OXFORD

INTERVENTION GUIDE

Natural Sciences
Grade 7

Packed with catch-up and assessment support!

- *Baseline assessments*
- *Intervention strategies*
- *Answers to assessments*

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Contents

Types of assessment

This handbook focuses on three main types of assessment: baseline assessment; formal formative assessment and summative assessment.

Type of assessment	Description
Baseline assessment	Establishes whether learners meet the basic skills and knowledge level required. Helps the teacher plan for the year and for each learner. Is administered at the beginning of the year and before a particular topic. Results are used as a guide for teaching and not for promotion purposes.
Formative assessment	Used to aid the learning process and not for promotion purposes. Usually informal, to provide the teacher and learner with a more frequent account of where the learner is at in their learning journey. Teachers can use this form of assessment to modify and adapt their own teaching.
Summative assessment	Carried out after completion of a topic or cluster of topics. Is an assessment of learning that has taken place. Recorded and used for promotion. This is usually formal assessment, making up the formal Programme of 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.

The forms of assessment used should be appropriate for the learners' ages and developmental levels.

Learners must complete formal assessments each term. Formal assessment provides teachers with a systematic way of evaluating how well learners are progressing in a grade and in a particular subject. This guide includes a number of intervention strategies that can be used to help learners that have performed poorly in the assessments. It is essential that intervention occurs at an early stage in order for it to be effective.

Programme of assessment

The formal assessment programme for Grade 7 Natural Sciences consists of five school-based assessments and two examinations. One is a mid-year examination in Term 2 and the other is an end-of-year examination in Term 4. The school-based assessments include two tests, two practical investigations and a project.

Practical investigations make up 40% of the term mark and the test makes up the remaining 60%.

The content covered in Term 1 makes up 40% of the mid-year examination, with the Term 2 content making up the remaining 60%. The end-of-year examination comprises 60% Term 3 content and 40% content from Term 4.

Summary of the programme of assessment for Grade 7 Natural Sciences:

	Term 1	Term 2	Term 3	Term 4
Assessment task 1	Test (60 marks; 90 minutes)	Practical investigation (20 marks)	Test (60 marks; 90 minutes)	End-year examination (80 marks; 120 minutes)
Assessment task 2	Practical investigation (20 marks)	Mid-year examination (80 marks; 120 minutes)	Project (30 marks)	

In this guide you will find a baseline assessment that you can photocopy and give to learners in order to assess their current skills and knowledge. You will also find all the assessments stipulated in the POA (Programme of Assessment), like practical activities and tests. These can be copied and given to the learners and the marks used for their formal assessment. The memoranda for all assessments are available at the back of the guide. The guide also contains intervention strategies that can assist learners who performed below average in the baseline assessment, Term 1 and Term 3 assessments. These intervention strategies give practical guidelines on how to help the learners in order for them to improve their understanding.

Baseline assessment

1. Choose the correct answer for each of the questions below:

   1.1 Separating a mixture by letting it sit and separate on its own is called:
   a. Settling
   b. Filtering
   c. Evaporation
   d. Decanting (2)

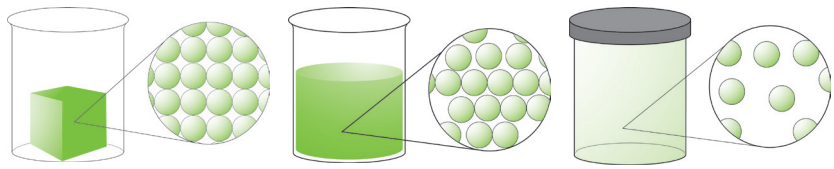
   1.2 Which of these substances is soluble in water?
   1 Oil
   2 Sand
   3 Salt
   a. 1 only
   b. 1 and 2
   c. 2 and 3
   d. 3 only (2)

   1.3 Which of the following materials is a good conductor of electricity?
   a. Iron nails
   b. Styrofoam
   c. Plastic
   d. Cardboard (2)

   1.4 The majority of electricity in South Africa is generated by ...
   a. the burning of fossil fuels
   b. a hydroelectric plant
   c. nuclear power
   d. wind power. (2) **[8]**

   2.1 Explain what is meant by the term *matter*? (2)

   2.2 Use the diagrams below to complete the table comparing the particles in a solid, liquid and a gas:



solid liquid gas

	Solid	Liquid	Gas
Spaces between particles			
Movement of particles			
Shape			

(9) **[11]**

3. Sam has a mixture of sand and sea water that he would like to separate.

3.1 Draw a labelled diagram of the equipment that he would need to separate the sand from the sea water. (3)

3.2 Sea water is an example of a solution.
Describe what is meant by this term. (2)

3.3 Sea water can be formed by dissolving salt in water. Sam decided to do an experiment to see how temperature affects the amount of salt that can dissolve in 100 cm^3 of water.

He obtains the following results:

Temperature of water (°C)	20	25	30	35	40	45	50	55
Mass of salt that dissolved (g)	2	4	5	8	9	10	12	14

3.3.1 State a possible hypothesis for Sam's experiment. (2)

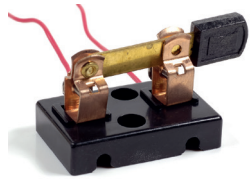
3.3.2 Plot a line graph of his results. (5)

3.3.3 What conclusion can you draw from his results? (2)

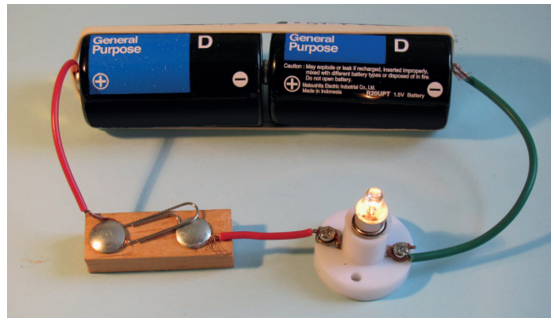
3.3.4 After a while the water becomes saturated.
Explain what this means. (2) **[16]**

4. Electricians use simple diagrams to show electrical circuits.

4.1 Use your knowledge of circuit diagrams to match the picture of the component with its symbol and its name: (6)

Component	Picture	Symbol
Closed switch		
Light bulb		
Cell/battery		

4.2 Use symbols to draw a circuit diagram of the circuit below:



(4)

4.3 We often use copper in electrical wiring. List two reasons why copper is a good choice. (2) **[12]**

5. Scientists are currently researching alternative energy sources to the burning of fossil fuels. Discuss the negative impact the burning of fossil fuels has on the environment. **[3]**

[Total marks: 50]

Intervention strategies

Natural Science can be a difficult subject for many learners. It requires learners to not only memorise the content, but also to apply their knowledge in various situations. It is essential that learners understand the content, rather than attempting to rote learn it. This baseline assessment assesses the skills and knowledge that the learners should have gained in Grade 6. Analyse your basement assessment results and use the data to identify why the learner performed poorly. Poor results can be attributed to a number of factors including:

- Barriers to learning
- Class size
- Reading comprehension (the ability to understand what they have read)
- Lack of understanding of the scientific method
- Inability to plot results on a line graph.

Barriers to learning

- Learners may face barriers to learning. It is essential that we as educators accommodate these learners to ensure that our classrooms remain inclusive.
- These learners may require and should be granted more time for:
  - completing tasks
  - acquiring thinking skills (own strategies)
  - assessment activities.
- Teachers need to adapt the number of activities to be completed without interfering with the learners gaining the required language skills.
- Ensure that weaker learners are paired with learners who are academically strong.

