basic education

Department:
Basic Education
REPUBLIC OF SOUTH AFRICA

Curriculum and Assessment Policy Statement

Grade 8 & 9

MECHANICAL TECHNOLOGY:

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SECTION 1:

1.1 BACKGROUND

The *National Curriculum Statement Grades R-12 (NCS)* stipulates policy on curriculum and assessment in the schooling sector.

To improve implementation, the National Curriculum Statement was amended, with the amendments coming into effect in January 2012. A single comprehensive Curriculum and Assessment Policy document was developed for each subject to replace Subject statements, Learning Programme Guidelines and Subject Assessment Guidelines in Grades R-12.

1.2 OVERVIEW

(a) The *National Curriculum Statement Grades R-12 (January 2012)* represents a policy statement for learning and teaching in South African schools and comprises the following:

(i) *Curriculum and Assessment Policy Statements for each approved school subject;*

(ii) *The policy document, National policy pertaining to the programme and promotion requirements of the National Curriculum Statement Grades R-12; and*

(iii) *The policy document, National Protocol for Assessment Grades R-12 (January 2012).*

(b) The *National Curriculum Statement Grades R-12 (January 2012)* replaces the two current national curricula statements, namely the

(i) *Revised National Curriculum Statement Grades R-9, Government Gazette No. 23406 of 31 May 2002, and*

(ii) *National Curriculum Statement Grades 10-12 Government Gazettes, No. 25545 of 6 October 2003 and No. 27594 of 17 May 2005.*

(c) The national curriculum statements contemplated in subparagraphs b(i) and (ii) comprise the following policy documents which will be incrementally repealed by the *National Curriculum Statement Grades R-12 (January 2012)* during the period 2012-2014:

(i) *The Learning Area/Subject Statements, Learning Programme Guidelines and Subject Assessment Guidelines for Grades R-9 and Grades 10-12;*

(ii) *The policy document, National Policy on assessment and qualifications for schools in the General Education and Training Band, promulgated in Government Notice No. 124 in Government Gazette No. 29626 of 12 February 2007;*

(iii) *The policy document, the National Senior Certificate: A qualification at Level 4 on the National Qualifications Framework (NQF), promulgated in Government Gazette No.27819 of 20 July 2005;*

(iv) *The policy document, An addendum to the policy document, the National Senior Certificate: A qualification at Level 4 on the National Qualifications Framework (NQF), regarding learners with special needs, published in Government Gazette, No.29466 of 11 December 2006, is incorporated in the policy document, National policy pertaining to the programme and promotion requirements of the National Curriculum Statement Grades R-12; and*

(v) *The policy document, An addendum to the policy document, the National Senior Certificate: A qualification at Level 4 on the National Qualifications Framework (NQF), regarding the National Protocol for Assessment (Grades R-12), promulgated in Government Notice No.1267 in Government Gazette No. 29467 of 11 December 2006.*

(d) The policy document, *National policy pertaining to the programme and promotion requirements of the National Curriculum Statement Grades R-12*, and the sections on the Curriculum and Assessment Policy as contemplated in Chapters 2, 3 and 4 of this document constitute the norms and standards of the *National Curriculum Statement Grades R-12.* It will therefore, in terms of *section 6A* of the *South African Schools Act, 1996 (Act No. 84 of 1996,)* form the basis for the Minister of Basic Education to determine minimum outcomes and standards, as well as the processes and procedures for the assessment of learner achievement to be applicable to public and independent schools.

1.3 GENERAL AIMS OF THE SOUTH AFRICAN CURRICULUM

(a) The *National Curriculum Statement Grades R-12* gives expression to the knowledge, skills and values worth learning in South African schools. This curriculum aims to ensure that children acquire and apply knowledge and skills in ways that are meaningful to their own lives. In this regard, the curriculum promotes knowledge in local contexts, while being sensitive to global imperatives.

(b) The National Curriculum Statement Grades R-12 serves the purposes of:

- equipping learners, irrespective of their socio-economic background, race, gender, physical ability or intellectual ability, with the knowledge, skills and values necessary for self-fulfilment, and meaningful participation in society as citizens of a free country;
- providing access to higher education;
- facilitating the transition of learners from education institutions to the workplace; and
- providing employers with a sufficient profile of a learner's competences.

(c) The National Curriculum Statement Grades R-12 is based on the following principles:

- Social transformation: ensuring that the educational imbalances of the past are redressed, and that equal educational opportunities are provided for all sections of the population;

- Active and critical learning: encouraging an active and critical approach to learning, rather than rote and uncritical learning of given truths;
- High knowledge and high skills: the minimum standards of knowledge and skills to be achieved at each grade are specified and set high, achievable standards in all subjects;

- Progression: content and context of each grade shows progression from simple to complex;

• Human rights, inclusivity, environmental and social justice: infusing the principles and practices of social and environmental justice and human rights as defined in the Constitution of the Republic of South Africa. The National Curriculum Statement Grades R-12 is sensitive to issues of diversity such as poverty, inequality, race, gender, language, age, disability and other factors;

- Valuing indigenous knowledge systems: acknowledging the rich history and heritage of this country as important contributors to nurturing the values contained in the Constitution; and

- Credibility, quality and efficiency: providing an education that is comparable in quality, breadth and depth to those of other countries.

(d) The National Curriculum Statement Grades R-12 aims to produce learners that are able to:

- identify and solve problems and make decisions using critical and creative thinking;

- work effectively as individuals and with others as members of a team;

- organise and manage themselves and their activities responsibly and effectively;

- collect, analyse, organise and critically evaluate information;

- communicate effectively using visual, symbolic and/or language skills in various modes;

- use science and technology effectively and critically showing responsibility towards the environment and the health of others; and

- demonstrate an understanding of the world as a set of related systems by recognising that problem solving contexts do not exist in isolation.

(e) Inclusivity should become a central part of the organisation, planning and teaching at each school. This can only happen` if all teachers have a sound understanding of how to recognise and address barriers to learning, and how to plan for diversity.

The key to managing inclusivity is ensuring that barriers are identified and addressed by all the relevant support structures within the school community, including teachers, District-Based Support Teams, Institutional-Level Support Teams, parents and Special Schools as Resource Centres. To address barriers in the classroom, teachers should use various curriculum differentiation strategies such as those included in the Department of Basic Education's *Guidelines for Inclusive Teaching and Learning* (2010).

1.4 TIME ALLOCATION

1.4.1 Foundation Phase

(a) The instructional time in the Foundation Phase is as follows:

SUBJECT	GRADE R (HOURS)	GRDES 1-2 (HOURS)	GRADE 3 (HOURS)
Home Language	10	8/7	8/7
First Additional Language		2/3	3/4
Mathematics	7	7	7
Life Skills • Beginning Knowledge • Creative Arts • Physical Education • Personal and Social Well-being	**6** (1) (2) (2) (1)	**6** (1) (2) (2) (1)	**7** (2) (2) (2) (1)
TOTAL	**23**	**23**	**25**

(b) Instructional time for Grades R, 1 and 2 is 23 hours and for Grade 3 is 25 hours.

(c) Ten hours are allocated for languages in Grades R-2 and 11 hours in Grade 3. A maximum of 8 hours and a minimum of 7 hours are allocated for Home Language and a minimum of 2 hours and a maximum of 3 hours for Additional Language in Grades 1-2. In Grade 3 a maximum of 8 hours and a minimum of 7 hours are allocated for Home Language and a minimum of 3 hours and a maximum of 4 hours for First Additional Language.

