Every child is a National Asset

2020 REVISED CURRICULUM AND ASSESSMENT PLANS

TECHNOLOGY

GRADE 8

Implementation: June 2020

basic education
Department:
Basic Education
REPUBLIC OF SOUTH AFRICA

Read to Lead
A Reading Nation is a Leading Nation

Presentation Outline

1. Purpose
2. Amendments to the Content Overview for the Phase;
3. Amendments to the Annual Teaching Plan;
4. Amendments School Based Assessment (SBA)
5. Conclusion

1. Purpose

- To mediate the amendments of the trimmed and re-organised 2020 Annual Teaching Plan including School Based Assessment for Subject, Grade 8, Technology for implementation in June 2020 as stipulated in Circular S2 of 2020.
- To ensure that **meaningful teaching proceeds** during the remaining teaching time as per the revised school calendar.
- To assist teachers with **guided pacing and sequencing** of curriculum content and assessment.

1. Purpose (continued)

- To enable teachers to **cover the essential core content /skills** in each grade within the available time.
- To assist teachers with **planning** for the different forms of **assessment**.
- To ensure learners are **adequately prepared** for the **subsequent year/s** in terms of content, skills, knowledge, attitudes and values

2. Amendments to the Content Overview for the Phase

Summary: Amendments to the Content Overview for the Phase

GRADE 7	GRADE 8	GRADE 9
STRUCTURES		
Definition and purpose Classification	Adapting materials to withstand forces – reinforcing concrete, plywood.	Strength of materials under the action of forces: compression, tension, torsion, and shear.
Investigating the cell phone tower (Frame Structure)	Selecting metal sections (I-beam, angle iron, T-bar, etc.) to withstand forces and to save material.	Properties of construction materials: mass, density, hardness, stiffness, flexibility, corrosion.
Case Study Examining existing structures		Suitability of materials (fitness-for-purpose) in terms of properties, safety and cost effectiveness.
Action research: How to stiffen structure Tubing, Folding ,Triangulation		Task: identify and solve problems related to community on the far side of a river.

Summary of the Content Overview for the Phase

GRADE 7	GRADE 8	GRADE 9
STRUCTURES		
Evaluation • Advantages and disadvantages of cell phone and land line		

Summary: Amendments to the Content Overview for the Phase

MECHANICAL SYSTEMS AND COTROL

• Machines (simple and complex) • Mechanical advantage	• Gear systems – concepts (counter rotation, idler, velocity ratio, force multiplication).	Learners experiment with two different sizes of syringes linked by a tube and filled with hydraulic fluid (water). Learners experience force transfer with either force multiplication or force division (depending on which syringe is the driver/master). Gases (like air) are compressible. Liquids (like water, oils) are incompressible.
What is a mechanical advantage? • Cranks • Pulleys	• Two spur gears of equal size – note counter rotation and velocity ratio.	
	• Two spur gears of unequal size – note velocity ratio and force ratio (mechanical advantage < or > 1).	
	• Two spur gears connected via an idler – note synchronised rotational direction.	• Pascal's principle – pressure exerted on one part of a hydraulic system will be transferred equally without any loss in all directions to other parts of the system.

Overview for the Phase

	• Two bevel gears linked to transfer the axis of rotation through 90o.	Note that equal volumes of liquid are moved through the systems, and this results in different extensions (amount of movement) where syringes (cylinders) are of different sizes, so less distance/more force (MA > 1); and more distance/less force (MA < 1).
	• *Calculate* mechanical advantage (MA)	
	• Levers: mechanical advantage calculations for levers using ratios.	
	• Calculations using LOAD/EFFORT; load ARM/effort ARM; etc.	THE HYDRAULIC PRESS (including simple calculations). • The hydraulic jack. • Draw a systems diagram which describes the way a hydraulic jack works.
	• Gears: mechanical advantage calculations for gears using ratios	

Summary: Amendments to the Content Overview for the Phase

	• Calculations using tooth ratios; gear wheel diameters; velocity ratios	ACTION RESEARCH: practical investigations: - Use a single wheel fixed pulley to change the direction of pull (MA = 0).
	• Represent gear systems graphically: use circular templates and/or pair of compasses to draw gear systems with:	Use a single wheel moveable pulley to change the direction of pull (MA > 0). - Use a pulley block system (block and tackle) to determine the relationship between loadbearing ropes on moveable pulley wheels and M.A (force multiplication).
	▪ The driven gear rotating in the *opposite* direction to the driver (counter rotation).	
	▪ The driven gear rotating in the *same* direction to the driver (include an idler gear).	INVESTIGATE: learners find out about the following mechanical control systems: - Ratchet and pawl. - Disc brake. - Bicycle brake & Cleat.