Class size

- Peer tutoring can be an effective intervention method when class size is an issue.
- Quieter learners tend to struggle in a large class as they tend not to ask questions and often fall behind.
- Dividing the class into smaller groups or pairs can help these learners as they will feel less intimidated.
- Ensure that the groups are made up of learners with varying ability so that the weaker students are helped by the stronger ones.
- Peer assessment can also be used successfully during informal assessment and allows the educator to gauge the learner's understanding in a less intimidating manner than a formal test or assignment.

Reading comprehension

- Many learners struggle to understand what they have read. It is therefore important to make content comprehensible for all learners, particularly those who have English as a second or third language.
- Support learners by giving them pre-reading questions (to aid while reading) and post reading strategies to organise what they have learned.
- Pre-reading questions could include asking the learners *what they already know about the topic? What is the main idea in this paragraph? What real-life examples relate to this topic?*
- One strategy that can help these learners is teaching them to summarise the content into bullet points and make use of mind-maps.
- This forces the learners to rewrite the content in their own words.
- Write difficult terminology on the board and use simple words to explain what those terms mean.

Diagrams can be very useful for explaining concepts in such a way that learners can visualise the situation.

Lack of understanding of the scientific method

- It is essential that learners have a good understanding of the scientific method.
- Practical work can be intimidating for many learners.
- Ensure that learners are given time to become familiar with the apparatus used.
- Allow learners to work in groups or pairs so that they are able to help each other.
- Revise the scientific method. Ensure that learners understand what is meant by the terms hypothesis and conclusion.
- Explain to the learners that the conclusion must always be based on the evidence that they have collected.

Inability to plot results on a line graph

- Drawing graphs is an essential skill for learners.
- Learners must always use a sharp pencil when drawing graphs.
- The axes must be labelled and the label must include the units for the quantity being plotted.
- The dependent variable must be on the Y-axis and the independent variable on the X-axis.
- An appropriate scale is one where the graph itself covers more than half the vertical and horizontal space provided.

Term 1 Assessment

Test 1

1. Choose one correct answer for each of the following questions:

1.1 Which of the following organisms is an example of a micro-organism?
- a. an earthworm
- b. a spider
- c. bacteria
- d. a turtle (2)

1.2 Ovulation refers to:
- a. the ovaries releasing a ripe egg into the fallopian tube
- b. the growth of a foetus in the uterus
- c. the changes that happen during puberty
- d. the release of sperm from the penis (2)

1.3 Plants require energy. What is the name of the process by which plants obtain energy?
- a. respiration
- b. menstruation
- c. photosynthesis
- d. conduction (2)

1.4 Which gas is required by living organisms for respiration?
- a. oxygen
- b. nitrogen
- c. carbon dioxide
- d. helium (2)

1.5 Cone bearing plants are also known as ……..
- a. angiosperms
- b. gymnosperms
- c. vertebrates
- d. seedless plants (2) **[10]**

2.1 Define the term *biosphere*. (2)

2.2 The biosphere is made up of three parts. Match the part in Column A with the description in Column B. (3)

Column A	Column B
Hydrosphere	The layer of gases surrounding the earth.
Lithosphere	The oceans, lakes and rivers.
Atmosphere	The earth's crust including soil and rocks

[5]

3. Camels live in very hot, dry conditions.

3.1 State two adaptations that allow camels to survive in the desert. (2)

3.2 How does this animal obtain its energy? (1) **[3]**

4. An unknown organism has the following characteristics:
It can move from place to place.
It cannot make its own food.

4.1 Which kingdom does this animal belong to? (1)

4.2 Describe how this organism reproduces. (2)

4.3 Identify one example of this kind of organism. (1) **[4]**

5. Organisms are divided into different categories depending on their characteristics. Rearrange the categories below into the correct order.

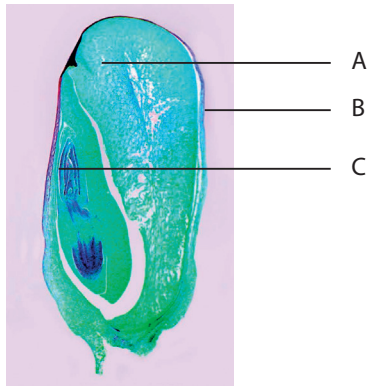
Phylum	Kingdom	Order
Species	Class	
Genus	Family	

[4]

6. A maize kernel is an example of a monocotyledon.

6.1 Define the term *monocotyledon*. (2)

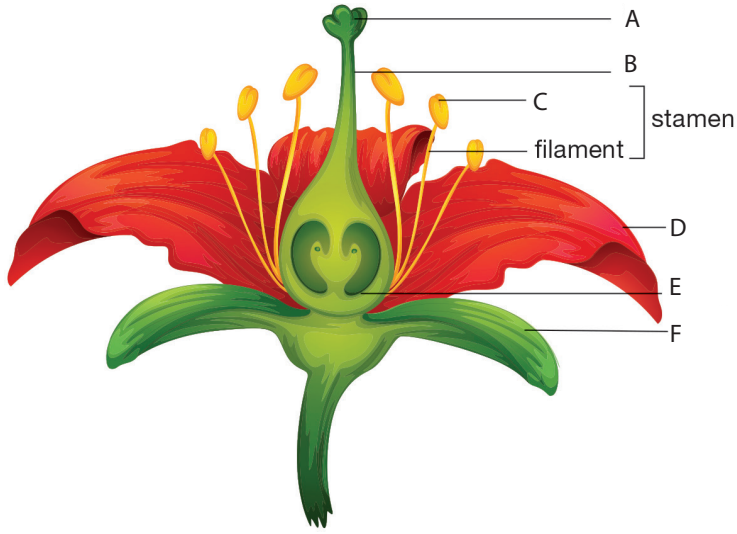
6.2 Use the diagram below to label the three parts of the maize kernel: (3)



6.3 The King Protea is South Africa's national flower. Is it a monocotyledon or a dicotyledon? Give three reasons that motivate your answer. (4) **[9]**

7. Flowering plants are known as angiosperms.

7.1 Use your knowledge of flowers to label the diagram below:



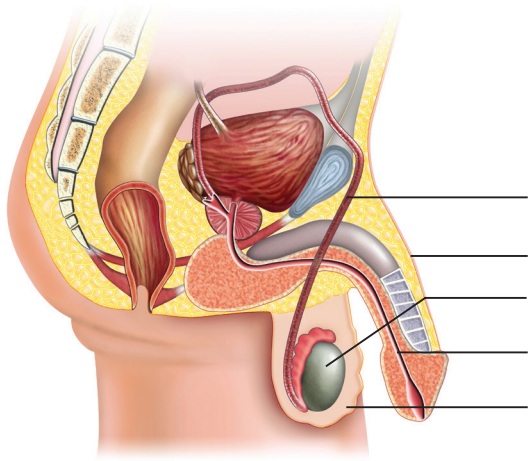
(6)

7.2 Describe the function of the anther. (2)

7.3 Name the thin hollow tube that connects the stigma to the ovary. (1)

7.4 Pollination is an essential process for flowers to produce seeds. Name and describe three agents of pollination. (6) **[15]**

8. The diagram below represents the male reproductive system.



8.1 What is the name given to the phase of life when the sexual organs mature? (1)

8.2 Name the chemicals responsible for the maturation of the sexual organs. (1)

8.3 Complete the table below stating the different functions of the male sex organs. (3)

Sex organ	Function
Sperm duct	8.3.1
Testis	8.3.2
Urethra	8.3.3

8.4 Our global population is growing rapidly. Discuss the disadvantages of a growing population. (2)

8.5 List three methods that can be used to prevent unwanted pregnancies and sexually transmitted diseases. (3) **[10]**

[Total marks: 60]

Practical Task 1: Flower dissection

Materials required:

- Dicotyledonous flower (for example a lily, a rose or a sunflower)
- Scalpel
- Cork board or cutting board
- Magnifying glass

Method:

1. Place the flower on the cutting board.
2. Carefully cut the flower so that you are left with a longitudinal cross-section. The components should be clearly visible.
3. Draw a labelled diagram of your flower in the block below: (8)

4. Carefully remove the petals from the flower. How do the petals increase the chance of successful pollination? (2)
5. Carefully remove the stigma and style from your flower. Describe their structure and function. (4)
6. Use your flower to complete the table below: (5)

Name of flower	Description of petals	Scent	Description of stamen	Description of pistil
Lily	Large and yellow/red	Sweet	Multiple stamens from the centre of the flower	Long and thin

7. Predict the agent of pollination for your type of flower. (1)

[Total marks: 20]

Term 1 Intervention strategies

The assessments in Term 1 consist of a test and a practical activity. Intervention is required for learners that perform below average in these assessments. It is essential that intervention takes place timeously in order for it to be effective. There are a number of factors that could result in a learner achieving a poor result. These include:

- a poor understanding of the content
- a lack of metacognition
- inability to retain information.

Poor understanding of content

- Many learners find Natural Science a difficult subject largely due to the terminology used. A good way to introduce terminology is to create a glossary. New words and terms can be written at the back of the learners' books with the definition written next to it. Learners can then refer to the back of their book when they come across a word they do not understand.
- Select key words that learners did not understand in the assessments and display these along with the definitions in the classroom.
- In your lesson planning define both the content objectives/outcomes and the language objectives/outcomes for the specific lesson. For example, a language objective might be that learners need to understand the materials listed in a practical task. A scaffolding strategy might be to provide illustrations for these – such as pictures of a scalpel and magnifying glass.

A lack of metacognition

- It is essential that metacognition takes place during lessons. Metacognition is the ability to understand one's own thought processes. Learners retain information best when they can visualise situations.
- Visual aids and practical work can aid learners to understand the content.
- Practical work can be done as a demonstration if resources are limited.
- Visual aids like the diagram of the flower on page 35 of the *Oxford Successful Natural Science Grade 7* learner's book can be enlarged for learners with poor sight.
- Allow learners time to copy diagrams into their books.

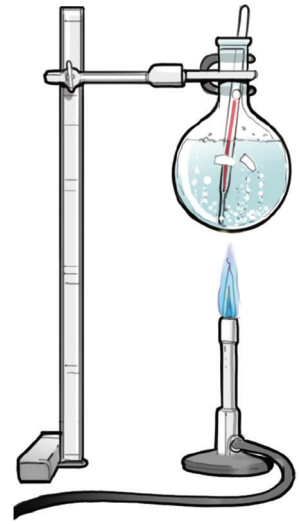
An inability to retain information

- Flash cards and mind-maps can be useful tools to help learners memorise facts.
- Term 1 covers a large amount of content and learners can be intimidated by the volume of work covered.
- Encourage learners to break the work down into more manageable sections. They can then create a mind-map for each sub-topic.
- Tables can also help learners summarise the work into more manageable sections.

Practical activity 2: Investigating the effect of salt on the boiling point of water

Materials:

- Round bottomed flask
- Thermometer
- Bunsen burner
- Retort stand and clamp
- Balance
- Measuring cylinder
- Salt
- Water



Method:

1. Set up apparatus as seen in the diagram.
2. Use the measuring cylinder to add 100 cm^3 of water to the round bottom flask.
3. Heat up the water and note the temperature at which the water begins to boil. It is very important to work carefully with boiling water as it can burn you.
4. Repeat the experiment, but use the balance to measure out 2 g of salt that you then add to the water in the flask.
5. Heat the salt water until it boils and note the temperature at which the boiling starts.
6. Empty out the flask and repeat the experiment but add 4 g of salt to the water.
7. Continue increasing the salt content of the water until the salt no longer dissolves.
8. Tabulate your results. (2)
9. Plot your results as a line graph. (10)
   [Your graph will be marked according to a rubric]

Questions:

1. Define the term *boiling point*. (2)
2. State a possible hypothesis for this experiment. (2)
3. Identify the:
   3.1 independent variable
   3.2 dependent variable for this experiment. (2)
4. What conclusion can you draw from this experiment? (2)

Rubric:

Graph			
	0	1	2
Labels and units	Learner did not label the axes and no units were included.	Axes were labelled, but units were not included.	Axes were labelled including units.
Scale	An appropriate scale was not used.	Points cover only one half of the horizontal or vertical area.	An appropriate scale was chosen. Points cover more than half the vertical and horizontal area.
Line of best fit	No line of best fit was drawn.	Line of best fit was attempted, but was drawn incorrectly.	Correct line of best fit was drawn. The same number of points is found on either side of the line.
Plotting of points	Points were plotted incorrectly.	Most points were plotted correctly.	All points were plotted correctly.
Neatness	Graph was untidy.	Attempts were made to work neatly, but the line drawn was not smooth.	A smooth pencil line was drawn.

[Total marks: 20]

Mid-year examination

1. Choose the correct answer from the options below:

   1.1 The first level of sub-division within a kingdom is known as the:
   a. phylum
   b. genus
   c. species
   d. class. (2)

   1.2 Which of these kingdoms of organisms can move from place to place?
   1. Bacteria
   2. Fungi
   3. Plantae

   a. 1 only
   b. 1 and 2
   c. 2 and 3
   d. 1, 2 and 3 (2)

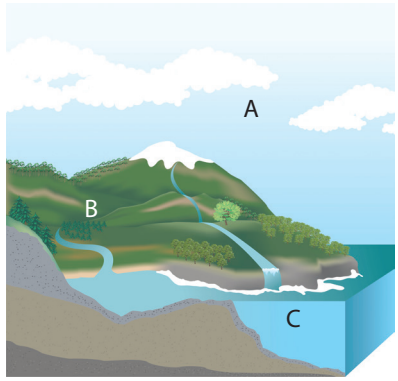
   1.3 Which type of arthropods have a cephalothorax?
   1. insects
   2. arachnids
   3. crustaceans

   a. 1 only
   b. 1 and 2
   c. 2 and 3
   d. 1, 2 and 3 (2)

   1.4 Which part of the plant contains the anthers and filaments?
   a. stamen
   b. pistil
   c. ovary
   d. sepal (2)

   1.5 Which of the following substances is an example of an alkali?
   a. water
   b. milk
   c. lemon juice
   d. washing powder (2) **[10]**

2. The biosphere consists of three parts as seen in the diagram below:



2.1 State the name of the part labelled B. (1)

2.2 Describe the part labelled A. (2)

2.3 Identify two living organisms that can be found in Part B. (2) **[5]**

3. Redraw the table and match the examples of living organisms in Column A with their correct kingdom in Column B.

Column A	Column B
Unicellular algae	Protista
Blue green bacteria	Fungi
Ferns	Animalia
Reptiles	Bacteria
Multicellular fungi	Plantae

(5)

4. Thaku wants to investigate the conditions needed for plant growth. She takes three seedlings of equal length and places them under different conditions. Seedling A is given no access to light or water. Seedling B has access to light, but no water and Seedling C has access to light and water. After a week she measures the seedlings to determine which conditions have resulted in the best growth.