(d) In Life Skills Beginning Knowledge is allocated 1 hour in Grades R – 2 and 2 hours as indicated by the hours in brackets for Grade 3

1.4.2 Intermediate Phase

(a) The instructional time in the Intermediate Phase is as follows:

SUBJECT	HOURS
Home Language	6
First Additional Language	5
Mathematics	6
Natural Sciences and Technology	3,5
Social Sciences	3
Life Skills • Creative Arts • Physical Education • Personal and Social Well-being	4 (1,5) (1) (1,5)
TOTAL	27,5

1.4.3 Senior Phase

(a) The instructional time in the Senior Phase is as follows:

SUBJECT	HOURS
Home Language	5
First Additional Language	4
Mathematics	4,5
Natural Sciences	3
Social Sciences	3
Technology	2
Economic Management Sciences	2
Life Orientation	2
Creative Arts	2
A maximum of two subjects can be selected from the list of thirteen Elective Occupational subjects to replace any two of the following: Technology, Creative Arts and/or Economic and Management Sciences. The instructional time for these subjects is 2 hours each.	
TOTAL	27,5

Elective Occupational Subjects (Not more than 2)	
1. Agricultural Studies	**Time Allocation per week: 2 hours each**
2. Art and Design	
3. Digital Technology	
4. Early Childhood Development	

5. Mechanical Technology	
6. Mechanical Technology	
7. Civil Technology	
8. Hairdressing, Nail and Beauty Technology	
9. Ancillary Health Care Studies	
10. Services: Maintenance and Upholstery	
11. Consumer Studies	
12. Hospitality Studies	
13. Wholesale and Retail Studies	

Grades 10-12

(a) The instructional time in Grades 10-12 is as follows:

SUBJECT	**Time allocation per week (hours)**
Home Language	4,5
First Additional Language	4,5
Mathematics	4,5
Life Orientation	2
A minimum of any three subjects selected from **Group B** Annexure B, Tables B1-B8 of the policy document, *National policy pertaining to the programme and promotion requirements of the National Curriculum Statement Grades R-12,* subject to the provisos stipulated in paragraph 28 of the said policy document.	12 (3x4h)
	27,5

The allocated time per week may be utilised only for the minimum required NCS subjects as specified above, and may not be used for any additional subjects added to the list of minimum subjects. Should a learner wish to offer additional subjects, additional time must be allocated for the offering of these subjects.

SECTION 2:

INTRODUCTION TO MECHANICAL TECHNOLOGY

2.1 What is Mechanical Technology?

Mechanical Technology focuses on concepts and principles in the Mechanical (motor, mining, shipping, rail, power-generation etc.) environment and on technological processes. It embraces practical skills and the application of scientific principles. This subject aims to create and improve the engineering and manufacturing environment to enhance the quality of life of both the individual and society alike, and ensure the sustainable use of the natural environment and resources.

It consists of the following subjects; **Manufacturing** (**Fitting & Machining) Motor Mechanics, Welding and Body Works.**

Embedded in this subject are the following disciplines:

Motor Mechanics: encompassing petrol and diesel driven vehicles, motor cycles, lawnmowers and tractor mechanics;

Manufacturing: includes turning, milling, cutting, shaping, fitting of keys, couplings, bushes, shafts and bearings;

Welding: includes welding (gas, electric, MIG/MAGS), developments, working with sheet metal and the manufacturing of structures.

Body works: which includes Panel Beating and Spray Painting of vehicles and motor cycles**.**

The foundations of Mechanical Technology

During the activities, the learner engages in investigating, diagnosing, adjusting, removing, replacing, designing, manufacturing and applying the necessary skills to provide solutions to problems in Mechanical systems, processes and components. Mechanical Technology is however not limited to these processes.

It affords learners with opportunities for life-long learning, self-development, empowerment, awareness of human rights, and exposure to socio-economic and environmental injustices, access to latest international trends and innovations, and an awareness of the process of globalisation.

Valuing indigenous knowledge systems, it acknowledges the rich history and heritage of this country as important contributors to nurturing the values contained in the Constitution.

Apply solutions – vocational specific learning

This learning describes a core set of skills that can be developed through projects, simulations and real-life applications that are needs driven and sensitive to environmental impact. An integrating approach, to structure projects that develop the learner's skills, knowledge, values and attitudes in a holistic way, should be adopted.

- Repair / Make / Maintenance:

This aspect provides the opportunity for the learner to use tools, equipment and materials to solve / for monitoring the identified problems, needs or opportunities. The making should be according to the specific design or the manufacturer's specifications. Repairs include the removal of defective parts and the replacement of fixed or new parts. All work must always be undertaken in a safe and healthy environment. The necessary safety measures and precautions against injuries should be applied with due consideration to HIV /AIDS.

- Evaluate:

The learner has to evaluate products, actions, decisions and results throughout the process, and where necessary changes or improvements should be recommended and implemented. Evaluation should be done against the applicable criteria that may be given or developed. This stage requires the use of probing questions, fair testing and analysis.

- Communicate:

The assessment evidence of the process followed in any project is: the ability to analyse, investigate, plan, design, draw, report, evaluate and communicate. All reports, designs, assessment forms and assessment records should be kept in a Portfolio file.

Career Pathways: The curriculum is designed to incorporate the career fields of Manufacturing, Motor Mechanics, Welding and Body Works.

Elements of entrepreneurship have been included to provide learners with the ability to identify business opportunities in the engineering industry.

2.1.1 **Manufacturing**

Also known as Fitting and Machining or Turning, focuses on the manufacturing and machining of machines parts using processes such as lathe turning, milling, cutting, shaping, fitting of keys, couplings, bushes, shafts and bearings. **Turning** is a machining process in which a cutting tool, typically a non-rotary tool bit, moves more or less linearly while the work piece rotates. Turning can be done manually, in a traditional form of lathe, or by using an automated lathe. Today the most

common type of such automation is computer numerical control, better known as CNC. (CNC is also commonly used with many other types of machining besides turning.)

When turning, a piece of relatively rigid material is rotated and a cutting tool is traversed along axes of motion to produce precise diameters and depths. Turning can be either on the outside of the cylinder or on the inside (also known as boring) to produce tubular components of various geometries.

The turning processes are typically carried out on a lathe, considered to be the oldest machine tools, and can be of four different types, namely straight turning, taper turning, profiling or external grooving. These types of turning processes can produce various shapes of materials such as straight, conical, curved or grooved work pieces. In general, turning uses simple, single-point cutting tools. Each group of work piece materials have an optimum set of tool angles which have been developed through the years.

Milling operates on the principle of rotary motion. A milling cutter is spun about an axis while a work piece is advanced through it in such a way that the cutters are able to shave chips of material. This non-continuous cutting operation means that no surface cut by a milling machine will ever be completely smooth; at a very close level (microscopic for very fine feed rates), it will always contain regular ridges.

2.1.2 **Motor Mechanics**

Encompassing petrol and diesel driven vehicles, motor cycles, lawnmowers, generators and tractor mechanics.

The automotive industry is a term that covers a wide range of companies and organisations involved in the design, development, manufacture, repair marketing, aftermarket products and selling of motor vehicles, motorcycles, mopeds and recovery and repair of damaged and stolen vehicles. It is one of the world's most important economic sectors by revenue.

