

## 2021 Annual Teaching Plan – Term 2: TECHNOLOGY: Grade 8

## GRADE 8 TERM 1

Term 1 45 days	Week 1 27-29 January (3 days)	Week 2 1-5 February	Week 3 8-12 February	Week 4 15-19 February	Week 5 22-26 February
CAPS Topic	Revision	Structures		Communication skills (Learners must not share any resources)	
Core Concepts, Skills and Values	<ul style="list-style-type: none"> <li>Learners complete the baseline assessment.</li> <li>Teachers to discuss the content of the assessment with learners after completing the activity.</li> </ul>	Definition of <b>frame</b> structures. <ul style="list-style-type: none"> <li>Purpose of structural members (components) in wood and steel roof trusses (king and queen post, strut, tie, rafter, tie beam).</li> <li>Learners identify structural members and type of force (shear, torsion, tension, compression) acting on them in given frame structures.</li> <li><b>Case study:</b> Electrical pylons – use pictures of a range of pylon designs noting:               <ul style="list-style-type: none"> <li>The variety of designs that solve the same problem effectively.</li> <li>The use of <b>internal</b> cross-bracing and triangulation to provide stiffness.</li> </ul> </li> <li>Structural members under tension/compression (<b>worksheet</b>).</li> </ul> <b>Structural members</b> <ul style="list-style-type: none"> <li>Structures that span over space:               <ul style="list-style-type: none"> <li>Beams: steel I-beams (girders), concrete lintels; beam and column bridge.</li> <li>Alternative bridge supports: suspension bridges; cable-stayed bridges.</li> <li>Arches: arches in buildings, bridges, dam walls.</li> <li>Cantilevers: simple cantilever, cable stayed cantilever. <b>Structural failure</b> – the three most likely ways structures fail are:                   <ul style="list-style-type: none"> <li><b>Fracture</b> of a member – due to lack of strength.</li> <li><b>Bending</b> (flexing, buckling) – due to lack of stiffness (rigidity).</li> <li><b>Toppling over</b> – due to lack of stability (top heavy, narrow base).</li> </ul> </li> </ul> </li> </ul>		<ul style="list-style-type: none"> <li><b>Purpose of graphics:</b> develop and communicate ideas.</li> <li><b>Conventions:</b> outlines (thick/dark); construction lines (thin/feint); hidden detail (dashed); centre lines (chain dash-dot); scaling up and scaling down; dimensioning (in mm).</li> <li><b>Working drawing</b> techniques for planning:               <ul style="list-style-type: none"> <li>Single view flat 2D drawing with dimensions, line types and scale.</li> <li>Isometric – using underlying isometric grid (term 1) and simple instruments (term 3).</li> </ul> </li> <li><b>Artistic drawing:</b> Double vanishing point perspective with colour, texture and shading.               <ul style="list-style-type: none"> <li>Sketching – using pencil, ruler and blank paper.</li> <li>Enhancing drawing to promote realism using colour, texture, shading and shadows.</li> </ul> </li> </ul>	
Requisite Pre-Knowledge	Gr 7 knowledge and skills	Types and functions of structures.		Basic graphic communication skills	
Resources (other than textbook) to enhance learning		DBE Sasol Inzalo workbooks/ Textbooks and any applicable resource whether “YouTube” videos, etc.		DBE Sasol Inzalo workbooks/ Textbooks and any applicable resource whether you tube videos, etc.	
Informal Assessment	Baseline assessment	Informal Assessment		Informal Assessment	
SBA (Formal Assessment)					