Summary: Amendments to the Content Overview for the Phase

	▪ The driven gear rotating *faster* than the driver (with and without an idler).	Lead learners as they find out about the interactions of the following: - Bevel gears of equal size – axis of rotation 90˚. - Bevel gears of unequal size – axis of rotation 90˚ – Note velocity/force relationships. - Rack-and-pinion gear system as found on automatic gates and steering racks. - Worm gear system for large reduction in speed and increase in force.
	▪ The driven gear rotating *slower* than the driver (with and without an idler).	
	• Design brief: learners write a design brief with specifications for a device that will use a combination of gears to achieve:	
	• A mechanical advantage with force multiplication of three times.	EVALUATE: learners examine various items using mechanisms found in the modern kitchen and/or home, workshop/garage.

Summary: Amendments to the Content Overview for the Phase

	• An increase in output velocity of four times.	ARTISTIC DRAWING: single vanishing point perspective. - Learners draw a 3D wooden object using single VP perspective. They enhance the drawing showing the texture of the wood grain, colour and shadows - Learners use single VP perspective to draw an inside view of the classroom.
	• Investigate:	
	▪ Acid mine drainage..... OR	
	▪ Dust pollution from mine dumps on residential areas. ..... OR	
	▪ Indigenous mining of iron in South Africa before the modern era..... OR	
	▪ Gender bias in career choice/opportunities related to mining.	

Overview for the Phase

	• Drawings for the shaft head-gear – each learner draws a:	
	• 3D isometric drawing of the selected design giving dimensions and drawn to scale.	
	• 2D working drawing showing one or more views with dimensions and lines.	
	• Budget: prepare detailed realistic budget of expected costs.	

Summary: Amendments to the Content Overview for the Phase

ELECTRICAL & ELECTRONIC SYSTEMS AND CONTROL

Electrical Systems Magnetism • What is magnetism? • Practical Investigation • Types of magnets (Bar and horse shoe	Advantages and disadvantages of: • Thermal power stations • Wind-driven turbines	Electronic systems and control – how simple electronic circuits and devices are used to make an output respond to an input.
Case Study • Examining of cranes • Crane designing (Single VP) • Electrical circuits • Drawing of circuit components	• Alternating current • The national grid	Revise 1 – component symbols: • Cells in series and parallel. • Lamps in series and parallel. • Switches in series (AND logic) and parallel (OR logic). • Current in the circuit – conventional current flows from positive to negative.

Overview for the Phase

ELECTRICAL & ELECTRONIC SYSTEMS AND CONTROL

Practical Demonstration • Magnetic and non magnetic materials	• Energy for heating, lighting and cooking in rural and informal settlements.	Revise 2 – simple circuits: • One cell, switch, two lamps in series. • Two cells in series, switch, two lamps in series.
Case Study • Recycling scrap metal • Electrical Circuit	• Energy from illegal connections; ethical issues; safety considerations.	Ohm's Law quantitatively: *as voltage increases, current increases if resistance is constant*.
Designs • Two possible designs (single VP) • Draw circuit diagram of an electro magnet with a light	• Equitable sharing of resources • Written report on above issues.	Learners should be able to read a given electronic circuit diagram and assemble the components into a working circuit.

