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Department:
Basic Education
REPUBLIC OF SOUTH AFRICA

## GRADE 7 TERM 1

| Term 1<br>45 days | Week 1<br>27 – 29 Jan (3 days) | Week 2<br>1 – 5 Feb | Week 3<br>8 - 12 Feb | Week 4<br>15 - 19 Feb | Week 5<br>22 – 26 Feb | Week 6<br>1 – 5 March |
|---|---|---|---|---|---|---|
| **CAPS Topic** | **Design Process Skills** | | **Communication Skills** | | **Mechanical Systems & Control** | |
| **Core Concepts, Skills and Values** | **Introduction: what is technology?**<br>• **Definition**<br>**scope** – *who does technology in the 'world of work'?*<br>• **How we will be working – the development of a technology task:**<br>**IDMEC**<br>**Investigate***: find, use and acknowledge information.*<br>**Design***: design brief, specifications, constraints; initial idea sketches; choosing the best design; selecting materials.*<br>**Make***: draw plans; develop the manufacturing sequence; make the item/model.*<br>**Evaluate***: learners evaluate both their design stages and their final product.*<br>**Communicate***: learners present their solutions; learners compile all notes and drawings into a project report in their workbooks.*<br>• **Use two to three real world examples of the IDMEC process.**<br>• **How we will be working – the development of a technology task:**<br>**Design considerations**<br>• **Fitness-for-purpose***:*<br>*Who is it for? What is it for? Will it do the job? Is it cost effective? Is it safe? Is it easy to use (ergonomics)? Does it look good (aesthetics)? Will it affect society? Will it affect the environment?*<br>• *[Explain the above by using examples for learners to understand the concepts better]* | | **Introduction to graphical Communication**<br>• **Purpose of graphics***: develop ideas and communicate ideas.*<br>• **Conventions***: outlines (thin/dark); construction lines (thin/feint); hidden detail (dashed) scale; dimensioning.*<br>• **Sketch***: free-hand sketching.*<br>• **Working drawings:** *two-dimensional drawing of one face of an object using conventions (dark lines; feint lines; dashed lines; dimensions; scale).*<br>**Graphic techniques**<br>• **3D oblique** – *front view with depth at 45˚ (use squared 'quadrant' paper); oblique projection used to assist with interpretation, and with drawing single VP perspective.* | | **Simple mechanisms**<br>*levers – mechanical advantage: simple* quantitative *treatment – no calculations using moments. Examine the relationship between load, effort and their distances from the pivot.*<br>• ***First-class levers:*** *characteristics (fulcrum/pivot placed between effort and load).*<br>• *First-class levers may give a mechanical advantage or not – depending on pivot position.*<br>• ***Case study:*** *first-class levers with mechanical advantage: ma > 1; ma = 1; ma < 1*<br>**Second-class levers**: characteristics (load is placed between effort and fulcrum); give real examples.<br>• Learners **demonstrate models of second-class** levers, which ***always*** give a mechanical advantage.<br>• **Third-class levers**: characteristics (effort is placed between load and fulcrum): give real examples<br>• Teacher to **demonstrate models of third-class levers**, which ***never*** give a mechanical advantage.<br>**Practical Investigation***: Levers and linkages*<br>• ***Examine simple linked first-class levers*** *(e.g. pair of scissors; pair of pliers; hedge trimming shears).*<br>• ***Examine simple linked second-class levers*** *(e.g. office punch, nut crackers).*<br>• ***Examine simple linked third-class levers*** *(e.g. most office staplers, pair of tweezers).*<br>• ***Examine more complex linkages*** *(e.g. linkages with more than one pivot)* | |
| **Requisite Pre-Knowledge** | Pre-knowledge of the Design Process in the Natural Sciences and Technology ( NST) in the intermediate phase | | Basic drawing skills | | Pre-knowledge of machines/ mechanisms in Natural Sciences and Technology | |
| **Resources (other than textbook) to enhance learning** | Siyavula workbook/ Textbooks<br>Applicable resources | | Siyavula workbook/ Textbooks<br>Applicable resources | | Siyavula workbook/ Textbooks<br>Applicable resources<br>Examples of different classes of levers | |
| **Informal Assessment** | Informal Assessment | | Informal Assessment | | Informal Assessment | |
| **SBA (Formal Assessment)** | | | | | | |