Modern automotive engineering, along with aerospace engineering and marine engineering, is a branch of vehicle engineering, incorporating elements of Mechanical, MECHANICAL, electronic, software and safety engineering as applied to the design, manufacture and operation of motorcycles, automobiles, buses and trucks and their respective engineering subsystems. This includes entities such as:

Safety Engineering, Fuel Economy/Emissions, Vehicle Dynamics (ride, handling, steering, braking, comfort and traction), Design of the chassis systems of suspension (steering, braking, structure (frame), wheels and tires, and traction control); Vehicle Electronics (responsible for operational controls such as the throttle, brake and steering controls; as well as many comfort and convenience

systems such as the HVAC, infotainment and lighting systems. It would not be possible for automobiles to meet modern safety and fuel economy requirements without electronic controls); Shift Quality (as influenced by the powertrain (engine, transmission), and the vehicle (driveline, suspension, engine and powertrain mounts, etc.); Drivability (cold starts and stalls, RPM dips, idle response, launch hesitations and stumbles, and performance levels).

2.1.3 **Welding**

Includes welding (gas, electric, MIG/MAGS), developments, working with sheet metal and the manufacturing of structures.

Welding is a fabrication or sculptural process that joins materials, usually metals or thermoplastics, by causing coalescence. This is often done by melting the work pieces and adding a filler material to form a pool of molten material (the weld pool) that cools to become a strong joint, with pressure sometimes used in conjunction with heat, or by itself, to produce the weld. This is in contrast with soldering and brazing, which involve melting a lower-melting-point material between the work pieces to form a bond between them, without melting the work pieces.

Many different energy sources can be used for welding, including a gas flame, an electric arc, a laser, an electron beam, friction and ultrasound. While often an industrial process, welding may be performed in many different environments, including open air, under water and in outer space. Welding is a potentially hazardous undertaking and precautions are required to avoid burns, electric shock, vision damage, inhalation of poisonous gases and fumes, and exposure to intense ultraviolet radiation.

Modern welding techniques include manual methods like shielded metal arc welding, now one of the most popular welding methods, as well as semi-automatic and automatic processes such as gas metal arc welding, submerged arc welding, flux-cored arc welding and electro-slag welding. Developments continued with the invention of laser beam welding, electron beam welding, electromagnetic pulse welding and friction stir welding in the latter half of the century. Robot welding is commonplace in industrial settings, and researchers continue to develop new welding methods and gain greater understanding of weld quality.

Metalworking is the process of working with metals to create individual parts, assemblies, or large-scale structures. The term covers a wide range of work from large ships and bridges to precise engine parts and delicate jewellery. It therefore includes a correspondingly wide range of skills, processes and tools. Metalworking is a science, art, hobby, industry and trade. Modern metalworking processes, though diverse and specialized, can be categorized as forming, cutting, or joining processes. Today's machine shop includes a number of machine tools capable of creating a precise, useful work piece.

2.2 **Topics to be studied in** Mechanical Technology

1. Safety and first aid – Occupational Health and Safety (OHS)
2. Graphics Communication (Engineering Graphics and Design) (rough sketches, simple drawing ISO and orthographic)
3. Tools and equipment (hand, power and machine)
4. Entrepreneurship
5. Materials – ferrous and non-ferrous materials
6. Joining methods – permanent and semi-permanent.
7. Terminology (operations/procedures and equipment).
8. Maintenance (operations/procedures and equipment).
9. Body Works (operations/procedures and equipment).

2.3 Specific Aims:

The learner is able to:

1. Adhere to and identify safe working practices and demonstrate safe working conditions daily, also adopting proper safety and first aid procedures.
2. Demonstrate knowledge of the Mechanical industry and its productivity requirements, by applying appropriate work-procedures.
3. Understand and interpreting work instructions and drawings for the completion of projects.
4. Apply Mechanical Technology, techniques, processes and skills, as applied in the fabrication and Mechanical industry, using appropriate tools and measuring equipment.
5. Identify Ferrous & Non-Ferrous metals, Alloys and Plastics with their differences, applications and uses.
6. Demonstrate the joining methods processes:
7. Use vehicle lifting equipment
8. Identify and maintain (car) batteries
9. Lubrication machinery components
10. Explain fundamental machine technology
11. Remove and fit automotive components
12. Assemble Mechanical components
13. Carry out an automotive service

2.4 Requirements for Mechanical Technology as a subject

2.4.1: **Time Allocation**

The total number of hours allocated for the subject in a five-day cycle is 2 hours. Sufficient time must be allocated in the school timetable for the practical work required to be done.

2.4.2 Resources

Human resources

Mechanical Technology requires a trained subject specialist (should be a person that has at least 5 years' industry experience). It is preferred that the Educator offering Mechanical Technology is an artisan, technician, technical educator that has been in the Mechanical industry.

Mechanical Technology Educators are required to:

- Teach the subject content with confidence, professionalism and in a relaxed firm manner.
- Plan and execute Theory and Practical lessons/work/demonstrations in a manner that would be suitable for the learners.
- Provide workshop that is properly equipped, clean and safe and first aid friendly for learners.
- Keep proper records of all learners and results from all SBA and PAT.
- Implement innovative methods to keep learners interested in the subject.
- Maintain and service the workshop, tools, and instruments as a whole.
- Produce working PAT projects for learners one for every term and scale at the learners' ability.
- Educator must carry out SBA regularly, at the end of every term correct break down of learner's progress.

Learner Resources:

Each learner should be in possession of the following:

- Workbooks
- Overall
- School Leather Shoes or safety shoes

2.4.3 Infrastructure, equipment and budget.

Schools must ensure that teachers have the necessary infra-structure, equipment and financial resources for quality teaching and learning.

Infrastructure:

- Mechanical Technology cannot be implemented in a school without an equipped workshop.
- Electricity supply to the workshop is crucial, preferably a three phase, four-wire supply, but at least single phase with a high current circuit breaker.
- Lighting and ventilation is of extreme importance and a workshop should ideally have multiple exits with doors that open outward.
- Tools and equipment should have sufficient storage and well-secured storage management system with an up to date inventory. Shelves should be clearly marked and storage areas defined.
- Good housekeeping principles require that all workshops be cleaned regularly. A suitable waste removal system should be in place to accommodate refuse, off-cut materials as well as chemical waste. The requirements of the Occupational Health and Safety (OHS) Act 85 of 1993 need to be complied with at all times.
- Machinery on stands should be permanently affixed to the floor, with isolation switches for the mains supply. All machines should have working machine guards.
- Mechanical motors should ideally be painted bright orange. Specification plates should be clearly legible.
- The workshop must have a lockable mains distribution board. The workshop must be fitted with an emergency cut of switch/s which is/are easily accessible at all times. The red, mushroom type, emergency switch should preferably be lockable to prevent accidental re-connection with mains in the case of it being activated.
- Safety rules must be displayed on posters in the workshop.

Finances:

Budget and inventory

A budget must be allocated for the subject. The amount will be determined by the number of learners taking the subject across all the years and the nature of the practical work required as stipulated in the curriculum. The budget needs to be revised annually and must consider all resources needed per year. The funding must make provision for maintenance of equipment and the replacement over the years.

Resourcing could be sub-divided into the following categories:

- Safety Equipment
- Tools and Equipment
- Consumable Materials
- Practical Assessment Task Resources (PAT)
- Teaching and Learning Support Material
- Maintenance

A stock inventory must be quarterly maintained by the teacher and verified annually by a Senior Management Team member.

2.5 Career opportunities

Career and occupational opportunities for learners with a foundation in Mechanical Technology include but is not limited to:

• Fitter • Machinist • Gunsmith • Motor mechanic • Diesel mechanic • Motorbike mechanic • Farm mechanic • Technician • Instrument specialist • Vehicle designer • Auto electrician • Specialized engine tuner and diagnostic analyst • Suspension builder • Blacksmith • Jeweller • Rigger	• Welder • Boilermaker • Panel beater • Exhaust fitter • Brake and clutch fitter and machinist • Upholsterer • Draughtsman • Toolmaker • Automotive machinist and fitter • Engine rebuilder • Transmission machinist • Roof truss developer • Technical teacher • Lecturer • Technical trainer etc.