/Term 1 45 days	Week 6 1-5 March	Week 7 8-12 March	Week 8 15-19 March	Week 9 23-26 March (4 days)	Week 10 29-31 March (3 days)
CAPS Topic	Mechanical Systems and Control			PAT 1 (Assignment: Investigate and Design)	
Core Concepts, Skills and Values	<ul style="list-style-type: none"> <li>• <b>Revision:</b> mechanical advantage. Well-designed machines give “<i>mechanical advantage</i>”.</li> <li>• All complex machinery consists of combinations of simple mechanisms.</li> <li>- <b>The wedge:</b> e.g. inclined plane or ramp, door wedge, knife blade, etc.</li> <li>- <b>The wheel and axle:</b> e.g. from bicycle to shopping trolley.</li> <li>• <b>Gears:</b> (wheels with wedges for teeth)</li> <li>- Show how meshing of two spur gears causes <b>counter-rotation</b>.</li> <li>- Show how introducing an <b>idler</b> gear between two spur gears synchronises rotation of the driver and driven gears.</li> <li>- <b>Gear ratios:</b> Show how different sized gears result in a change in the velocity ratio as well as an ‘opposite’ change in the force ratio – <i>if force increases, speed decreases, and vice versa</i>.</li> <li>• Mechanisms that change the direction of movement:</li> <li>- <b>The Cam:</b> show how a cam converts rotary motion into reciprocating motion. Compare an eccentric wheel and a snail cam.</li> <li>- <b>The Crank:</b> an adaptation of a second-class lever. Show how a crank converts rotary motion into reciprocating motion.</li> <li>• <b>Graphic skills:</b> Learners draw an artist’s impression of one of each of the above mechanisms (cam and crank) in their books using colour, shading and texture.</li> </ul>			<p>Learners work <b>individually</b> to design a structure utilising required structural components and mechanisms to suit the context provided.</p> <ul style="list-style-type: none"> <li>• <b>Evaluate:</b> learners examine information on several complex structures and list advantages and disadvantages in the designs.</li> <li>• <b>Design:</b> initial idea sketches.</li> <li>• <b>Design:</b> design brief with specifications and constraints.</li> <li>• <b>Make:</b> a 3D isometric projection of the idea with dimensions and drawn to scale.</li> <li>• <b>Make:</b> a working drawing in 2D showing one view with dimensions and line types.</li> <li>• Communicate: Individual presentations of plans.</li> <li>• Communicate: a sketch enhanced using two of colour, texture or shading</li> </ul>	
Requisite Pre-Knowledge	Mechanical advantage and communication skills			Design process skills: I,D, M, E and C	
Resources (other than textbook) to enhance learning	DBE Sasol Inzalo workbooks/ Textbooks and any applicable resource whether you tube videos, etc.			DBE Sasol Inzalo workbooks/ Textbooks and any applicable resource whether you tube videos, etc.	
Informal Assessment	Informal Assessment				
SBA (Formal Assessment)	Formal Assessment: Investigate and Design				

GRADE 8 TERM 2						
Term 2 51 days	Week 1 13- 16 April (4 days)	Week 2 19- 23 April	Week 3 28 - 30 April (3 days)	Week 4 3-7 May	Week 5 10-14 May	Week 6 17-21 May
CAPS Topic	Processing Investigation skills		Investigation skills Designing skills		Impact of technology Investigating skills	
<b>Core Concepts, Skills and Values</b>	<p><b>The positive impact of technology:</b> many natural materials have been replaced in modern times by new or improved materials. Some new materials are environmentally friendly by being bio-degradable.</p> <ul style="list-style-type: none"> <li>• <b>Case study 1:</b> investigate the impact of plastic shopping bags on the environment.</li> <li>• <b>Report:</b> learners write a report evaluating the effectiveness of using thicker, bio-degradable plastic shopping bags which shoppers must buy.</li> </ul>		<p><b>Case study 2:</b> technology with a positive impact on society.</p> <ul style="list-style-type: none"> <li>• Investigate how waste paper and cardboard are recycled to produce new products for the packaging industry.</li> <li>• <b>Development:</b> draw a development of an opened container.</li> <li>• <b>Practical activity:</b> a product requires packaging. Design various packaging for different purposes. The nature of the product determines the design and properties of the packaging material.</li> </ul>		<p><b>Case study 3:</b> technological products can have a <u>negative</u> impact.</p> <ul style="list-style-type: none"> <li>• <b>Investigate</b> a technological product that can have a negative impact on society.</li> <li>• <b>Class discussion:</b> facilitate a class discussion on possible solutions that can counteract or compensate for the negative impact of the technology identified.</li> </ul>	
<b>Requisite Pre-Knowledge</b>	Pre-knowledge on how to conduct an investigation and a developed vocabulary on the terminology related to the environment and the effects that some material have on it.		Pre-knowledge on how to look for and separate information to conduct an investigation and basic graphic communication skills.		Pre-knowledge on how to look for and separate information to conduct an investigation and basic graphic communication skills.	
<b>Resources</b> (other than textbook) <b>to enhance learning</b>	Siyavula workbook/ Textbooks and or any other relevant resources.		Siyavula workbook/ Textbooks and or any other relevant resources.		Siyavula workbook/ Textbooks and or any other relevant resources.	
<b>Informal Assessment</b>	Informal Assessment		Informal Assessment		Informal Assessment	
<b>SBA</b> (Formal Assessment)						

