

"It is not the strongest of the species that survive, nor the most intelligent, but the one most responsive to change."

- **Charles Darwin**

**NATURAL
SCIENCES
&
TECHNOLOGY**

LESSON PLAN
GRADE 5 TERM 4



A MESSAGE FROM THE NECT

NATIONAL EDUCATION COLLABORATION TRUST (NECT)

Dear Teachers,

This learning programme and training is provided by the National Education Collaboration Trust (NECT) on behalf of the Department of Basic Education (DBE)! We hope that this programme provides you with additional skills, methodologies and content knowledge that you can use to teach your learners more effectively.

What is NECT?

In 2012 our government launched the National Development Plan (NDP) as a way to eliminate poverty and reduce inequality by the year 2030. Improving education is an important goal in the NDP which states that 90% of learners will pass Maths, Science and languages with at least 50% by 2030. This is a very ambitious goal for the DBE to achieve on its own, so the NECT was established in 2015 to assist in improving education and to help the DBE reach the NDP goals.

The NECT has successfully brought together groups of relevant people so that we can work collaboratively to improve education. These groups include the teacher unions, businesses, religious groups, trusts, foundations and NGOs.

What are the Learning programmes?

One of the programmes that the NECT implements on behalf of the DBE is the 'District Development Programme'. This programme works directly with district officials, principals, teachers, parents and learners; you are all part of this programme!

The programme began in 2015 with a small group of schools called the Fresh Start Schools (FSS). Curriculum learning programmes were developed for Maths, Science and Language teachers in FSS who received training and support on their implementation. The FSS teachers remain part of the programme, and we encourage them to mentor and share their experience with other teachers.

The FSS helped the DBE trial the NECT learning programmes so that they could be improved and used by many more teachers. NECT has already begun this embedding process.

Everyone using the learning programmes comes from one of these groups; but you are now brought together in the spirit of collaboration that defines the manner in which the NECT works. Teachers with more experience using the learning programmes will deepen their knowledge and understanding, while some teachers will be experiencing the learning programmes for the first time.

Let's work together constructively in the spirit of collaboration so that we can help South Africa eliminate poverty and improve education!

www.nect.org.za

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PROGRAMME ORIENTATION

Welcome to the NECT Natural Sciences & Technology learning programme! This CAPS compliant programme consists of:

- A full set of lesson plans for the term (3 lessons per week)
- A resource pack with images to support the lesson plans
- A full colour poster for one topic
- An outline of the assessment requirements for the term
- A tracker to help you monitor your progress

Lesson Plan Structure

1. The Term 4 lesson plan is structured to run for 8 weeks.
2. Each week, there are three lessons, of the following notional time:

1 x 1 hour 30 minutes

2 x 1 hour

This time allocation of 3.5 hours per week is CAPS aligned.

Lesson Plan Contents

1. The lesson plan starts with a **CONTENTS PAGE** that lists all the topics for the term, together with a breakdown of the lessons for that topic. You will notice that lessons are named by the week and lesson number, for example, Week 8 Lesson 8C.
2. Every topic begins with a 2 - 4 page **TOPIC OVERVIEW**. The topic overview pages are grey, making them easy to identify. The topic overview can be used to introduce the topic to learners. The topic overview includes:
 - a. A **general introduction** to the topic that states how long the topic runs for, the value of the topic in the final exam and the number of lessons in the topic.
 - b. A table showing the **position of the topic** in the term.
 - c. A **sequential table** that shows the prior knowledge required for this topic, the current knowledge and skills that will be covered, and how this topic will be built on in future years. Use this table to give learners an informal quiz to test their prior knowledge. If learners are clearly lacking in the knowledge and skills required, you may need to take a lesson to cover some of the essential content and skills. It is also useful to see what you are preparing learners for next, by closely examining the 'looking forward' column.
 - d. A glossary of **scientific and technological vocabulary**, together with an explanation of each word or phrase. It is a good idea to display these words and their definitions somewhere in the classroom, for the duration of the topic. It is also a good idea to allow learners some time to copy down these words into their personal dictionaries or science exercise books. You must explicitly teach the words and their meanings as and when you encounter these words in the topic. A good way to teach learners new vocabulary is to use 'PATS':