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SECTION 3

OVERVIEW OF TOPICS PER TERM AND ANNUAL TEACHING PLANS

3.1 Content overview

TOPIC	Grade 8	Grade 9
1. Safety:	○ Definition of an accident ○ Causes of Accidents ○ Identify and respond to unsafe or potentially unsafe conditions or acts ○ Personal safety equipment and performing housekeeping duties ○ Purpose of demarcated areas, emergency stops and first aid stations ○ Explain what HIV/AIDS is, and how to manage the accident scene.	○ Fire- fighting. ○ Identify and respond to unsafe or potentially unsafe conditions or acts ○ Explain the rights and responsibilities of workers with HIV/AIDS
2. Graphics Communication	**Introduction of Graphics Communication** ➢ What is Graphics Communication? ➢ The purpose of Graphics Communication ➢ General drawing principles ➢ Safety precautions when using drawing instruments ➢ Correct use and care of drawing instruments ➢ Free hand sketches ➢ Types of lines ➢ Lines(SANS110 guidelines) ➢ Dimensions, lettering and border ➢ Freehand drawing ➢ Scale drawing 1:1 and 1:2 ○ Pictorial Drawings	**Demonstrate and apply all aspects of drawing.** ➢ Revision of Grade 8 work ➢ Free-hand drawings ➢ Geometrical drawings ➢ Isometric and Orthographic drawings
3. Use and Care of Tools:	○ Identify hand tools, and their uses **(THEORY)** ○ Select and use hand tools **(PRACTICAL APPLICATION)** ○ Discuss basic units of measurement and symbols **(THEORY)** ○ Selecting and use of measuring equipment **(PRACTICAL APPLICATION)** ○ Recognise and report any damage to any tool	○ Care and maintenance of hand tools ○ Work safely with due care for self, fellow worker and equipment ○ Care and maintenance of measuring equipment Recognise, and report wear or damage to measuring equipment ○ Power supply and connection to equipment

	○ Identify different lifting equipment used in the Automotive workshop i.e. hydraulic trolley jack, bottle jack, scissor jack ○ Safety involved when using lifting equipment i.e. chock blocks, jacking points on the vehicle, trestles and creepers	○ Recognise and report any damage to any power tool ○ Select and use power tools ○ Care and maintenance of power tools ○ Discuss operation, functions and components of the lifting equipment ○ Carry out precautionary measures before operating the lifting equipment ○ Use lifting equipment to change a wheel of a vehicle.
4. Entrepreneurship	What is entrepreneurship Who is an entrepreneurship Type of entrepreneurship ➢ Small Business entrepreneurship ➢ Scalable start-up entrepreneurship ➢ Large company entrepreneurship ➢ Social entrepreneurship	What is entrepreneurship Who is an entrepreneurship Type of entrepreneurship ➢ Small Business entrepreneurship ➢ Scalable start-up entrepreneurship ➢ Large company entrepreneurship ➢ Social entrepreneurship • Why is entrepreneurship important? • What factors affect entrepreneurship? • Business Plan
5. Materials	○ Introduction and classification of materials into: • Ferrous metals • Non-ferrous metals	○ Classification and application of materials: • Ferrous Alloys • Non-ferrous Alloys • Plastics • Alloys
6. Joining Methods	• Differentiate between permanent and semi-permanent joining methods • Apply procedures of semi-permanent joining processes • Bolt and nuts ○ pop riveting • Apply procedures of semi-permanent joining processes	• Demonstrate joining process • Apply permanent joining method ○ Soldering ○ Arc welding • Demonstrate cutting procedures • Screw cutting (Tap and Die ONLY) • ISO metric

	• Bolt and nuts • Screws • Keys and keyways Introduce the different methods of screw cutting internally and externally	
7. Terminology	• Identify the different machines used in the Fitting and Machining Workshop and their uses. o Centre Lathe o Milling Machine Operations that can be done on a centre lathe (Boring, Facing, Drilling, Taper turning, Screw cutting, Taper Cutting, turning, Knurling, Parting, Chamfering) • **Engines** o TDC o BDC o Stroke o Bore • <u>Fundamentals engine technology</u>: o FOUR (4) Stroke (Petrol) Engine o Operation: ▪ Intake ▪ Compression ▪ Power ▪ Exhaust	• Identify the different components of the machines used in the Fitting and Machining Workshop Centre Lathe (Tail stock. Chuck, Chuck key, Tool post. Lead screw, Compound slide, cross slide and Head stock) Milling Machine (Table, Motor Levers, Switches, Spindle, Stand) Surface grinder (Table, Base, Feed lever, Grinding wheel, Switches) Operations that can be done on a milling machine (Boring, Drilling, Indexing, Gear cutting, Key ways, Splines) **Terminology**: o Engine designs o Function of engine systems FOUR (4) Stroke (Petrol) – 1 cylinder o Comparison of the two engines o Inspect parts

8. Maintenance:	○ Definition of Lubrication ○ Different types of Lubricants ○ Different types of Lubrication ○ Plan and prepare to inspect lubricate machines and equipment	○ Drain, refill or top up fluids and lubricants ○ Inspect for leaks and defects ○ Correct handling of lubricants ○ Correct storage of lubricants ○ Remove and install battery in vehicle ○ Remove and replace battery terminals and cables
9. Body Works	REPAIR DIFFERENT COIN SIZE DENT ON FERROUS BODY SHELL WHILE APPLYING SAFETY RULES. Practical demonstration. • Repair a coin size dent on a body panel. Tools • Identify and assess the damage • Select appropriate tools to be used for repairs. • Planishing hammer • Cross-Pane and Finishing hammer • Curved Pane and Finishing hammer • Pick Finishing hammer • General Purpose Dolly • Heel Dolly • Toe dolly • Curved Dolly • Beating File • Adjustable body file • Orbital sander • Steal brush Practical task. • Repair a coin size dent on a body panel. Tools • Identify and assess the damage • Select appropriate tools to be used for repairs.	**PERFORM SURFACE PREPARATION ON A BODY PANEL GRIND AND FEATHER EDGING OPERATIONS** Identify the type of panel and name the material it is made from. • Identify and assess the body panel to be repaired. Practical demonstration • Wash panels in accordance with the workshop procedures. • Grind and feather edging operations. Tools; • Electric disc sander/ Air driven disc sander • Orbital sand • Sanding blocks Material/Abrasives: • P150 Hook it disc • P80 sand paper • P180 Sand paper

	• Planishing hammer • Cross-Pane and Finishing hammer • Curved Pane and Finishing hammer • Pick Finishing hammer • General Purpose Dolly • Heel Dolly • Toe dolly • Curved Dolly • Beating File • Adjustable body file • Orbital sander • Steal brush • Assess the repaired work. • Clean the work area and clean and store the tools and equipment. **PERFORM SURFACE PREPARATION ON A BODY PANEL** Practical demonstrations. • Identify and assess the damage on the panel. • Clean panels in accordance with the workshop procedures. • Apply spot putty if needed accordance with job requirement • Select the appropriate sand paper (Wet or Dry). • Demonstrate and perform the sanding operation in according with the job requirement. • Clean and store tools, equipment and material in	• Prepsol • Metal cleaner Practical task • • Wash panels in accordance with the workshop procedures. • Grind and feather edging operations. Tools; • Electric disc sander/ Air driven disc sander • Orbital sand • Sanding blocks Material/Abrasives: • P150 Hook it disc • P80 sand paper • P180 Sand paper • Prepsol • Metal cleaner • Body Filler • Spot putty • Rags • Prepsol • Metal cleaner **IDENTIFY THE VARIOUS TYPES OF PRIMERS.** **Practical demonstration** • Identify and explain the use of the primer • Masking of panel that need to be primed • Demonstrate the correct use of Primers

	accordance with workshop procedures. Practical task. • Clean body panels using water. • Select the appropriate sand paper (Wet or Dry). • Apply spot putty if needed accordance with job requirement • Demonstrate and perform the sanding operation in according with the job requirement. • Assess and inspect the sanding and masking procedures Clean and store tools, equipment and material in accordance with workshop procedures.	in accordance to manufactures manuals **Practical task** • Identify and explain the use of the primer • Masking of panel that need to be primed • Demonstrate the correct use of Primers in accordance to manufactures manuals Clean and store tools, equipment and material in accordance with workshop procedures.