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Department:
Basic Education
REPUBLIC OF SOUTH AFRICA

| Term 1<br>45 days | Week 7<br>8 - 12 March | Week 8<br>15 - 19 March | Week 9<br>23 - 26 March (4 days) | Week 10<br>29 – 31 March (3 days) |
|---|---|---|---|---|
| **CAPS Topic** | **Mechanical Systems & Control**<br>**Impact of technology**<br>**Design skills** | | **Design skills** | |
| **Core Concepts, Skills and Values** | **Scenario:** *Impact of technology – emergency workers use "Jaws-of-Life" system to rescue trapped accident victims.*<br><br>**Pneumatics and Hydraulics**<br>• *Using pneumatics and hydraulics to obtain a mechanical advantage.*<br><br>• ***Practical Investigations: Teacher demonstration***<br>*- Force transfer between two equal syringes filled with 1) air and 2) water.*<br><br>*- Force transfer between two unequal syringes filled with 1) air and 2) water.*<br><br>Learners **develop a working model** of a hydraulic-syringe powered, linked-lever rescue device using simple materials.<br><br>• **Write a design brief, specifications and constraints**;<br><br>• **Draw a 3D drawing** of the idea in **oblique projection** using dark and feint lines. | | • **Draw working drawing in 2D** showing <u>*one view with dimensions to scale*</u> | Consolidation of work done in term 1:<br><br>• Class exercise on drawings<br>• Class exercise on different classes of levers<br>• Revision on pneumatics and hydraulics to give mechanical advantage |
| **Requisite Pre-Knowledge** | Design Process skills developed in week 1<br>Communication skills developed in weeks 3 - 4 | | Communication skills developed in weeks 3-4 | Mechanical systems and control work covered in the term |
| **Resources (other than textbook) to enhance learning** | Siyavula workbook/ Textbooks<br>Applicable resources | Siyavula workbook/ Textbooks<br>Applicable resources for practical investigation:<br>Syringes, plastic tubing, etc. | Siyavula workbook/ Textbooks<br>Applicable resources | Siyavula workbook/ Textbooks<br>Applicable resources |
| **Informal Assessment** | | | | Informal Assessment |
| **SBA (Formal Assessment)** | **Formal Assessment (PAT 1):**<br>**Investigate & Design** | | | |

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Department:
Basic Education
REPUBLIC OF SOUTH AFRICA

## Annual Teaching Plan – Term 2: TECHNOLOGY: Grade 7

## GRADE 7 TERM 2

| Term 2<br>51 days | Week 1<br><br>13- 16 April (4 days) | Week 2<br><br>19- 23 April | Week 3<br><br>28 - 30 April (3 days) | Week 4<br><br>3-7 May | Week 5<br><br>10-14 May | Week 6<br><br>17-21 May |
|---|---|---|---|---|---|---|
| **CAPS Topic** | **Structures**<br>**Investigation skills** | | **Structures**<br>**Evaluation and Investigation skills** | | **Structures**<br>**Investigation, Impact of technology, Design skills** | |
| **Core Concepts, Skills and Values** | • Definition and purpose of structures to contain, protect, support, span.<br>• Classification of structures: natural and man-made.<br>• Types of structures: shell, frame, solid – learners complete a work-sheet.<br>• Investigate: a cell phone tower – a frame structure<br>• Case study: examine existing towers strengthened by triangulation, including pylons, windmills and mine headgear | | • Evaluate: worksheet on the advantages and disadvantages of telephone systems;<br>Landline vs. mobile. learners complete a table<br>Action research: to stiffen materials / structures<br>• Practical activity 1 – Stiffen a structural material by tubing individual activity<br>• Practical activity 2 – Stiffen a structural material by folding individual activity<br>• Practical activity 3 – stiffen a frame structure by triangulation individual activity | | **Case study:** study photographs of existing cell phone towers noting structural elements, reinforcing techniques and design issues such as visual pollution, stability, base size and centre of gravity.<br>• **Class discussion:** how designers consider the needs of society in terms of technology while considering the impact on society and on the environment.<br>• **Case study** – existing designs 1: examine the ***features*** of a school desk; write the ***design brief*** with ***specifications*** for a school desk.<br>Case study **– existing designs 2: examine an existing product (FM radio/cell phone), list its features and then write a design brief with specifications for that product**. | |
| **Requisite Pre-Knowledge** | Pre-knowledge of structures in the Natural sciences and Technology Subject in the intermediate phase | | Pre-knowledge of structures in the Natural sciences and Technology Subject in the intermediate phase | | Pre-knowledge of structures in the Natural sciences and Technology Subject in the intermediate phase<br>Design process skills developed in term 1 | |
| **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 2**<br>**51 days** | **Week 7**<br><br>**24-28 May** | **Week 8**<br><br>**31 May- 4 June** | **Week 9**<br><br>**7-11 June** | **Week 10**<br><br>**14-18 June (4 days)** | **WEEK 11**<br><br>**21- 25 June** |
|---|---|---|---|---|---|
| **CAPS Topic** | **Structures**<br>**Design skills** | | **Design & Making skills** | | **Consolidation** |
| **Core Concepts, Skills and Values** | **Scenario**: Cell phone towers are everywhere and are built using materials to ensure stability, strength and rigidity (stiffness).<br>• **Write the design brief**:<br>Individual learners write the design brief with specifications for a new cell phone tower.<br>**Note: 1.** At a minimum, the cell phone tower can consist of struts made of found materials like “Elephant grass” or rolled paper dowels. It should show reinforcing using triangular webs, gussets and internal cross-bracing.<br>**Note 2:** One of the design ideas must involve disguising the tower so that it blends in with the environment, avoiding visual pollution**.**<br>• **Sketch initial ideas**:<br>Individual learners draw free-hand sketches to show ***two*** different design ideas in 3D for a cell phone tower to be erected near the school.<br>- Draw one idea using oblique projection.<br>- Draw the other idea using single vanishing point perspective. | | Making: includes working drawings, choosing materials and tools<br><br>• Each learner lists the resources to be used.<br>• Each learner draws a working drawing for the cell phone tower showing one face in 2D. | | **Revise** challenging topics and or concepts of the term:<br><br>• More practical examples on stiffening structures<br><br>• Strengthening by triangulation |
| **Requisite Pre-Knowledge** | Pre-knowledge on structures and design process skills developed in term 1. . | | Pre-knowledge on structures and design process skills developed in term 1. | | Pre-knowledge of 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. |
| **Informal Assessment** | Informal Assessment | | Informal Assessment | | |
| **SBA**<br>**(Formal Assessment)** | | | **Formal Assessment: Controlled TEST** | | |