Summary: Amendments to the Content Overview for the Phase

Revision of 3D drawings • **Oblique drawing** • **Flow chart (Manufacturing of an electro magnetic crane)**	• **Simple circuit components; input devices; output devices; control devices**	**Input components: electrochemical cells, photovoltaic cells.**
• Presentation of designs • Working drawings of the electromagnetic crane	• Correct connections, short circuits. • Electrical components and their accepted symbols.	Action Research: testing Ohm's Law practically – measure the voltage (potential difference) and the current strength in each of the following circuits: • One cell connected to a 20W resistor. • Two cells connected to the 20W resistor. • Three cells connected to the 20W resistor.
	• Drawing electrical circuits using accepted symbols	
	• Set up circuits using a range of components. • Draw the circuits using symbols	

Summary: Amendments to the Content Overview for the Phase

	• Practical: learners draw circuit diagrams AND connect circuits showing the effect of circuits with resistors connected in series and parallel.	Plot the readings on a graph and determine the relationship between potential difference and current strength while keeping the resistance constant.
	• Electrochemical cells. • Practical: make your own batteries – fruit, vegetable and salt water batteries. • Advantages and disadvantages of series and parallel batteries.	Resistor Colour Codes: • Low value resistors often have their resistance value printed on them in numbers. • Higher value resistors are coded using coloured bands. The first three bands give the value of the resistor in ohms. The fourth band is an accuracy rating as a percentage.
	• Photovoltaic cells - advantages and disadvantages of solar cells.	**Calculate values:** $R = \frac{V}{I}$ use to calculate R if V and I are known. $V = IR$ use to calculate V if I and R are known. $I = \frac{V}{R}$ use to calculate I if V and R are known.

Summary: Amendments to the Content Overview for the Phase

	• Investigation: AND logic gate and simple cases where it is used.	Switches: Manual switches controlled by the user, e.g. push, SPST, SPDT, DPDT.
	• Investigation: OR logic gate and simple cases where it is used.	• Diodes and led (light emitting diode): - A diode is a component that allows current to flow in one direction only.
	• Lesson: truth tables for AND & OR logic conditions.	- A LED allows current to flow in one direction only and also gives off light and is often used as an indicator that a circuit is 'ON'.

Summary: Amendments to the Content Overview for the Phase

		Transistors: only npn-type will be used at this level. - A transistor is a device that can act as a *switch* and it can *amplify* a small current (e.g. from a sensor) into a larger current. - Connect a simple transistor circuit.

Summary: Amendments to the Content Overview for the Phase

PROCESSING

Investigation of emergency situations • Situations that causes people to be refugees • Problems faced by refugees	• The positive impact of technology: Some new materials are environmentally friendly by being bio-degradable.	PRESERVING METALS (painting, galvanizing - theoretically, Electroplating – demonstration/video)
Processing food • Investigation of types of food supplied to people in a refugee camp • Designing a tasty nutritious menu for refugees	• Case study 1: investigate the impact of plastic shopping bags on the environment.	1.1 Painting 1.2. Galvanising 1.3. Electroplating
• Flow chart of preparing the menu • Preparation of the menu • **Evaluation** of the menu (texture and nutrition)	• Report: learners write a report the use of thicker, bio-degradable plastic shopping bags.	PRESERVING FOOD (storing grain & storing grain - theoretically, Drying and/or salting – demonstration/video)

Summary: Amendments to the Content Overview for the Phase

PROCESSING

Investigation of clothes worn by people in specialised occupations (e.g. fire department)	• Case study 2: Investigate how waste paper and cardboard are recycled.	2.1. Storing grain 2.2. Pickling 2.3. Drying and/or salting
		INVESTIGATION: identification of plastic identifying - codes and sorting for recycling
		PROPERTIES OF PLASTICS Reduce – reuse – recycle
		CASE STUDY: Remanufacturing waste plastic into pellets for re-use.
		**Systems diagram: Draw a systems diagram describing a plastics recycling project.

Summary: Amendments to the Content Overview for the Phase

	• Development: draw a development of an opened container.	CASE STUDY: Moulding recycled plastic pellets into products.
Textile used to make clothes for fire fighters Textile used to make clothes for members of NSRI **Scenario** Tragic shack fire/ natural disaster may create need for emergency	• Investigate a technological product that can have a negative impact on society. • Class discussion on possible solutions for the negative impact of the technology identified.	CASE STUDY: plastics used on modern motor cars. CASE STUDY: plastics used around the home.
		PROBLEM IDENTIFICATION: learners identify a need or want that can be satisfied by the making of a plastic item of their own design.