3.2 CONTENT OUTLINE PER TERM

GRADE 8

TERM 1

WEEKS	TOPIC	CONTENT
3 WEEKS	**SAFETY**	Mechanical Technology Workshop orientation: • Purpose of demarcated areas, emergency stops and first aid stations. • Safety signs • Ventilation • Lighting • Electricity supply o Workshop rules and procedures o Definition of Accident o Causes of Accidents o Identify Unsafe Acts and Unsafe Conditions o Good housekeeping o Personal Protective Equipment ▪ Eye and ear protection ▪ Head protection ▪ Safety boots/shoes ▪ Protective clothing <u>First Aid- Understand and deal with HIV / AIDS</u>: o What is HIV/AIDS and infectious deceases Causes of HIV/AIDS o Describe AIDS and HIV as infectious diseases o Know the danger of HIV and AIDS and how it is transmitted **<u>Basic First Aid – incident management – CPR</u>** o Define first aid o Basic first aid kit content o Types of injuries ▪ Cuts ▪ Burns ▪ Fractures ▪ MECHANICAL shock ▪ Trauma (Shock) Practical Skill – : Basic First Aid - Demonstrate application of basic first aid. o Stop bleeding • Bandaging the wound
2 WEEKS	**GRAPHICS COMMUNICATION**	**Introduction of Graphics Communication** ➢ What is Graphics Communication? ➢ The purpose of Graphics Communication ➢ General drawing principles

		➢ Safety precautions when using drawing instruments ➢ Correct use and care of drawing instruments ➢ Free hand sketches ➢ Types of lines ➢ Lines(SANS110 guidelines) ➢ Dimensions, lettering and border ➢ Freehand drawing ➢ Scale drawing 1:1 and 1:2 ➢ Pictorial Drawings
3 WEEKS	**TOOLS, INSTRUMENTS AND EQUIPMENT**	Purpose, use and care of Tools, Instruments and Equipment: • <u>Hand tools</u>: ○ <u>Identify, use and care (and storage) of hand tools –</u> ○ spanners; ○ pliers; ○ screwdrivers; ○ hammers ○ cutting tools ○ Wire brush ○ Clamping tools ○ marking off tools ○ rivet gun/ rivet set snap ○ Workbench • Power Tools ○ Portable Hand Drill • <u>Measuring instruments</u>: ○ <u>Identify, use and care:</u> ○ Measuring tape ○ Steel rule ○ Vernier caliper ○ Outside caliper ○ Outside micrometer ○ Identify the different lifting equipment used in the Mechanical Technology workshop i.e. trolley jack, bottle jack and scissor jack. <u>Machine Equipment</u> ○ Identify and uses of the different machines used in the Mechanical Technology Workshop: • Bench grinder

1 WEEK	**ENTREPRENEURSHIP**	What is entrepreneurship Who is an entrepreneur? Type of entrepreneurship ➢ Small Business entrepreneurship ➢ Scalable start-up entrepreneurship ➢ Large company entrepreneurship entrepreneurship
1 WEEK	**REVISION AND PRACTICALS**	
	Formal Assessment	The weeks allocated for formal assessment are integrated across the weeks planned for teaching and learning. The assessment will consist of Practical Task/s with a 60% weighting and a Theory test with a 40% weighting.
Revision and Assessment Assignment = 50 Marks :40 % Practical =50 Marks:60% Time: 1 hour Assignment to cover all work done in term 1		

TERM 2

HOURS	TOPIC	CONTENT

2 WEEKS	**MATERIALS**	<u>Introduction and classification of:</u>
		• Ferrous metals
		• Non-ferrous metals
		• Sheet metals
		  ○ Cold rolled sheets
		  ○ Galvanising sheets
		  ○ Expanded metals

2 WEEKS	**JOINING METHODS**	**Semi-permanent joining methods**
		• **Apply procedures of basic Semi-permanent joining processes**
		  ○ Bolt and nuts
		  ○ Pop riveting
		  ○ Screws
		  ○ Keys and keyways

4 WEEKS	**TERMINOLOGY**	• **Introduction of Machines**
		  ○ Centre Lathe
		  ○ Milling Machine
		• **Engine components**
		Crankshaft
		Connecting rods
		Cylinder block
		Combustion chamber
		Inlet valve
		Cam
		Camshaft
		Spark plug
		Valve spring
		Exhaust valve
		Cylinder head
		Water jacket
		Piston
		Crankcase
		• **Engines**
		  ○ TDC
		  ○ BDC
		  ○ Stroke
		  ○ Bore
		• <u>Fundamentals engine technology</u>:

		○ FOUR (4) Stroke (Petrol) Engine ○ Operation: ▪ Intake ▪ Compression ▪ Power ▪ Exhaust Practical Skill – Use of an engine for learners to identify and explain the purpose of components
	Formal Assessment	The weeks allocated for formal assessment are integrated across the weeks planned for teaching and learning. The assessment will consist of Practical Task/s with a 60% weighting and a Theory test with a 40% weighting.
2 WEEKS	**Activity** • Theory 40% • Practical 60% **<u>PRACTICAL</u>** • Use marking off tools to make a product whereby semi-permanent joining methods must be used by using pop-rivets, bolts and nuts.	
Revision and Examinations	Exam= 80 marks= 40% Practical=50 marks =60% Examination to cover all work done in term 1and term2 Time: 1 hour 30 minutes	

TERM 3

HOURS	TOPIC	CONTENT
3 WEEKS	**MAINTENANCE**	• Lubrication: o Identify lubricant for different components. o Characteristics of a lubricant. o Importance of using the lubricants o Lubrication of machines and equipment. o Inspection frequency o Use and care of appropriate tools and equipment • Automotive batteries: Lead Acid Storage Type (out of vehicle): o Use of personal protective equipment (PPE) when handling batteries. Practical Skill – Demonstration: • Adherence to the SHE procedures • Basic visual inspection

4 WEEKS	**BODY WORKS** **PANEL BEATING**	**REPAIR DIFFERENT COIN SIZE DENT ON FERROUS BODY SHELL WHILE APPLYING SAFETY RULES.** Practical demonstration. • Repair a coin size dent on a body panel. Tools • Identify and assess the damage • Select appropriate tools to be used for repairs. • Planishing hammer • Cross-Pane and Finishing hammer • Curved Pane and Finishing hammer • Pick Finishing hammer • General Purpose Dolly • Heel Dolly • Toe dolly • Curved Dolly • Beating File • Adjustable body file • Orbital sander • Steal brush Practical task. • Repair a coin size dent on a body panel. Tools • Identify and assess the damage • Select appropriate tools to be used for repairs. • Planishing hammer • Cross-Pane and Finishing hammer • Curved Pane and Finishing hammer • Pick Finishing hammer • General Purpose Dolly • Heel Dolly • Toe dolly • Curved Dolly • Beating File • Adjustable body file • Orbital sander • Steal brush