4.1 State a possible hypothesis for Thaku's investigation. (1)

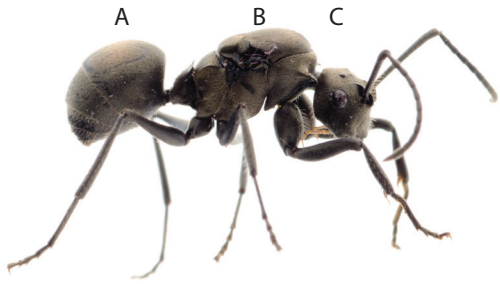
4.2 State the independent and dependent variables for this experiment. (2)

4.3 Predict which seedling will grow best. (1)

4.4 Aloes are plants that have adapted to grow in hot, dry climates. State one adaptation that allows aloes to survive in these conditions.

(1) **[5]**

5. An ant is an example of an arthropod.



5.1 Label its body parts A, B and C. (3)

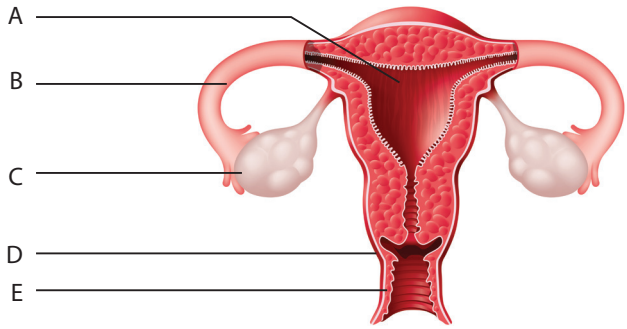
5.2 Arthropods have an exoskeleton.
Explain what is meant by this term. (1)

5.3 To which class of arthropod does an ant below?
Give three reasons to motivate your answer. (4) **[8]**

6. Complete the table below comparing reptiles and amphibians: **[6]**

	Reptiles	Amphibians
Control of body temperature		
Skin		
Reproduction		

7. The female reproductive system is divided into many parts as seen in the diagram below:



7.1 Label the diagram of the female reproductive system. (5)

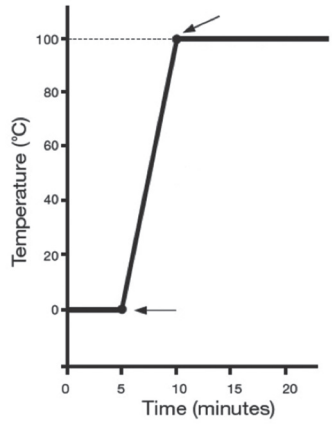
7.2 Identify the part of the female reproductive system where the foetus develops. (1)

7.3 Describe how the foetus gets oxygen and food. (2)

7.4 Siphokazi says that: "the contraceptive pill is the safest form of contraception." Criticise this statement. (2)

7.5 Define menstruation. (2) **[12]**

8. The diagram below shows how the temperature of a substance changes as it is heated from a solid to a liquid to a gas:



8.1 Define what is meant by *boiling point*. (2)

8.2 Use the heating curve to determine the melting point of the substance. (2)

8.3 Could this substance be pure water? Motivate your answer. (2)

8.4 Write a paragraph comparing the particles in a solid, liquid and gas. Compare the: Arrangement of particles
Movement of particles (6)

8.5 Sugar is dissolved in water.

8.5.1 What name is given to the mixture formed? (1)

8.5.2 List three factors that can affect the rate at which sugar dissolves. (3)

8.5.3 Identify a method that could be used to separate the sugar from the water. (1) **[17]**

9. Sara was given three colourless solutions. One was an alkali, another was neutral and the third was an acid. She used litmus paper and performed tests on all three solutions and obtained the following results:

	Test with red litmus paper	Test with blue litmus paper
Solution 1	Litmus paper turns blue	Litmus paper stays blue
Solution 2	Litmus paper stays red	Litmus paper stays blue
Solution 3	Litmus paper stays red	Litmus paper turns red

9.1 Which solution is acidic? Explain your answer. (3)

9.2 State three properties of acids. (3)

9.3 Which solution could be water? Give a reason for your answer. (3)

9.4 Define what is meant by the term *alkali*. (2)

9.5 Why must you be careful when working with bases? (1) **[12]**

[Total marks: 80]

Term 3 Assessment

Test 3

1. Choose one correct answer for each of the following questions:

   1.1 Which row correctly identifies one renewable and one non-renewable energy source? (2)

	Renewable energy source	Non-renewable energy source
A	Coal	Natural gas
B	Sunlight	Coal
C	Uranium	Coal
D	Oil	Sunlight

   1.2 The energy an object has because of its motion is called…..
   a. kinetic energy
   b. mechanical energy
   c. potential energy
   d. electrical energy. (2)

   1.3 State the name of the machine that converts energy from steam or water into electrical energy.
   a. Turbine
   b. Dynamo
   c. Transformer
   d. Motor (2)

   1.4 Potential electrical energy is measured in ……
   a. volts
   b. degrees
   c. joules
   d. nanometres. (2) **[8]**

2. Energy is what makes things happen or change. It is what is needed to do work.

   2.1 Define the term *renewable energy source*. (2)

   2.2 Nuclear power is an example of a non-renewable energy source.

   2.2.1 Which element acts as the fuel in nuclear power plants? (1)

   2.2.2 State one advantage and one disadvantage of using nuclear power as a source of electricity. (2)

   2.2.3 Wind power can be used as an alternative to nuclear energy. Describe how electrical energy is produced by wind power. (3)

2.3 Use your knowledge of renewable and on-renewable resources to complete the table below: (6) **[14]**

	Burning of fossil fuels	Hydroelectric power
Renewable/non-renewable		
Advantages		
Disadvantages		

3. A boy sits at the top of a slide.

3.1 Describe the type of energy the boy has at the top of the slide. (1)

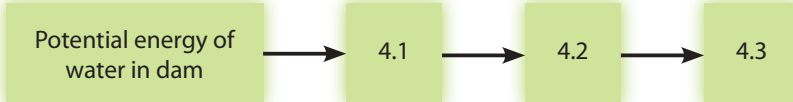
3.2 As the boy begins to move the type of energy he has changes. State the name of the type of energy the boy has as he moves down the slide. (1)

3.3 State the Law of Conservation of Energy. (2)

3.4 The boy has 500J of energy at the top of the slide. How much kinetic energy will he have at the bottom of the slide? (2) **[6]**

4. A hydroelectric power station uses water to produce electricity.

Use your knowledge of energy transfer to complete the flow diagram below:



[6]

5. Heat is transferred between objects.

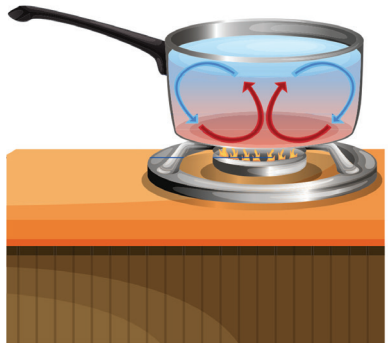
5.1 Define the term *temperature*. (2)

5.2 Name the instrument used to measure temperature. (1)

5.3 Use your knowledge of heat transfer to match the term in Column A with the description in Column B. (3)

Column A	Column B
Radiation	Heat moves through air or water
Convection	Heat moves through objects
Conduction	Heat moves through empty space

5.4 The diagram below shows a convection current.



Explain how convection currents form. (4) **[10]**

6. Not all appliances are efficient. A lot of energy is wasted.

6.1 Complete the table below describing the useful and wasted energy of some appliances. The first example is completed for you: (4)

	Useful energy	Wasted energy
Vacuum cleaner	Mechanical energy	Sound and heat energy
Kettle	6.1.1	6.1.2
Electric drill	6.1.3	6.1.4

6.2 A light bulb needs 100J of energy. Only 10J is transformed into light energy.

6.2.1 What form does the wasted energy take? (1)

6.2.2 Calculate the amount of wasted energy produced. (2)

6.2.3 Calculate the percentage efficiency of the light bulb. Include the formula used in your answer. (4) **[11]**

7. It is very important that we do our part to conserve electricity.

7.1 State two reasons why we need to conserve electricity. (2)

7.2 Describe three ways you can conserve electricity at home. (3) **[5]**

[Total marks: 60]

Project: Electricity consumption and alternate energy sources

This project consists of two parts. In the first part you will research South Africa's electricity consumption. In the second part of the project, you will design a poster exploring possible alternate sources of energy.