Summary: Amendments to the Content Overview for the Phase

Investigation Material and building techniques for a temporary structure		SKETCH: learners sketch their plastic item using isometric projection on grid paper.
Comparison of building material and building techniques used by indigenous people/people in the informal settlement		PLAN: learners draw their plastic item using first angle orthographic projection.
Chemicals which can water proof like canvas		SKILLS DEVELOPMENT: learners practice the skills needed to manufacture their plastic item – measure, mark out, cut, bend and join. Moulding is an optional extra

Summary: Amendments to the Content Overview for the Phase

Examine the burning characteristics of various materials Design brief for and specification for textiles to be used for making an emergency shelter. Design of an emergency shelter(easy to transport and erect)		PRACTICAL SESSIONS: working safely, learners measure, mark out, cut and bend the materials for their plastic item, and then assemble the product.
		• Each learner compiles a record of his/her term's work including extending the lifespan of metals and food, properties and uses of various plastics, the plastics recycling strategy, the case studies, and the sketches and plans for the plastic item.

3. Amendments to the Annual Teaching Plan

Grade 8 - Annual Teaching Plan

- Annual Teaching Plan 

- Jaarlikse Onderrigprogram 

Summary: Reorganisation of content topics

WEEK	CONTENT, CONCEPTS AND SKILLS
	GRADE 8 REVISED TERM 2 CONTENT
1	THE POSITIVE IMPACT OF TECHNOLOGY: many natural materials have been replaced in modern times by new or improved materials. Some new materials are environmentally friendly by being biodegradable. Case study 1: investigate the impact of plastic shopping bags on the environment. REPORT: learners write a report evaluating the effectiveness of using thicker, bio-degradable plastic shopping bags which shoppers must buy.
2	• Case study 2: technology with a positive impact on society. • Investigate how waste paper and cardboard are recycled to produce new products for the packaging industry. • Development: draw a development of an opened container.
3	• Case study 3: technological products can have a negative impact. • INVESTIGATE a technological product that can have a negative impact on society. • CLASS DISCUSSION: facilitate a class discussion on possible solutions that can counteract or compensate for the negative impact of the technology identified. • Adapting materials to withstand forces – reinforcing concrete, plywood. • Selecting metal sections (I-beam, angle iron, T-bar, etc.) to withstand forces and

Summary: Reorganisation of content topics

WEEK	CONTENT, CONCEPTS AND SKILLS
	GRADE 8 REVISED TERM 2 CONTENT
4	• Calculate Mechanical advantage (MA) • Levers: mechanical advantage calculations for levers using ratios. • Calculations using LOAD/EFFORT; load ARM/effort ARM; etc. • Do NOT use the method of "taking moments about a point". • Gears: mechanical advantage calculations for gears using ratios. • Calculations using tooth ratios; gear wheel diameters; velocity ratios
5	• REPRESENT GEAR SYSTEMS GRAPHICALLY: use circular templates and/or pair of compasses to draw gear systems with: • The driven gear rotating in the opposite direction to the driver (counter rotation). • The driven gear rotating in the same direction to the driver (include an idler gear). • The driven gear rotating faster than the driver (with and without an idler). • The driven gear rotating slower than the driver (with and without an idler). DESIGN BRIEF: learners write a design brief with specifications for a device that will use a combination of gears to achieve: A mechanical advantage with force multiplication of three times.An increase in output velocity of four times.

Summary: Reorganisation of content topics

WEEK	CONTENT, CONCEPTS AND SKILLS
	GRADE 8 REVISED TERM 2 CONTENT
6	Sketches (2D) showing gear systems that: Provide an output force four times greater than the input force (MA = 4:1). Provide double the rotation rate on a driven axle at 90o to the driver axle. SYSTEM ANALYSIS – bicycle gear system Analysis of the gears used on modern bicycles – terminology: master/slave or driver/driven; chain wheel; cogs. SYSTEMS DIAGRAMS Analyse a mechanical system by breaking it into input-process-output. Draw a Systems Diagram for a gear system with a mechanical advantage of 4:1. Plan a mechanical system to produce a specific output. Systems diagram for a gear train with the driven gear rotating faster than the driver.
7	INVESTIGATE and report on one of the following: Distribute the investigations so all are covered and reported in each class. INVESTIGATE: The impact on the environment as a result of mining of:Acid mine drainage..... OR INVESTIGATE: The impact on the environment as a result of mining of:Dust pollution from mine dumps on residential areas. ..... OR INVESTIGATE: Iron age technology: Indigenous mining of iron in South Africa before the modern era..... OR INVESTIGATE: Bias in technology: Gender bias in career choice / opportunities related to mining.