		• Assess the repaired work. Clean the work area and clean and store the tools and equipment.
	SURFACE PREPARATION FOR SPRAY PAINTING	**PERFORM SURFACE PREPARATION ON A BODY PANEL** Practical demonstrations. • Identify and assess the damage on the panel. • Clean panels in accordance with the workshop procedures. • Apply spot putty if needed accordance with job requirement • Select the appropriate sand paper (Wet or Dry). • Demonstrate and perform the sanding operation in according with the job requirement. • Clean and store tools, equipment and material in accordance with workshop procedures. Practical task. • Clean body panels using water. • Select the appropriate sand paper (Wet or Dry). • Apply spot putty if needed accordance with job requirement • Demonstrate and perform the sanding operation in according with the job requirement. • Assess and inspect the sanding and masking procedures Clean and store tools, equipment and material in accordance with workshop procedures.
6 HRS	Formal Assessment	The weeks allocated for formal assessment are integrated across the weeks planned for teaching and learning. The assessment will consist of Practical Task/s with a 60% weighting and a Theory test with a 40% weighting.
Revision and Assement Test = 50 Marks :40 % Practical =50 Marks:60% Time: 1 hour Test to cover all work done in term 3		

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TERM 4

WEEKS	TOPIC	CONTENT
4 WEEKS	**REVISION AND PRACTICALS**	
1 WEEK		

GRADE 9

TERM 1

WEEKS	TOPIC	CONTENT
3 WEEKS	**SAFETY**	General Safety rules • **Accidents** ○ Safe and unsafe conditions or acts ○ Use personal protective equipment (PPE) ○ Good housekeeping ○ Workshop layout ○ Demarcated areas, emergency stops, exits and first aid stations ○ Safety signs • Fire prevention and protection ○ Elements of fire ○ Classification of fires ○ Causes of fires ○ Types of fire fighting equipment ○ Basic First Aid – response and incident management Practical Skill – • How to treat a fractured arm using first aid How to treat a patient in shock.
2 WEEKS	**GRAPHICS COMMUNICATION**	Demonstrate and apply all aspects of drawing. • *Revision of Grade 8 work* • *Free-hand drawings* • *Geometrical drawings* • *Isometric and Orthographic drawings*
3 WEEKS	**TOOLS, INSTRUMENTS AND EQUIPMENTS**	• **Classification and application of Hand tools** ○ Screw drivers ○ Spanners ○ Pliers ○ Cutting tools ○ Marking off tools ○ Hammers • **Classification and application** <u>of measuring equipment</u>: ○ Vernier calliper ○ inside micro-meter and ○ outside micro-meter

		○ Combination set ○ Square ○ Pitch gauge • Care and use of vehicle lifting equipment: ○ Vehicle hoist ○ Trolley jack ○ Trestles • Identify, use and care of power tools: ○ Drill press ○ Bench grinder Practical Skill – Removing and fitting of a vehicle wheel
1 WEEK	**ENTREPRENEURSHIP**	What is entrepreneurship Who is an entrepreneur? Type of entrepreneurship ➢ Small Business entrepreneurship ➢ Scalable start-up entrepreneurship ➢ Large company entrepreneurship ➢ Social entrepreneurship • Why is entrepreneurship important? • What factors affect entrepreneurship? Business Plan
1HR	Formal Assessment	The weeks allocated for formal assessment are integrated across the weeks planned for teaching and learning. The assessment will consist of Practical Task/s with a 60% weighting and a Theory test with a 40% weighting.
Revision and Assessment Assignment = 50 Marks :40 % Practical =50 Marks:60% Time: 1 hour Assignment to cover all work done in term 1 •		

TERM 2

WEEKS	TOPIC	CONTENT

2 WEEKS	**MATERIALS**	**Classification and application of materials:**
		• **Alloys**
		  ○ Ferrous Alloys
		  ○ Non-Ferrous Alloys
		• **Sheet metals**
		  ○ Cold rolled sheets
		  ○ Galvanising sheets
		  ○ Expanded metals
		• **Plastics**
		
		Practical Skill – Classification of plastics (chart with samples)

2 WEEKS	**JOINING METHODS**	• **Riveting -** theory and applications
		• **Soldering** theory and applications on
		  ○ Butt joint
		  ○ Lap joint
		• **Arc welding theory only**
		  ○ Identification of components (Welding machine)
		  ○ Identification of the following welding joints and symbols
		  ➢ Lap joint
		  ➢ Butt joint
		• **Robotic welding(introduction)**
		
		• **PRACTICAL APPLICATION**
		  ➢ Learners to be exposed to the practical application of soldering.

4 WEEKS	**TERMINOLOGY**	• Identify the different components of the machines used in the Mechanical Technology Workshop
		  ○ Centre lathe: Identification and purpose of components
		  ○ Milling Machine (Table, Motor Levers, Switches, Spindle, Stand)
		  ○ Surface grinder (Table, Base, Feed lever, Grinding wheel, Switches)
		  ○ Bench grinder (Tool rest, safety shield, Grinding Wheel, Safety guards, Switches)
		  ○ Pedestal Drill press (Levers, Base, Table, Depth gauge, Column, Motor, Chuck, Spindle and Safety Guards)

		Operations that can be done on a milling machine (Boring, Drilling, Indexing, Gear cutting, Key ways, Splines) • Fundamentals engine technology: o TWO (2) Stroke (Petrol) – 1 cylinder • Identify the parts of a single cylinder two-stroke petrol engine: o Engine parts and function in accordance with design criteria. • Operations of the TWO-stroke single cylinder petrol engine: o Intake / Compression o Power / Exhaust o Comparison of the TWO engines – TWO and FOUR stroke engines Practical Skills – Team investigation/ presentation and presentation on "comparison of a 2 and 4 stroke engine • Terminology and concepts, images of different engine designs. Posters depicting, valves and camshaft layouts like side valve, overhead valve, single overhead cam, double overhead cam, multivalve and cross flow engines. • Multi-media and videos • Two- and four-stroke engines for demonstrations • Consumables • PPE • Worksheets and notes
Revision and Assessment Practical =50 marks =60% • Mid-year Examination =80 marks = 40%		

TERM 3

WEEKS	TOPIC	CONTENT
3 WEEKS	**MAINTENANCE**	• Lubrication service: o Lubrication of machines and equipment. o Inspection frequency o Correct handling of lubricants o Correct storage of lubricants o Use of owner's manual for frequencies • Liquids: o Inspection and top up fluids o Inspect for defects • Batteries: (Lead, Acid Storage and Gel type batteries) – o Handling and care. o Identifying correct size and type for application. • Machine Maintenance: o Importance of regular o Different replaceable components during a service. Practical Skill – Demonstration: • Adherence to the OHSA procedures • Fluid (Oil, coolant and hydraulic fluid) inspections

WEEKS	TOPIC	CONTENT
5 WEEKS	**BODY WORKS** **GRIND AND FEATHER EDGING**	**PERFORM SURFACE PREPARATION ON A BODY PANEL GRIND AND FEATHER EDGING OPERATIONS** Identify the type of panel and name the material it is made from. • Identify and assess the body panel to be repaired. Practical demonstration • Wash panels in accordance with the workshop procedures. • Grind and feather edging operations. Tools; • Electric disc sander/ Air driven disc sander • Orbital sand