1. The table below shows South Africa's energy consumption from 1992 to 2010:

Year	1992	1994	1996	1998	2000	2002	2004	2006	2008	2010
Electricity consumption (Gwh)	125	135	150	160	158	177	205	195	190	200

1.1 Plot these values as a line graph. The graph will be marked according to the following rubric: (10)

Graph			
	0	1	2
Labels and units	Learner did not label the axes and no units were included.	Axes were labelled, but units were not included.	Axes were labelled including units.
Scale	An appropriate scale was not used.	Points cover only one half of the horizontal or vertical area.	An appropriate scale was chosen. Points cover more than half the vertical and horizontal area.
Line of best fit	No line of best fit was drawn.	Line of best fit was attempted, but was drawn incorrectly.	Correct line of best fit was drawn. The same number of points is found on either side of the line.
Plotting of points	Points were plotted incorrectly.	Most points were plotted correctly.	All points were plotted correctly.
Neatness	Graph was untidy.	Attempts were made to work neatly, but the line drawn was not smooth.	A smooth pencil line was drawn.

1.2 What trend can you see regarding South Africa's energy consumption during this time? (2)

1.3 Discuss the negative effects that a high electricity consumption can have on the environment. (3) **[15]**

2. Design a poster discussing alternate sources of energy. Your poster should include:
   - wind energy
   - solar energy
   - hydro energy
   - geothermal energy.

   For each source of energy you should explain their functioning as well as the advantages and disadvantages of each. Marks will be awarded according to the rubric below:

Marks	0–1	2–3	4–5
Layout	Layout does not flow.	Layout is clear, but improvements could be made.	Logical and well thought out.
Science content and literacy	No analysis of science topic No explanation No science-specific connection.	Adequate explanation Science connection present but could be developed further.	Concept fully and properly explained Insight present Science-specific connection made Content is accurate, comprehensive and well supported.
Creativity	No creativity shown.	Poster makes use of colour.	Shows creativity in presentation of content. Multiple resources are used.

[15]

[Total marks: 30]

Term 3 Intervention strategies

Term 3 assessments consist of a test and a project. The Term 3 assessments require students to not only understand new concepts, but also apply that knowledge in the form of analysing data. Learners that have performed poorly are likely to have struggled with one of the following:

- conceptualising of new content
- calculations
- inability to interpret data and plot results on a graph.

Conceptualising of new content

- Energy is a difficult concept for learners to visualise.
- The more "real-life" examples used the easier it will be for the learners to conceptualise the topic. For example you could use a stretched elastic band to explain potential energy or bring a kettle to the classroom and use it to explain how energy is transformed from one form to another.

Calculations

- Topic 2 introduces calculations for the first time when learners are required to calculate the efficiency of an appliance.
- Ensure that learners understand the concept of percentage.
- Do a number of examples on the board before giving learners opportunities to do the questions themselves.
- Ensure learners understand what is meant by output and wasted energy so that they can use the formula correctly.
- Pair mathematically strong learners with those that struggle.

Inability to interpret data

- Data analysis is an essential skill for Science learners.
- Ensure learners understand the data before attempting to analyse it.
- Revise how to draw a line graph as well as the interpretation of that graph.
- Many learners do not understand the concept of an independent and dependent variable. This impacts their ability to plot a graph correctly. Revise these terms in class and include examples so that learners can correctly identify the different variables.
- Emphasise that the dependent variable is found on the Y-axis and the independent variable on the X-axis.

Term 4 Assessment

End-of-year examination

1. Choose one correct answer for each of the following questions:

1.1 When an object falls…..
- a. Its kinetic energy changes to potential energy
- b. Its potential energy changes to kinetic energy
- c. Its potential energy changes to mechanical energy
- d. Its mechanical energy changes to potential energy (2)

1.2 Energy is transferred in a food chain. Which of the food chains below correctly shows the flow of energy?
- a. plant → snail → jackal → guinea fowl
- b. snail → plant → jackal → guinea fowl
- c. jackal → guinea fowl → snail → plant
- d. plant → snail → guinea fowl → jackal (2)

1.3 A hot stove plate transfers energy by……
- a. conduction
- b. convection
- c. radiation
- d. insulation (2)

1.4 Which of the following materials are good insulators?
1. Styrofoam
2. Plastic
3. Metal

- a. 1 only
- b. 1 and 2
- c. 2 and 3
- d. 3 and 4 (2)

1.5 Which statement concerning the equator is INCORRECT?
- a. Areas near the equator have 14 hour days.
- b. Areas near the equator have very little difference between summer and winter.
- c. Areas near the equator experience year-long high temperatures.
- d. More sunlight per unit area reaches the equator than at any other point. (2) **[10]**

2. Amy wants to investigate which substance is the most effective insulator, metal or styrofoam. She has the following materials:

- a metal cup
- a styrofoam cup
- a thermometer
- boiling water.

She pours the boiling water into each of the cups and records the temperature every minute for 15 minutes. She obtains the following results:

Time (minutes)	0	1	2	3	4	5	6	7	8
Temperature of water in styrofoam cup (°C)	78	77	75	72	70	67	65	64	62
Temperature of water in metal cup (°C)	78	75	70	67	64	60	57	53	50

2.1 Define the term *insulator*. (2)

2.2 State a hypothesis for this experiment. (2)

2.3 Plot a line graph of the results she obtained. (5)

2.4 What conclusion can you draw from your graph? Explain your answer. (2)

2.5 The heat is transferred to the cup by convection. Describe what is meant by this term. (2) **[13]**

3. An energy-saving light bulb uses less electricity than other light bulbs.

3.1 State two reasons why it is essential that South Africans conserve electricity. (2)

3.2 An energy-saving light bulb has an efficiency of 75%. It requires 100J of energy.

3.2.1 Calculate the output energy of the light bulb. (3)

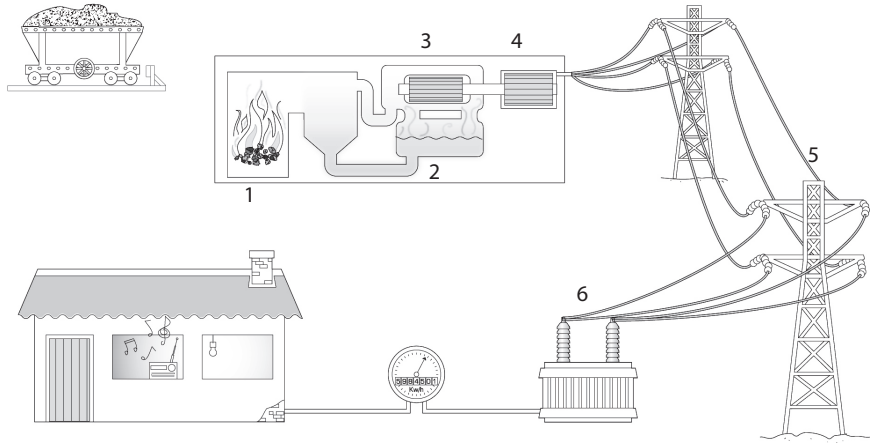
3.2.2 Calculate the amount of wasted energy. (2)

