Theory: The teacher explains the historical overview of heat engines in relation to the society and the environment		Discuss and debate on the impact of technology, society and the environment (cultural aspects)		Text books and handouts videos		Assignment	
Describes the operating principles of : - Internal combustion engines a. Four stroke & two stroke petrol engines b. Four stroke & two stroke diesel engines - External combustion engines Reciprocating steam engine - Comparison between two & four stroke engines - Sketches must be stressed - Group learners, Guide, Observe & assess task		Take notes, ask questions, and interact in discussion, Learners develop listening skills and adhere to constructive instructions, Group discussion and debate for presentation purposes.		Text books and handouts Posters and demonstration models		Task based, Experiment	
Practical : The teacher demonstrates the operating principles of an engine		Interact during demonstration question and answers. Carry out a practical demonstration by dismantling , assessing and assembling the main components of the engine.		Workshop: tools and equipment Practical models for demonstrations		Experiments Task based	
Describe the main functions of the components required for internal combustion engines and explain there functions		identify main components e.g (Pistons, rings, crankshaft, connecting rod, gudgeon pin, etc.)		Workshop: demonstration models / posters		Task based / assignment	
Homework:							
Enrichment/Expanded Opportunities:							
Teacher Reflections:							

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