		• Sanding blocks Material/Abrasives: • P150 Hook it disc • P80 sand paper • P180 Sand paper • Prepsol • Metal cleaner Practical task • • Wash panels in accordance with the workshop procedures. • Grind and feather edging operations. Tools; • Electric disc sander/ Air driven disc sander • Orbital sand • Sanding blocks Material/Abrasives: • P150 Hook it disc • P80 sand paper • P180 Sand paper • Prepsol • Metal cleaner • Body Filler • Spot putty • Rags • Prepsol cleaner
	PRIMER FOR SPRAY PAINTING	**IDENTIFY THE VARIOUS TYPES OF PRIMERS.** **Practical demonstration** • Identify and explain the use of the primer • Masking of panel that need to be primed • Demonstrate the correct use of Primers in accordance to manufactures manuals **Practical task**

		• Identify and explain the use of the primer • Masking of panel that need to be primed • Demonstrate the correct use of Primers in accordance to manufactures manuals Clean and store tools, equipment and material in accordance with workshop procedures.
Term3 Test = 50marks =40% Practical formal Assessment =50 Marks , 60%		

TERM 4

HOURS	TOPIC	CONTENT
8 HRS	**REVISION AND PRACTICALS**	TERM 1-3 WORK
2HRS	Formal Assessment - EXAMINATION	

SECTION 4

4.1 INTRODUCTION

Assessment is a continuous, planned process of identifying, gathering and interpreting information about the performance of learners, using various forms of assessment. It involves four steps: generating and collecting evidence of achievement; evaluating this evidence; recording the findings and using this information to understand and thereby assist the learner's development in order to improve the process of learning and teaching.

Assessment should be both informal (Assessment for Learning) and formal (Assessment of Learning). In both cases regular feedback should be provided to learners to enhance the learning experience.

Assessment in Electrical Technology measures skills proficiency and knowledge in a range of learning required to work. This capability requires an understanding of the concepts and terminology as well interpretation of circuit diagrams.

4.2 INFORMAL OR DAILY ASSESSMENT

Assessment for learning has the purpose of continuously collecting information about learner performance, that can be used to improve their learning.

Self-assessment and peer assessment actively allow learners to assess themselves. This is important as it allows learners to learn from, and reflect on their own performance. The results of the informal daily assessment tasks are not formally recorded unless the teacher wishes to do so. The results of daily assessment tasks are not taken into account for promotion purposes.

4.3 FORMAL ASSESSMENT

All assessment tasks that make up a formal programme of assessment for the year are regarded as Formal Assessment. Formal assessment tasks are marked and formally recorded by the teacher for progression and certification purposes. All Formal Assessment tasks are subject to moderation for the purpose of quality assurance and to ensure that appropriate standards are maintained.

Formal assessment provides teachers with a systematic way of evaluating how well learners are progressing in a grade and in a particular subject. Examples of formal assessments include tests, examinations, practical tasks, projects, oral presentations, demonstrations, performances, etc. Formal assessment tasks form part of a year-long formal Programme of Assessment in each grade and subject.

Formal assessment tasks form part of a year-long formal Programme of Assessment in each grade and subject, are school-based and are weighted as follows for the different grades:

Grades	Formal School Based Assessments	End-of-year Examinations
R -3	100%	-
4 - 6	75%	25%
7 – 9: Academic stream	40%	External examination 60%
8: Occupational/Vocational stream	60%	Internal Examination 40%
9: Occupational/Vocational stream		External Examination 40%
10 and 11	25% including a mid-year examination	External examination: 75%
12	25% including mid-year and trial examinations	External examination: 75%

The cognitive demands in assessment should be appropriate for the age and developmental level of the learners in the grade. Assessment in Electrical Technology must cater for a range of cognitive levels and abilities of learners. The assessment tasks should be carefully designed to cover the content of the subject as well as the range of skills and the cognitive levels that have been identified in the specific aims. The design of assessments should therefore ensure that a full range of content and skills are assessed within each Grade in the Phase. The specific aims, topics, content and range of skills in the subject should be used to inform the planning and development of assessments.

Formal assessments must cater for a range of cognitive levels and abilities of learners, as shown below:

Cognitive Levels	Percentage of task
Low Order	50%
Medium Order	30%
High Order	20%

4.4 Programme of Assessment in Grades 8 and 9

	Formal School-Based Assessments			Final End-of-Year Assessments
	Term 1	**Term 2**	**Term 3**	**Term 4**
Grade 8	Assignment (theory) 40%	June Examination 40%	Test 40%	
	Practical Task 60%	Practical Task 60%	Practical Task 60%	Examination 100%
Term Report	100%	100%	100%	
End of Year	School Based Assessment (SBA) = 60%			Examination = 40%
Promotion /Progression	SBA + Year End (Internal) Examination = Promotion 60% + 40% = 100%			

Table below compilation of the school-based assessment in grade 8:

Grade 8			
Description	**Time Frame**	**Weighting of Final Mark**	**Mark Allocation**
Assignment	Term 1	4%	50
Practical		8%	50
June Examination	Term 2	8%	80
Practical		8%	50
Test	Term 3	4%	50
Practical		8%	50
Internal Examination	Term 4	60%	120

	Formal School-Based Assessments			Final End-of-Year Assessments
	Term 1	**Term 2**	**Term 3**	**Term 4**
Grade 9	Assignment (theory) 60%	June Examinations 60%	Test 60%	External Examinations 100%
	Practical Task 40%	Practical Task 40%	Practical Task 40%	
Term Report	100%	100%	100%	
End of Year	School Based Assessment (SBA) = 60%			External Examinations = 40%
Promotion /Progression	SBA + External Examinations = Promotion/ Progression 60% + 40% = 100%			

Table below compilation of the school-based assessment in grade 9:

Grade 9			
Description	**Time Frame**	**Weighting of Final Mark**	**Mark Allocation**
Assignment	Term 1	**4%**	**50**
Practical		**8%**	**50**
June Examination	Term 2	**8%**	**80**
Practical		**8%**	**50**
Test	Term 3	4%	50
Practical		8%	50
External Examination	Term 4	60%	120

Table below compilation of the school-based assessment in grade 9:

Grade 9			
Description	**Time Frame**	**Weighting of Final Mark**	**Mark Allocation**
Assignment	Term 1	4%	50
Practical		8%	50
June Examination	Term 2	8%	80
Practical		8%	50
Test	Term 3	4%	50
Practical		8%	50
External Examination	Term 4	60%	120

In grade 9 the focus shifts to the different pathways. Learners must consolidate required skills for the qualification. Learners develop independent mastery of skills.

Assignment

An assignment is a short task of 1 hour and includes activities such as translation activities, analysis and interpretations of data, Research, Case study, Calculations and drawings and justifying of conclusions. It could further include an activity that the learners do that simulates an Electrical activity or action. This could include the building of models, computer simulations, planning documents, data gathered from experiments, etc. That are based on a specific technological activity. It should cover all term1 with a mark allocation of 50 marks. The forms of assessment used should be age and developmental level appropriate. The design of these tasks should cover the content and context of the subject and include a variety of tasks designed to achieve the objectives of the subject.

Test

A test for formal Assessment should not comprise of a series of small tests be made up of several smaller tests. A test should cover term 1 content and should be set for 60 minutes with a mark allocation of 50 marks (Allocate1mark per fact). The test must cater for a range of cognitive levels. The design of the task should cover the content and context

Examination

Each examination must cater for a range of cognitive levels. For Grades 8 and 9, the 1-hour Mid-year(June) examination in Electrical Technology comprises (80 marks) The midyear examination should cover term 1 and term 2 content. For Grades 8 and 9, the 1 hour 30 minutes' final examination in Electrical Technology comprises (120 marks). The final examination should cover all term 1to term 4 content in Grade 8 and 9. The assignment, term3 test and the mid-year examination and final examination question papers are set by the teacher. The question papers must be moderated by the head of department at the school and approved by the district curriculum advisors / facilitator. This is done to ensure that the prescribed weightings are adhered to by the teacher. The end of the year examination for grade 9 question paper will bet externally set.In the Grade 9 examination **only Grade 9 content** will be assessed. However, prior knowledge from Grade8 may be necessary to interpret and answer some of the questions.