3.2.3 What form does the wasted energy take? (1) **[8]**

4. South Africa uses coal to produce the majority of its electricity.

4.1 Describe the energy conversion that takes place during the production of electricity. (2)

4.2 Electricity is generated according to the steps in the diagram below:



4.2.1 Coal is burned in Step 1 to produce steam. Is coal a renewable or non-renewable resource? Explain your answer. (2)

4.2.2 In Step 4 the turbine is connected to a generator. Describe the energy conversion that takes place inside the generator. (2)

4.2.3 Step 6 shows a transformer. Explain the function of a transformer. (2)

4.2.4 Discuss an advantage and a disadvantage of using coal to produce electricity. (2) **[10]**

5. The earth is tilted at an angle of 23.5° from the vertical position.

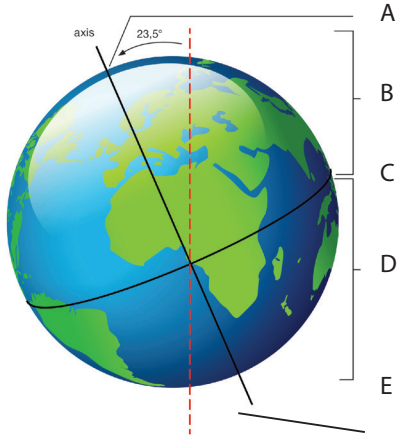
5.1 Explain how this tilt is responsible for the seasons. (6)

5.2 Discuss what is meant by the following terms:

5.2.1 Equinox (2)

5.2.2 Solstice (2)

5.3 Use your knowledge of the earth to label the diagram below:



(5) **[15]**

6. Plants require solar energy from the sun to make food.

6.1 State the name of the chemical responsible for the absorption of solar energy in plants. (1)

6.2 Describe what is meant by the term *photosynthesis*. (2)

6.3 Complete the equation below: (3)

6.4 Describe the energy conversion that takes place during photosynthesis. (2)

6.5 Discuss how the plant stores the sugar. (2) **[10]**

7.1 Explain the difference between gravitation and gravity. (2)

7.2 Sam says that, "An astronaut weighs the same in space as he does on earth." Is Sam correct? Motivate your answer. (3)

7.3 List the two factors that affect the gravitational force acting on an object. (2)

7.4 Explain how gravity is responsible for the tides. (3) **[10]**

8. Copper wire acts as an electrical conductor.

8.1 What is meant by the term *electrical conductor*? (1)

8.2 Categorise the following materials as conductors or insulators.

- Plastic
- Rubber
- Steel

(3) **[4]**

[Total marks: 80]

Baseline assessment answers

1.1 a. ✓✓ (2)

1.2 d. ✓✓ (2)

1.3 a. ✓✓ (2)

1.4 a. ✓✓ (2) **[8]**

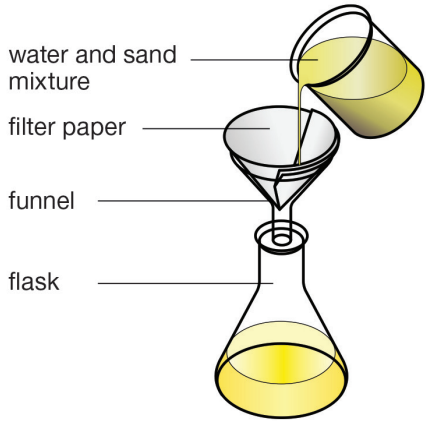
2.1 Matter is any physical substance ✓
in solid, liquid or gas state. ✓ (2)

2.2

	Solid	Liquid	Gas
Spaces between particles	Very small spaces between particles ✓	Small spaces between particles. ✓	Large spaces between particles ✓
Movement of particles	Particles vibrate ✓	Particles able to move around each other ✓	Particles move fast and in all directions ✓
Shape	In a fixed shape ✓	Particles take the shape of the container ✓	Particles fill all of the available space ✓

(9) **[11]**

3.1



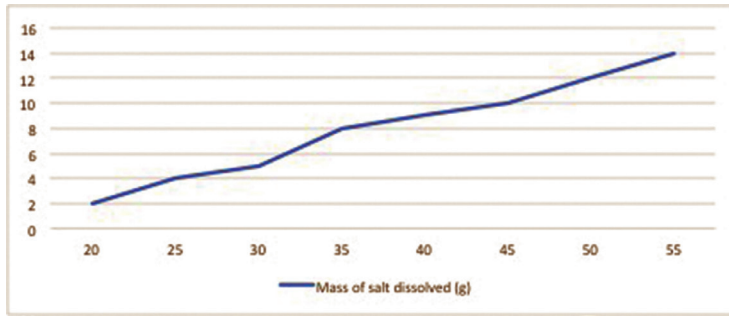
(4)

3.2 A mixture of a solid and liquid ✓ where the solid fills the spaces between the liquid particles. ✓ (2)

3.3.1 The higher the temperature of the water the more salt can dissolve in it ✓✓ (or the reverse argument). (2)

3.3.2 Award marks for:

- Correct plotting of points. (3)
- Using an appropriate scale. (1)
- Labelling the axes including units. (1)



3.3.3 The hotter the water, the more salt can dissolve in it. ✓✓ (2)

3.3.4 Saturated is when a solution has no more space ✓ for any more particles of solute. ✓ (2) **[16]**

4.1

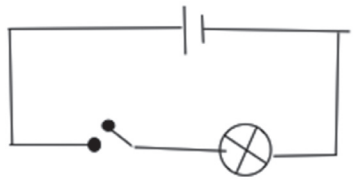
Component	Symbol
Closed switch	
Light bulb	
Cell/battery	

(6)

4.2 Award a mark for each correctly drawn component.

Ensure that the following are present:

- Connecting wires ✓
- A cell ✓
- A light-bulb ✓
- An open switch ✓



(4)

4.3 It is a very good conductor ✓
It is cheap ✓ (2) **[15]**

[Total marks: 50]

Term 1 Assessment answers

Test 1

1.1 c. ✓✓ (2)
1.2 a. ✓✓ (2)
1.3 c. ✓✓ (2)
1.4 a. ✓✓ (2)
1.5 b. ✓✓ (2) **[10]**

2.1 The biosphere is the part of the earth where living organisms live. ✓✓ (2)

Column A	Column B
Atmosphere	The layer of gases surrounding the earth ✓
Hydrosphere	The oceans, lakes and rivers ✓
Lithosphere	The earth's crust including soil and rocks ✓

(3) **[5]**

3.1 Camels store fat in their humps. Their bodies break down the fat to give them energy and to release water for body processes .✓ They have very wide, flat feet to prevent them from sinking into the sand when they walk. ✓ (2)
3.2 The obtain energy from the food they eat. ✓ (1) **[3]**

4.1 Animalia ✓ (1)
4.2 Females lay eggs ✓ or give birth to live young. ✓ (2)
4.3 lions, sheep, humans (any acceptable answer) ✓ (1) **[4]**

5. Kingdom
Phylum
Class
Order
Family
Genus
Species [Max 4 marks, remove one mark for every incorrect answer]

[4]

6.1 A cotyledon is a leaf of a seed ✓ which stores food for the developing seed. ✓ (2)

6.2 A – endosperm
B – Seed coat
C – Cotyledon (3)

6.3 It is dicotyledonous. ✓
- Its leaf veins form a network. ✓
- Its stem branches out and can become woody. ✓
- It has broad leaves. ✓ (4) **[9]**

7.1 A – stigma ✓
B – style ✓
C – anther ✓
D – petal ✓
E – ovary ✓
F – sepal ✓ (6)

7.2 The anther produces pollen ✓ which carries the male sex cells. ✓ (2)

7.3 style ✓ (1)