Summary: Reorganisation of content topics

WEEK	CONTENT, CONCEPTS AND SKILLS
	GRADE 8 REVISED TERM 2 CONTENT
8	INVESTIGATE: Lifting mechanisms (wire rope-driven mine head-gear) in use at South African mines for raising people and ore. Sketch: initial idea sketches to meet the requirements given in the scenario. Design brief with specifications and constraints.
9	DRAWINGS for the shaft head-gear – each learner draws a: 3D isometric drawing of the selected design giving dimensions and drawn to scale. 2D working drawing showing one or more views with dimensions and lines. Budget: individual learners prepare a realistic budget detailing expected costs of constructing a real mine shaft headgear, detailing valid prices of materials and labour costs of the range of workers who would be involved in designing and building such a device.
10	REVISE: simple circuit components; input devices (electrochemical cell; generator; solar panel), output devices (resistor; lamp; heater; buzzer; motor); control device (switches). Note: Some devices can serve as input, output, process or control device. CORRECT CONNECTIONS, short circuits. Electrical components and their accepted symbols. DRAWING ELECTRICAL CIRCUITS using accepted symbols (as in Grade 12 see Addend TEACHER SET UP CIRCUITS using a range of components. Learners draw the circuits

Summary: Reorganisation of content topics

WEEK	CONTENT, CONCEPTS AND SKILLS
	GRADE 8 REVISED TERM 2 CONTENT
11	Energy for heating, lighting and cooking in rural and informal settlements. Energy from illegal connections; ethical issues; safety considerations. CLASS DISCUSSION: equitable sharing of resources – industry needs reliable power for job creation; schools need power for lighting and computing. WRITTEN REPORT: Learners write a balanced report on these issues.
12	ELECTROCHEMICAL CELLS. Practical: make your own batteries – fruit, vegetable and salt water batteries. Advantages and disadvantages of series and parallel batteries. Photovoltaic cells - advantages and disadvantages of solar cells.
13	GENERATE ELECTRICITY FOR THE NATION – ADVANTAGES AND DISADVANTAGES of: Thermal power stations (steam turbines – sources of heat: coal, gas, nuclear, sun). Hydroelectric power stations (including pumped storage schemes). Wind-driven turbines. ALTERNATING CURRENT; step-up and step-down transformers; distributing electric power across the country: the national grid.
	•Practical: learners DRAW CIRCUIT DIAGRAMS & CONNECT CIRCUITS showing the effect of circuits with resistors connected in series and parallel.

Summary: Reorganisation of content topics

WEEK	CONTENT, CONCEPTS AND SKILLS
	GRADE 8 REVISED TERM 2 CONTENT
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	•Practi[boilerplate]NNECT CIRCUITS showing the effect of circuits with resistors connected in series and parallel.

Summary: Reorganisation of content topics

WEEK	CONTENT, CONCEPTS AND SKILLS
	GRADE 8 REVISED TERM 2 CONTENT
15	Investigation: AND logic gate and simple cases where it is used. Investigation: OR logic gate and simple cases where it is used. Lesson: truth tables for AND & OR logic conditions.
16	Revise term 4 content
17	Test on term 4 Content

Summary: Content/Topics Amended Grade 8

Content/Topics	Term / Week	Amendment
Practical activity: Design and make packaging for a purpose	2 / 3	• Removed • Making and assembling requires the use and sharing of tools which will put learners at greater risk of infecting one another.
Revise: forces that act on material	2 / 5	• Removed • This is only revision. Topic was addressed in Term 1.
Design: • adapt a material or design a product that will solve the problem • free-hand sketches showing two possible solutions.	2 / 6 & 7	• Removed • Skills are repeatedly addressed and assessed throughout the senior phase. • sharing of tools poses added risk