Term 2 51 days	Week 7 24-28 May	Week 8 31 May- 4 June	Week 9 7-11 June	Week 10 14-18 June (4 days)	WEEK 11 21- 25 June
<b>CAPS Topic</b>	<b>Structures/ Processing</b>		<b>Design &amp; Making skills</b>		<b>Consolidation</b>
<b>Core Concepts, Skills and Values</b>	<ul style="list-style-type: none"> <li>• <b>Revise:</b> forces that act on material – tension; compression; bending; torsion; shear.</li> <li>• Adapting materials to withstand forces – reinforcing concrete, plywood.</li> <li>• Selecting metal sections (I-beam, angle iron, T-bar, etc.) to withstand forces and to save material.</li> </ul>		<ul style="list-style-type: none"> <li>• <b>Design:</b> learners adapt a material or design a product that will solve the problem or reduce the impact or negative effects of the technology identified.</li> <li>• <b>Design:</b> learners sketch free-hand sketches showing two possible solutions.</li> <li>• <b>Make (drawing):</b> learners draw their chosen solution in 3D using isometric projection.</li> </ul>		<p><b>Revise</b> challenging topics and or concepts of the term:</p> <ul style="list-style-type: none"> <li>• practice more examples on developments</li> <li>• Types of forces</li> </ul> <p>The negative impact that material have on the environment.</p>
<b>Requisite Pre-Knowledge</b>	Pre-knowledge of strengthening and reasons why we need to reinforce some materials.		Pre-knowledge of basic design skills.		Pre-knowledge of content discussed during the term.
<b>Resources (other than textbook) to enhance learning</b>	Siyavula workbook/ Textbooks and or any other relevant resources.		Siyavula workbook/ Textbooks and or any other relevant resources.		Siyavula workbook/ Textbooks and or any other relevant resources.
<b>Informal Assessment</b>	Informal Assessment		Informal Assessment		
<b>SBA (Formal Assessment)</b>			<b>Formal Assessment: Controlled TEST</b>		

## GRADE 8 TERM 3

Term 3 52 days	Week 1 13-16 July (4 days)	Week 2 19-23 July	Week 3 26-30 July	Week 4 2-6 August	Week 5 10-13 Aug (4 days)	Week 6 16-20 August
CAPS Topic	Mechanical Advantage Investigation skills		Mechanical Systems and Control Communication skills		Mechanical Systems and Control Design & Investigation skills	
Core Concepts, Skills and Values	<p><b>Calculate Mechanical advantage (MA)</b></p> <ul style="list-style-type: none"> <li>Levers: mechanical advantage calculations for levers using ratios.</li> <li>Calculations using LOAD/EFFORT; load ARM/effort ARM; etc.</li> <li><i>Do NOT use the method of "taking moments about a point".</i></li> <li><b>Gears:</b> mechanical advantage calculations for gears using ratios.</li> </ul> <p>Calculations using tooth ratios; gear wheel diameters; velocity ratios.</p>		<p><b>REPRESENT GEAR SYSTEMS GRAPHICALLY:</b> use circular templates and/or pair of compasses to draw gear systems with:</p> <ul style="list-style-type: none"> <li>The driven gear rotating in the <b>opposite direction</b> to the driver (counter rotation).</li> <li>The driven gear rotating in the <b>same direction</b> to the driver (include an idler gear).</li> <li>The driven gear rotating <b>faster</b> than the driver (with and without an idler).</li> <li>The driven gear rotating <b>slower</b> than the driver (with and without an idler).</li> </ul> <p><b>DESIGN BRIEF:</b> learners write a design brief with specifications for a device that will use a combination of gears to achieve:</p> <ul style="list-style-type: none"> <li>A mechanical advantage with force multiplication of three times. An increase in output velocity of four times.</li> </ul>		<p><b>Sketches (2D)</b> showing gear systems that:</p> <ul style="list-style-type: none"> <li>Provide an output force four times greater than the input force (MA = 4:1).</li> <li>Provide double the rotation rate on a driven axle at 90° to the driver axle.</li> <li>SYSTEM ANALYSIS – bicycle gear system</li> <li>Analysis of the gears used on modern bicycles – terminology: master/slave or driver/driven; chain wheel; cogs.</li> </ul> <p><b>SYSTEMS DIAGRAMS</b></p> <ul style="list-style-type: none"> <li>Analyse a mechanical system by breaking it into input-process-output.</li> <li>Draw a Systems Diagram for a gear system with a mechanical advantage of 4:1.</li> <li>Plan a mechanical system to produce a specific output. Systems diagram for a gear train with the driven gear rotating faster than the driver.</li> </ul>	
Requisite Pre-Knowledge	Pre-knowledge on levers, classes of levers.		Knowledge on gears and ratios as discussed in previous week.		Knowledge on mechanical advantage as covered in weeks 1 and 2, investigating - and design skills.	
Resources (other than textbook) to enhance learning	Siyavula workbook/ Textbooks and or any other relevant resources.		Siyavula workbook/ Textbooks and or any other relevant resources.		Siyavula workbook/ Textbooks and or any other relevant resources.	
Informal Assessment	Informal Assessment		Informal Assessment		Informal Assessment	
SBA (Formal Assessment)						