7.4 wind pollination ✓ – pollen is blown from plant to plant. ✓
Water pollination ✓ – pollen floats on the surface of rivers and streams. ✓
Insect/ bird pollination✓ – the insects and birds carry the pollen from plant to plant. ✓ (6) **[15]**

8.1 Puberty ✓ (1)

8.2 Hormones ✓ (1)

8.3.1 Carries sperm from the testes to the penis ✓ (1)

8.3.2 Where sperm cells are formed ✓ (1)

8.3.3 Carries urine and semen to the penis ✓ (1)

8.4 Lack of housing ✓
Poverty ✓
Any motivated answer (2)

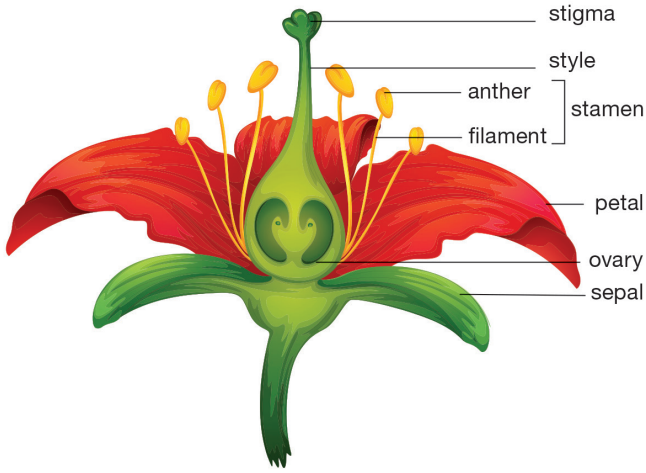
8.5 Condoms
Contraceptive pill
Diaphragm
Injection
Female condom (any three) (3) **[10]**

[Total marks: 60]

Practical activity 1

Results will vary depending on the type of flower used. Ensure that the learners' answers relate to the flower that they dissected.

3. The diagram will vary depending on the flower used.
   All labels should be included though.



(8)

4. The colour of the petals attract insects and birds for pollination. (1)
5. The stigma is sticky ✓ it receives the pollen ✓ the style is a thin hollow tube ✓ it connects the stigma to the ovary. ✓ (4)
6. This table will vary depending on the type of flower used.
   The answers below are correct if a lily was used.

Name of flower	Description of petals	Scent	Description of stamen	Description of pistil
Lily	Large and yellow/red	Sweet	Multiple stamens from the centre of the flower	Long and thin

(5)

7. This answer will vary depending on the flower used. A possible answer is pollination by insect or bird. (1)

[Total marks: 20]

Practical activity 2

Memorandum for table and questions:

Graph: marked according to rubric. (10)
Table:
Table has a logical layout ✓
Headings and units included in table. ✓ (2)

Questions:

1. Boiling point is the temperature ✓
   at which a liquid turns into a gas. ✓ (2)
2. The hypothesis must be a statement, not a question. ✓
   Any reasonable answer is acceptable, for example: The greater the mass of salt added, the higher the boiling point. ✓ (2)
3. Dependent variable: the boiling point of the water ✓ (1)
4. Independent variable: the mass of salt added ✓ (1)
5. The greater the mass of salt dissolved in the water, the higher the boiling point. ✓✓ (2)

[Total marks: 20]

1.1 a. ✓✓ (2)
1.2 a. ✓✓ (2)
1.3 c. ✓✓ (2)
1.4 a. ✓✓ (2)
1.5 d. ✓✓ (2) **[10]**

2.1 Lithosphere ✓ (1)
2.2 The atmosphere is the layer of gases surrounding the earth. ✓✓ (2)
2.3 Bacteria, ✓fish, ✓crabs etc. – any reasonable example. (2) **[5]**

3.

Column A	Column B
Unicellular algae	Protista ✓
Blue green bacteria	Bacteria ✓
Ferns	Plantae ✓
Reptiles	Animalia ✓
Multicellular fungi	Fungi ✓

[5]

4.1 The seedling that has access to light and water will grow best. ✓
(Note: the hypothesis must be a statement not a question.) (1)
4.2 The independent variables: the amount of light and water the plant receives. ✓
The dependent variable: the growth of the seedling ✓ (2)
4.3 Seedling C ✓ (1)
4.4 It has fleshy leaves that can store water. ✓ (1) **[5]**

5.1 A – abdomen ✓
B – thorax ✓
C – head ✓ (3)
5.2 An exoskeleton is a hard outer covering. ✓ (1)
5.3 It is an insect ✓ It has 6 legs, ✓ one pair of antennae ✓ and its body is divided into three. ✓ (4) **[8]**

6.

	Reptiles	Amphibians
Control of body temperature	Cannot control body temperature. Need heat from the environment. ✓	Cannot control body temperature. Need heat from the environment. ✓
Skin	Has scales ✓	Moist skin, no scales ✓
Reproduction	Lays eggs on dry land ✓	Lay eggs in water ✓

(6)

7.1 A – uterus ✓
B – fallopian tube ✓
C – ovary ✓
D – cervix ✓
E – vagina ✓ (5)

7.2 The uterus ✓ (1)

7.3 The foetus gets its nutrition and oxygen from the mother ✓ through the umbilical cord. ✓ (2)

7.4 The contraceptive pill only prevents pregnancy, ✓ it does not protect the woman from sexually transmitted diseases. ✓ (2)

7.5 Menstruation is defined as the passing of unfertilised egg cell and uterus lining ✓ through the vagina. ✓ (2) **[12]**

8.1 Boiling point is the temperature at which a substance changes from a liquid ✓ to a gas. ✓ (2)

8.2 0 ✓ °C ✓ (2)

8.3 Yes, ✓ pure water boils at 100°C. ✓ (2)

8.4 The particles in a solid are arranged in fixed structure with very little spaces between them ✓ The particles vibrate. ✓ In a liquid the particles have larger spaces between them ✓ and can move over one another. ✓ The particles in a gas have very large spaces between them ✓ and move quickly. ✓ (6)

8.5.1 Solution ✓ (1)

8.5.2 Temperature of mixture
Stirring vs shaking of mixture
Grain size of the solute (3)

8.5.3 Evaporation (1)

9.1 Solution 3 ✓ The red litmus paper stayed red ✓ and the blue litmus paper turned red. ✓ (3)

9.2 Tastes sour ✓
Feels rough to the touch ✓
Corrosive ✓ (3)

9.3 Solution 2 ✓ Water is neutral. ✓ Both colours of litmus paper remained unchanged. ✓ (3)

9.4 Alkalis are soluble ✓ bases. ✓ (2)

9.5 They are corrosive. ✓ (1) **[12]**

[Total marks for mid-year examination: 80]

Term 3 Assessment answers

Test 3

1.1 b. ✓✓ (2)
1.2 a. ✓✓ (2)
1.3 a. ✓✓ (2)
1.4 a. ✓✓ (2) **[8]**

2.1 Renewable energy sources can be replaced ✓ or made again naturally. ✓ (2)
2.2.1 Uranium ✓ (1)
2.2.2 Advantage: It is efficient. ✓
Disadvantage: Radioactive waste takes hundreds of years to bread down. ✓ (2)
2.2.3 Wind turns a turbine. ✓ Kinetic energy ✓ is converted into electrical energy. ✓ (3)

2.3

	Burning of fossil fuels	Hydroelectric power
Renewable/ non-renewable	Non-renewable ✓	Renewable ✓
Advantages	Cheap ✓	Does not produce pollution ✓
Disadvantages	Releases air pollution ✓	Expensive to maintain ✓

(6) **[14]**

3.1 He has stored energy/ potential energy. ✓ (1)
3.2 Kinetic energy ✓ (1)
3.3 Energy cannot be created or destroyed ✓ it can only be transformed from one form to another. (2)
3.4 500 ✓ J ✓ (2) **[6]**

4.1 kinetic energy ✓ in water flowing in pipes. ✓ (2)
4.2 kinetic energy ✓ in turning generators. ✓ (2)
4.3 electrical energy ✓ in power lines ✓ (2) **[6]**

5.1 A measurement of ✓ of how much heat energy something has. ✓ (2)

5.2 thermometer ✓ (1)

5.3 (3)

Column A	Column B
Convection	Heat moves through air or water.
Conduction	Heat moves through objects.
Radiation	Heat moves through empty space.