## GRADE 7 TERM 3

| Term 3<br>52 days | Week 1<br>13-16 July (4 days) | Week 2<br>19-23 July | Week 3<br>26-30 July | Week 4<br>2-6 August | Week 5<br>10-13 Aug (4 days) | Week 6<br>16-20 August |
|---|---|---|---|---|---|---|
| **CAPS Topic** | **Electrical Systems and Control<br>Investigation skills** | | **Electrical Systems and Control<br>Investigation skills** | | **Mechanical Systems and Control<br>Design & Investigation skills** | |
| **Core Concepts, Skills and Values** | Investigate: What is magnetism?<br>• Practical investigation: Different types of permanent magnets – bar and horseshoe.<br>• Practical demonstration by the teacher on magnetic and non – magnetic metals.<br>• Case study: Recycling scrap metals. Honest gleaners who collect scrap metal and deliver it to scrap metal dealers perform a valuable service to society. This good work is tainted by the criminal acts of thieves who steal copper telephone wire and steel manhole covers. | | • Simple electric circuits. Demonstrate a simple electric circuit with an energy source (cell), switch, conductor and a light bulb or buzzer. Sketch the circuit showing how to use component symbols.<br>• Circuit diagram: Each learner draw a circuit diagram using the correct symbols for components.<br>• Demonstration lesson: A simple electromagnet. Make a simple electromagnet made by winding insulated copper wire around an iron nail. When an electric current flow in the wire coil (solenoid) a magnetic field is created and this is amplified by the iron core. Switching the current off causes the magnetic field to fade away. (Note: electromagnetism is a key to a wide range of technologies making up our modern world.)<br>. | | Introductory lesson: All complex machinery consists of combinations of simple mechanisms. Machines can be designed to give the user a “mechanical advantage”.<br>• Introduce learners to cranks and pulleys.<br>The crank – an adaptation of a second-class lever.<br>The pulley – a type of wheel and axle.<br>• Revision:<br>a) What is mechanical advantage?<br>b) Strengthening frame structures | |
| **Requisite Pre-Knowledge** | Pre-knowledge on Metals and non-metals, magnetism in the Natural sciences and Technology Subject in the intermediate phase | | Pre-knowledge on electric current and circuit diagrams in the Natural sciences and Technology Subject in the intermediate phase | | Knowledge on simple mechanism and mechanical advantage as covered in term 1, strengthening structures done in term 2. . | |
| **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)** | | | | | | |

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Basic Education
REPUBLIC OF SOUTH AFRICA