Summary: Content/Topics Amended Grade 8

Content/Topics	Term / Week	Amendment
Make: learners make the model/prototype/product they have designed safely	2 / 6 & 7	• Removed • Making skills also poses the added risk of learners infecting one another through the sharing of tools and material.
Evaluate: learners evaluate their solution in terms of its effectiveness…, etc.	2 / 7	• Removed • Evaluation skills are repeatedly addressed and assessed throughout the senior phase. • This also requires team work and may compromise the requirement for social distancing.

Summary: Content/Topics Amended: Grade 8

Content/Topics	Term / Week	Amendment
Communicate: Teams present their plans, model and evaluation.	2 / 8	• Removed • Skills are repeatedly addressed and assessed throughout the senior phase.
Revise: Levers – single levers and levers linked in pairs.	3 / 1	• Removed • This is revision of the concept. This topic was addressed in grade 7 term 1, week 4-6 (pp14&15).
Draw: isometric projection using simple instruments to draw sketches showing gear systems that meet each of the two above specifications.	3 / 3	• Removed • Sharing of drawing instruments poses a risk of leaners infecting one another.

Summary: Content/Topics Amended: Grade 8

Content/Topics	Term / Week	Amendment
• **Simulation:** teams form mechanical engineering companies. • They evaluate sketches of individuals and select the best idea for the team tender bid. • Make: teams build their working scale model.	3 / 8	• Removed • Team work may compromise social distancing. • The skills are also addressed and assessed repeatedly throughout the senior phase.
• **Communicate:** teams present their tender proposal for the mine shaft headgear (research, plans, flow chart, model and budget) to the "Tender Board".	3 / 9	• Removed • Team work may compromise social distancing. • The skills are also addressed and assessed repeatedly throughout the senior phase.

Summary: Content/Topics Amended 8

Content/Topics	Term / Week	Amendment
Investigation: introduce Ohm's Law	4 / 5	• Removed • Ohm's Law will be addressed in more detail in grade 9.
• Design brief: learners write a design brief giving specifications for a suitable panic button system OR scenario given by the textbook. • Circuit diagram: draw the circuit diagram using correct symbol conventions. • Make: connect the components specified to form a circuit suitable for at least t	4 / 7	• Removed • This is the application of knowledge and skills already acquired during the term. It also involves team work and handling and sharing of tools which will compromise social distancing and put learners at risk of infecting one another.

Summary: Content/Topics Amended: Grade8

Content/Topics	Term	Amendment
• Design brief: learners write a design brief giving specifications for a suitable panic button system OR scenario given by the textbook. • Circuit diagram: draw the circuit diagram using correct symbol conventions. • Make: connect the components specified to form a circuit suitable for at least two switches.	4 / 7	• Removed • This is the application of knowledge and skills already acquired during the term. It also involves team work and handling and sharing of tools which will compromise social distancing and put learners at risk of infecting one another.
• Communicate: learners draw the truth table for the device. • Communicate: learners prepare an advertising poster for their device.	4 / 7	

4. Amendments School Based Assessment (SBA)

Summary: Revised Programme of Assessment

Term 1	Term 2	Term 3	Term 4
PAT 1: Assignment (Investigate and Design)	Mid-year exam was removed	**PAT 2:** Assignment (Investigate and Design)	End of Year Assessment: **Test**
MARK ALLOCATION			
70 Marks		70 Marks	Gr 7 – 30 Marks Gr 8 – 40 Marks Gr 9 – 40 Marks

Summary: Weighting of Revised Programme of Assessment: Gr 7-9

	Term 1	Term 2	Term 3	Term 4
SBA	PAT 1	No Formal Ass (NFA)	PAT 2	Test
	40%		40%	20%

Summary: Revision: Final Structure for Test

	Grade 7	Grade 8	Grade 9
Total Mark	30	40	40
Specific Aim 1 (50%)	15	20	20
Specific Aim 2 (30%)	9	12	12
Specific Aim 3 (20%)	6	8	8

5. Conclusion

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