4.3.3. Test weighting in Mechanical Technology

Term 3 test (50 Marks)

Topic	**Grade 8**		**Grade 9**	
	Percentage	**Marks +/- 3marks**	**Percentage**	**Marks +/- 3marks**
Maintenance	24%	12	24%	12

Body works	38%	19	38%	19
	7.5%	19	7.5%	19
		50		50

4.3.4. Exam weighting in Mechanical Technology

June Examination (80 Marks)

Topic	**Grade 8**		**Grade 9**	
	Percentage	**Marks +/- 3marks**	**Percentage**	**Marks +/- 3marks**
Section A (Generic)				
Safety	12.5%	10	12.5%	10
Graphics Communication	12.5%	10	12.5%	10
Tools and Equipment	15%	12	15%	12
Entrepreneurship	7.5%	6	7.5%	6
Section B (Subject Specific)				
Materials	7.5%	6	7.5%	6
Joining Methods	10%	8	10%	8
Terminology	35%	28	35%	28

Total	**100%**	**80**	**100%**	**80**

November Examination (120 Marks)

Topic	**Grade 8**		**Grade 9**	
	Percentage	**Marks +/- 3marks**	**Percentage**	**Marks +/- 3marks**
Safety	5.8%	7	5.8%	7
Graphics Communication	5.8%	7	5.8%	7
Tools	3.3%	4	3.3%	4
Entrepreneurship	8.3%	10	8.3%	10
Section B (Subject Specific)				
Materials	3.3%	4	3.3%	4
Joining Methods	8.5%	10	8.5%	10
Terminology	30%	36	30%	36
Maintenance	20%	24	20%	24
Body Works	15%	18	15%	18
TOTAL	**100%**	**120**	**100%**	**120**

.4.4. Clarification on theory assessment periods

Grade 8:

Term 1 theory assessment (an assignment) should cover term 1content only

Term 2 theory assessment (Mid-year Examinations) *should cover term* 1 and term2content only.

Term 3 theory assessment(Test) should cover term 3 content only

Term 4 theory assessment should cover terms 1,2,3 and 4 (Internal Examination) **Grade 9:**
Term 1 theory assessment (an assignment) should cover term 1content only

Term 2 theory assessment (Mid-year Examinations) *should cover term* 1 and term2 content only.

Term 3 theory assessment(Test) should cover term 3 content only

Term 4 theory assessment should cover terms 1,2,3 and 4 (External Examination)

4.5 RECORDING AND REPORTING

Recording is a process in which the teacher documents the level of a learner's performance in a specific assessment task. It indicates learner progress towards the achievement of the knowledge as prescribed in the Curriculum and Assessment Policy Statements. Records of learner performance should provide evidence of the learner's conceptual progression within a grade and her/his readiness to progress or promote to the next grade. Records of learner performance should also be used to verify the progress made by teachers and learners in the teaching and learning process.

Reporting is a process of communicating learner performance to learners, parents, schools, and other stakeholders. Learner performance can be reported in a number of ways. These include report cards, parents' meetings, school visitation days, parent-teacher conferences, phone calls, letters, class or school newsletters, etc. Teachers in all grades report in percentages against the subject. Seven levels of competence have been described for each subject listed for Grades R - 12. The various achievement levels and their corresponding percentage bands are as shown in the Table below.

Codes and Percentages for Recording and Reporting

Rating code	Description of competence	Percentage
7	Outstanding achievement	80 - 100
6	Meritorious achievement	70 - 79
5	Substantial achievement	60 - 69
4	Adequate achievement	50 - 59
3	Moderate achievement	40 - 49
2	Elementary achievement	30 - 39
1	Not achieved	0 - 29

Note: The seven-point scale should have clear descriptors that give detailed information for each level.

Teachers will record actual marks against the task by using a record sheet; and report percentages against the subject on the learners' report cards.

4.6 MODERATION OF ASSESSMENT

Moderation refers to the process that ensures that the assessment tasks are fair, valid and reliable. Moderation should be implemented at school, district, provincial and national levels. Comprehensive and appropriate moderation practices must be in place for the quality assurance of all subject assessments.

Formal assessment (SBA)
Moderation of written tests and examinations will be conducted by the curriculum advisors / facilitator or a peer teacher.
Grade 8and 9 tasks are internally moderated except for the PAT that is externally moderated. The curriculum advisors/ facilitator must moderate a sample of these tasks during school visits to verify the standard of the internal moderation.
Moderation of written tests constitutes a re-mark of the learner's work to ensure assessment by the teacher is correct. Moderation should be done on three tiers: school, district and province.
School-based moderation requires the HOD to check / control the following:
Learner compliance
•(a)Work done by learners complies with the following requirements:

• Classwork, Homework must reflect the textbook page reflecting a textbook page and exercise reference
• Learner scripts are required to show scrutiny and interaction from the teacher in red pen
• All teacher actions / interventions in the script must be dated
• Learners are required to mark all self-assessments in pencil and all corrections to be shown in pencil.

4.9 Practical Assessment Task (PAT)
The Department of Basic Education issues a Practical Assessment Task for Grade 9 every year.
The format of the Grade 9 PAT is duplicated for Grade 8
In all grades each learner must do a Practical Assessment Task for the year
Grades 8 Teachers will set and assess the Practical Assessment Task and it will be moderated externally by the curriculum advisors/ facilitator.

Grade 9: The practical assessment tasks for Grade 9 will be assessed by the teacher and will be externally moderated by the provincial curriculum advisors/ facilitator.
The date for the external moderation will be decided by the province in which the school is situated.
The provincial education departments or schools may not change or use the task of the previous year. Provisioning of the resources for the Practical Assessment Task is the responsibility of the school and schools should ensure that adequate time and funding is allocated for the completion of the Practical Assessment Task. Practical sessions should be scheduled in such a way that learners have enough time to practise skills needed for the completion of the PAT. Weekly practice sessions are necessary for the learner to hone the needed skills.

The ratio of learners per teacher for all practical work is 1 teacher per 15 learners or part thereof. For groups exceeding15, this means that multiple teachers would be required inside the workshop while practical work is being conducted. Alternatively, groups should be split into numbers below 15 to ensure that a ratio of 1:15 is not exceeded at any time. The motivation for smaller groups lies in the differentiation and mentoring of technical skills that require one on one contact between

teacher and learner. The safety of learners is paramount and smaller groups would ensure compliance with the OHS Act 87 of 1993.

NB: The completed PAT project will be made up from different phases and tasks.
Although the final PAT product only needs to be completed in the third term, learners should start working on phase 4
from the first term in order to avoid running out of time to complete the PAT.
Although the final PAT product only needs to be completed in the third term, learners should start working from the first term in order to avoid running out of time to complete the PAT.

4.7 Progression / Promotion
A learner needs to achieve at least 30% of the final mark to pass Mechanical Technology.

4.8 General
This document should be read in conjunction with:
4.11.1 National policy pertaining to the programme and promotion requirements of the National Curriculum Statements
Grades R – 12; and

4.9 The policy document, National protocol for Assessment Grades R – 12.