| Term 3<br>52 days | Week 7<br>23-27 August | Week 8<br>30 Aug-3 Sept | Week 9<br>6-10 Sept | Week 10<br>13-17 Sept | WEEK 11<br>20-23 Sept (4 days) |
|---|---|---|---|---|---|
| **CAPS Topic** | **Investigation and Design skills** | | **Investigation and Design skills** | | **Electrical Systems and Control<br>Design & Communication skills** |
| **Core<br>Concepts, Skills and Values** | *Learners must use their knowledge of structures and the drawing skills developed in earlier<br>tasks, together with their new knowledge of magnetism, electric circuits and electromagnets<br>as well as their new knowledge of cranks and pulleys to design and make a crane using an electromagnet to sort metals in a scrapyard.*<br><br>• **Case study:** Examine pictures of cranes in order to get ideas to be used in the learner's own designs.<br>• **Write a design brief** with specifications and constraints for a crane with electromagnet.<br>• **Sketch** two possible designs for a suitable crane using single VP perspective.<br>• **Draw a circuit diagram** for the electromagnet (with a light to show when it is on). | | • **Revision:** Revise the 3D oblique drawing technique; line types; scale; dimensions.<br>• **Drawing:** Each learner uses the Oblique technique to draw an idea for the crane chosen from the two ideas sketched the previous week. The idea should be drawn on squared paper (quadrant) using pencil and ruler. | | **Revision:**<br><br>• Magnetism<br>• Simple electric circuits<br>• Crank and pulley<br>• Mechanical advantage |
| **Requisite Pre-Knowledge** | Pre-knowledge on electrical systems for the term, investigation & design skills | | Graphic communication skills : 3D oblique drawing<br>Communication-Flow chart | | Pre-knowledge of 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. |
| **Informal Assessment** | Informal Assessment | | Informal Assessment | | |
| **SBA<br>(Formal Assessment)** | **Formal Assessment: PAT 2** | | | | |

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## GRADE 7 TERM 4

| Term 4<br>47 days | Week 1<br>5-8 Oct (4 days) | Week 2<br>11-15 Oct | Week 3<br>18-22 Oct | Week 4<br>25-29 Oct | Week 5<br>1-5 Nov | Week 6<br>8-12 Nov |
|---|---|---|---|---|---|---|
| **CAPS Topic** | **Processing**<br>**Investigation and Design skills** | | **Processing**<br>**Evaluation and Investigation skills** | | **Processing**<br>**Impact of technology**<br>**Indigenous technology and Investigation skills** | |
| **Core Concepts, Skills and Values** | • Learners investigate emergency situations that can lead to refugees:<br>Find out what situations commonly result in people becoming refugees.<br>Find out what initial problems are typically faced by refugees.<br>What mix of people will usually be present?<br>What are their needs for shelter? (Shelter will be addressed in the mini-PAT)<br>What are their needs for food and water<br>• **Processing food:** emergency food<br>• **Investigate** the types of food that can be supplied to occupants of a refugee camp.<br>• **Design brief**: learners write a design brief giving specifications of the types and quantities of food needed for a population of 100 refugees. | | • **Design:** List the ingredients of a meal that will be nutritious as well as tasty, and which can be prepared under conditions likely to be found in a refugee camp<br>• Write down the sequence of manufacture for the process of preparing one item from the meal described in weeks 1 and 2.<br>• Learners investigate clothing worn by people in specialised occupations like the emergency services, e.g. fire department, NSRI or dangerous professions. Learners must investigate the following:<br>• Find out what textiles are used to make the clothing worn by fire fighters, or<br>• Find out what textiles are used to make the clothing worn by members of the NSRI. | | **Scenario**: Tragic shack fires or natural disasters like floods or earthquakes or political strife may create the need for emergency shelters to be erected for the victims.<br>• **Investigate:** Learners investigate materials and building techniques used by indigenous people for constructing housing in rural South Africa. Materials used in such construction is typically readily available, appropriate and environmentally friendly.<br>• **Investigate:** Learners compare materials and building techniques used by people setting up informal settlements. They compare these materials to those used by indigenous builders in terms of suitability, availability and environmentally friendliness.<br>• **Investigate**: Learners find out what chemicals can waterproof a textile like canvas.<br>• **Investigate:** Learners find out about the burning characteristics of various textiles | |
| **Requisite Pre-Knowledge** | Investigation and Design skills<br>Pre-knowledge on food processing in grade 6 in Natural Sciences and Technology. | | Pre-knowledge on food processing in grade 6 in Natural Sciences and Technology.<br>Investigation skills | | Pre-knowledge on indigenous technologies in the intermediate phase<br>Investigation 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)** | | | | | | |

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Basic Education
REPUBLIC OF SOUTH AFRICA

| **Term 4**<br>**47 days** | **Week 7**<br><br>**15-19 Nov** | **Week 8**<br><br>**22-26 Nov** | **Week 9**<br><br>**30 Nov-3 Dec** | **Week 10**<br><br>**6-8 Dec (3 days)** |
|---|---|---|---|---|
| **CAPS Topic** | **Processing**<br>**Design skills** | **Processing** | **Processing** | |
| **Core**<br>**Concepts, Skills and Values** | **Design brief:** Learners write an appropriate *design brief* with *specifications* for producing a textile suitable for use in making an emergency shelter.<br>• **Design:** Learners sketch design ideas for an emergency shelter that can be transported to and erected at a site where people have become homeless. | Revise term 4 content | Revise term 4 content | Consolidation and school closure |
| **Requisite Pre-Knowledge** | Design skills | 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**<br>**(Formal Assessment)** | **FORMAL ASSESSMENT: CONTROLLED TEST** | | | |