5.4 Water molecules heat up. ✓ Molecules move faster ✓ and expand. ✓As water molecules cool, they sink down the sides of the container. ✓ (4) **[10]**

6.1.1 Heat energy ✓

6.1.2 Sound energy ✓

6.1.3 Mechanical energy ✓

6.1.4 Sound and heat energy ✓ (4)

6.2.1 Heat energy ✓ (1)

6.2.2 100 - 10 ✓ = 90J ✓ (2)

6.2.3 % efficiency = output energy/ total energy x 100% ✓
% energy = 10 ✓/100 ✓ x 100 = 10% ✓ (4) **[11]**

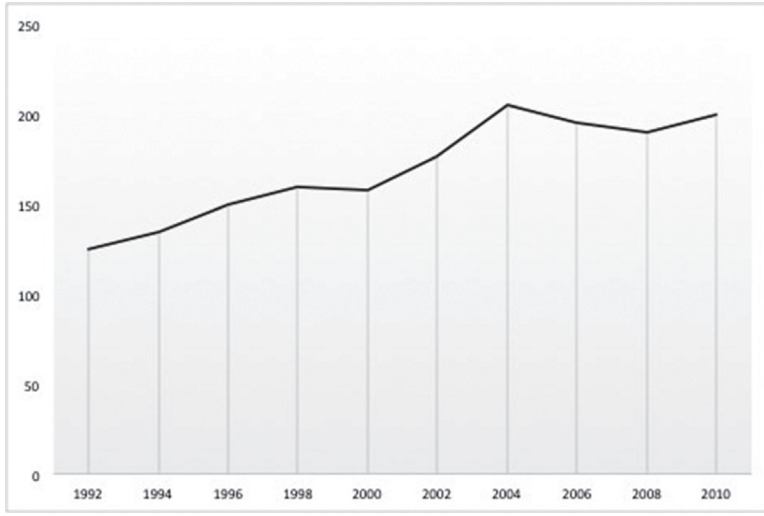
7.1 Electricity is expensive. ✓ Producing electricity releases greenhouse gases into the atmosphere. ✓ Accept: Damages the environment. (2)

7.2 Use energy saving light bulbs. ✓
Always use a lid when cooking in a pot. ✓
Cover the windows with curtains. ✓
Any acceptable answer. (3) **[5]**

[Total marks: 60]

Project

1.1 The graph is marked according to the rubric provided.
The graph should look similar to the one below: **[10]**



1.2 The graph shows that electricity usage in South Africa is increasing. (2)

1.3 The burning of fossil fuels releases greenhouse gases into the environment. ✓ This can lead to global warming. ✓
Other pollutants are formed as a by-product of the process which pollutes or rivers and seas and the atmosphere. ✓
It is a non-renewable resource. ✓
[Any suitable answers]. (3) **[15]**

2. The poster is marked according to the rubric provided. **[15]**

[Total marks for project: 30]

Term 4 Assessment answers

End-of-year examination

1.1 b. ✓✓
1.2 d. ✓✓
1.3 a. ✓✓
1.4 b. ✓✓
1.5 a. ✓✓ **[10]**

2.1 A material that does not transfer heat ✓ well by conduction. ✓ (2)
2.2 Styrofoam is a better insulator than metal (or reverse argument). ✓✓ (2)
2.3 Points correctly plotted. (Subtract one mark for each incorrectly plotted point.) (3)
Appropriate scale used. (1)
Axes labelled including units. (1)
2.4 Styrofoam is a better insulator. ✓ There is a smaller drop in temperature. ✓ (2)
2.5 Convection is the movement of heat ✓ through air or water. ✓ (2) **[13]**

3.1 Electricity is expensive. ✓
South Africa has a limited supply of electricity. ✓ (2)
3.2.1 Efficiency = output energy/total energy x 100 ✓
75 = output energy/100 x 100 ✓= 75% ✓ (3)
3.2.2 100 – 75 ✓ = 25J ✓ (2)
3.2.3 Heat energy ✓ (1) **[8]**

4.1 Potential/chemical energy ✓ ✓ Electrical energy ✓ (2)
4.2.1 Non-renewable ✓ Once it is used up it cannot be replaced. ✓ (2)
4.2.2 Kinetic energy ✓✓ electrical energy ✓ (2)
4.2.3 It is an electrical device ✓ that can increase or decrease the electrical voltage. ✓ (2)
4.2.4 Advantage: Cheap ✓
Disadvantage: It releases greenhouse gases that can result in global warming. ✓ (2) **[10]**

5.1 The earth moves around the sun once in a year. ✓ While the sun's rays hit the earth at an angle, the same amount of energy is spread over a larger area. ✓ At one point the tilt causes the southern hemisphere to be exposed to light of a high intensity. ✓ It is summer, ✓ but due to the tilt of the earth the northern hemisphere is tilted away from the sun ✓ and they experience winter. ✓ (6)

5.2.1 When the days and nights have equal numbers of hours. (2)

5.2.2 When the numbers of hours in a day are at their maximum in one hemisphere and at their minimum in the other. (2)

5.3 A – North Pole
B – Northern hemisphere
C – Equator
D – Southern Hemisphere
E – South Pole (5) **[15]**

6.1 Chlorophyll ✓ (1)

6.2 The process that green plants use to make food ✓ from sunlight, carbon dioxide and water. ✓ (2)

6.3.1 Water/carbon dioxide ✓

6.3.2 Carbon dioxide/water ✓

6.3.3 Oxygen ✓ (3)

6.4 Solar energy ✓✓ Chemical energy✓ (2)

6.5 As starch ✓ in the leaves, stems, roots and seeds. ✓ (2) **[10]**

7.1 The force of attraction between the earth and an object is known as gravity. ✓ Gravitation is the universal force of attraction between any two objects. ✓ (2)

7.2 Weight is the force with which the earth attracts an object, ✓ while mass is the amount of matter an object is made up of. ✓ Mass is always constant while the weight would change in space. ✓ (3)

7.3 The mass of each of the objects ✓
The distance between the objects ✓ (2)

7.4 The moon's gravitational force is greater than that of the sun as it is closer to the earth. ✓ As the moon passes over the ocean there is a swell in sea level. ✓ To balance this out a swell forms at the opposite side of the earth. ✓ (3) **[10]**

8.1 A material that allows electricity to pass through it. ✓ (1)

8.2 Insulators: rubber ✓ and plastic ✓
Conductor: steel ✓ (3) **[4]**

[Total marks: 80]

Notes

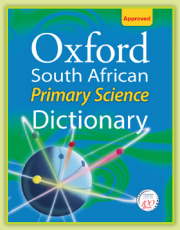
Notes

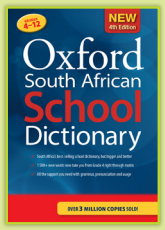
INTERVENTION GUIDE

Natural Sciences
Grade 7

For best results, use this guide with your *Oxford Successful Natural Sciences* Grade 7 Learner's Book and Teacher's Guide.

PLUS:





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