Term 3 52 days	Week 7 23-27 August	Week 8 30 Aug-3 Sept	Week 9 6-10 Sept	Week 10 13-17 Sept	WEEK 11 20-23 Sept (4 days)
CAPS Topic	Impact/ Indigenous and Bias in technology Investigation skills		Investigation and Design skills		Design & Communication skills
Core Concepts, Skills and Values	<ul style="list-style-type: none"> <li>• <b>INVESTIGATE</b> and report on one of the following: <i>Distribute the investigations so all are covered and reported in each class.</i></li> <li>• <b>INVESTIGATE:</b> The impact on the environment as a result of mining of: Acid mine drainage</li> </ul> <p style="text-align: center;"><b>OR</b></p> <ul style="list-style-type: none"> <li>• <b>INVESTIGATE:</b> The impact on the environment as a result of mining of: Dust pollution from mine dumps on residential areas.</li> </ul> <p style="text-align: center;"><b>OR</b></p> <ul style="list-style-type: none"> <li>• <b>INVESTIGATE:</b> Iron age technology: Indigenous mining of iron in South Africa before the modern era</li> </ul> <p style="text-align: center;"><b>OR</b></p> <ul style="list-style-type: none"> <li>• <b>INVESTIGATE:</b> Bias in technology: Gender bias in career choice / opportunities related to mining.</li> <li>• <b>INVESTIGATE:</b> Lifting mechanisms (wire rope-driven mine head-gear) in use at South African mines for raising people and ore.</li> <li>• <b>Sketch:</b> initial idea sketches to meet the requirements given in the scenario. Design brief with specifications and constrains.</li> </ul>		<p><b>DRAWINGS for the shaft head-gear</b> – each learner draws a:</p> <ul style="list-style-type: none"> <li>• 3D isometric drawing of the selected design giving dimensions and drawn to scale.</li> <li>• 2D working drawing showing one or more views with dimensions and lines.</li> </ul> <ul style="list-style-type: none"> <li>• <b>Budget:</b> 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.</li> </ul>		<p><b>Revision:</b></p> <ul style="list-style-type: none"> <li>• Mechanical advantage</li> <li>• Rotation direction of gears</li> <li>• Elements included in a design brief</li> <li>• Importance of budgeting</li> </ul>
Requisite Pre-Knowledge	Knowledge on how to gather information, report on the findings verbally and through sketches.		Knowledge on basic drawing skills.		
Resources (other than textbook) to enhance learning	Siyavula workbook/ Textbooks and or any other relevant resources.		Siyavula workbook/ Textbooks and or any other relevant resources.		Siyavula workbook/ Textbooks and or any other relevant resources.
Informal Assessment	Informal Assessment				
SBA (Formal Assessment)	<b>Formal Assessment: PAT 2</b>				

## GRADE 8 TERM 4

Term 4 47 days	Week 1 5-8 Oct (4 days)	Week 2 11-15 Oct	Week 3 18-22 Oct	Week 4 25-29 Oct	Week 5 1-5 Nov	Week 6 8-12 Nov
CAPS Topic	<b>Electrical Systems and Control Design skills</b>		<b>Impact of / Biases in technology Evaluation skills</b>		<b>Electrical Systems and Control Impact of technology</b>	
Core Concepts, Skills and Values	<ul style="list-style-type: none"> <li>• <b>REVISE:</b> simple circuit components; input devices (electrochemical cell; generator; solar panel), output devices (resistor; lamp; heater; buzzer; motor); control device (switches).</li> <li>• <b>Note:</b> Some devices can serve as input, output, process or control device.</li> <li>• <b>CORRECT CONNECTIONS</b>, short circuits. Electrical components and their accepted symbols.</li> <li>• <b>DRAWING ELECTRICAL CIRCUITS</b> using accepted symbols (as in Grade 12 see Addendum C).</li> <li>• <b>TEACHER SET UP CIRCUITS</b> using a range of components. Learners draw the circuits using symbols.</li> </ul>		<ul style="list-style-type: none"> <li>• <b>Energy</b> for heating, lighting and cooking in rural and informal settlements.</li> <li>• <b>Energy</b> from illegal connections; ethical issues; safety considerations.</li> <li>• <b>CLASS DISCUSSION:</b> equitable sharing of resources – industry needs reliable power for job creation; schools need power for lighting and computing.</li> </ul> <p><b>WRITTEN REPORT:</b> Learners write a balanced report on these issues.</p> <ul style="list-style-type: none"> <li>• <b>ELECTROCHEMICAL CELLS.</b></li> <li>• Advantages and disadvantages of series and parallel batteries.</li> </ul> <p>Photovoltaic cells - advantages and disadvantages of solar cells.</p>		<p><b>GENERATE ELECTRICITY FOR THE NATION - ADVANTAGES AND DISADVANTAGES of:</b></p> <ul style="list-style-type: none"> <li>• Thermal power stations (steam turbines – sources of heat: coal, gas, nuclear, sun).</li> <li>• Hydroelectric power stations (including pumped storage schemes).</li> <li>• Wind-driven turbines.</li> <li>• <b>ALTERNATING CURRENT;</b> step-up and step-down transformers; distributing electric power across the country: the national grid.</li> </ul>	
Requisite Pre-Knowledge	Pre-knowledge of circuit diagrams, components and their symbols		Pre-knowledge on investigation -, reasoning -and analysing skills		Pre-knowledge on how to identify advantages and disadvantages (tabulate if required)	
Resources (other than textbook) to enhance learning	Siyavula workbook/ Textbooks and or any other relevant resources.		Siyavula workbook/ Textbooks and or any other relevant resources.		Siyavula workbook/ Textbooks and or any other relevant resources.	
Informal Assessment	Informal Assessment		Informal Assessment		Informal Assessment	
SBA (Formal Assessment)						

Term 4 47 days	Week 7 15-19 Nov	Week 8 22-26 Nov	Week 9 30 Nov-3 Dec	Week 10 6-8 Dec (3 days)
CAPS Topic	<b>Electrical System &amp; Control Design skills</b>		<b>Electrical Systems &amp; Control Investigation skills</b>	
Core Concepts, Skills and Values	<ul style="list-style-type: none"> <li>• Practical: learners DRAW CIRCUIT DIAGRAMS &amp; CONNECT CIRCUITS showing the effect of circuits with resistors connected in series and parallel.</li> <li>• Investigation: AND logic gate and simple cases where it is used.</li> <li>• Investigation: OR logic gate and simple cases where it is used.</li> <li>• Lesson: truth tables for AND &amp; OR logic conditions</li> </ul>	Revise term 4 content	Revise term 4 content	Consolidation and school closure
Requisite Pre-Knowledge	Pre-knowledge of circuit diagrams	Knowledge on all relevant concepts and content discussed during the term.		
Resources (other than textbook) to enhance learning	Siyavula workbook/ Textbooks and or any other relevant resources.	Siyavula workbook/ Textbooks and or any other relevant resources.	Siyavula workbook/ Textbooks and or any other relevant resources.	Siyavula workbook/ Textbooks and or any other relevant resources.
Informal Assessment	Informal Assessment			
SBA (Formal Assessment)	<b>FORMAL ASSESSMENT: CONTROLLED TEST</b>			