PROGRAMME ORIENTATION

- POINT – if the word is a noun, point at the object or at a picture of the object as you say the word.
 - ACT – if the word is a verb, try to act out or gesture to explain the meaning of the word, as you say it.
 - TELL – if the word has a more abstract meaning, then tell the learners the meaning of the word. You may need to code switch at this point, but also try to provide a simple English explanation.
 - SAY – say the word in a sentence to reinforce the meaning.
- e. Understanding the uses / value of natural sciences & technology.** It is very important to give learners a sense of how science applies to their daily lives, and of the value that science adds to their lives. Hold a brief discussion on this point when introducing the topic, and invite learners to elaborate on the uses and value that this topic will have to their lives.
- f. Personal reflection.** At the end of every topic, come back to the topic overview, and complete this table. In particular, it is important to note your challenges and ideas for future improvement, so that you can improve your teaching the next year.
3. After the topic overview, you will find the **INDIVIDUAL LESSONS**. Every lesson is structured in exactly the same way. This helps you and the learners to anticipate what is coming next, so that you can focus on the content and skills. Together with the title, each lesson plan includes the following:
- a. Policy and Outcomes.** This provides you with the CAPS reference, and an overview of the skills that will be covered in the lesson. You can immediately see the SCIENCE PROCESS AND DESIGN SKILLS that will be covered, and whether they are lower or higher order skills.
 - b. Possible Resources.** Here, you will see the resources that you should ideally have for the lesson. If you need to use the poster or pages from the resource pack, this will be listed here. There is also a space for improvised resources, and you are invited to add your own ideas here.
 - c. Classroom Management.** Every lesson starts in the same way. Before the lesson, you must write a question that relates to the previous lesson on the chalkboard. Train your learners to come in to the classroom, to take out their exercise books, and to immediately try to answer this question. This links your lesson to the previous lesson, and it effectively settles your learners.

Once learners have had a few minutes to answer, read the question and discuss the answer. You may want to offer a small reward to the learner who answers first, or best. Get your learners used to this routine.

Next, make sure that you are ready to begin your lesson, have all your resources ready, have notes written up on the chalkboard, and be fully prepared to start. Remember, learners will get restless and misbehave if you do not keep them busy and focussed.
 - d. Accessing Information.** This section contains the key content that you need to share with learners. Generally, it involves sharing some new information that is written on the chalkboard, explaining this information, and allowing learners some time to copy the information into their exercise books. Train learners to do this quickly and efficiently. Learners must anticipate this part of the lesson, and must have their books, pens, pencils and rulers ready.

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Explain to learners that this is an important resource for them, because these are the notes they will revise when preparing for tests and exams.

Checkpoint 1. Straight after 'Accessing Information', you will find two checkpoint questions. These questions help you to check that learners understand the new content thus far.

- e. Conceptual Development.** At this point, learners will have to complete an activity to think about and apply their new knowledge, or to learn a new skill. This is the most challenging part of the lesson. Make sure that you fully understand what is required, and give learners clear instructions.

Checkpoint 2. Straight after 'Conceptual Development, you will find two checkpoint questions. These questions help you to check that learners understand the new concepts and skills that they have engaged with.

- f. Reference Points for Further Development.** This is a useful table that lists the relevant sections in each approved textbook. You may choose to do a textbook activity with learners in addition to the lesson plan activity, or even in place of the lesson plan activity. You may also want to give learners an additional activity to do for homework.

- g. Additional Activities / Reading.** This is the final section of the lesson plan. This section provides you with web links related to the topic. Try to get into the habit of visiting these links as part of your lesson preparation. As a teacher, it is always a good idea to be more informed than your learners.

4. At the end of the week, make sure that you turn to the **TRACKER**, and make note of your progress. This helps you to monitor your pacing and curriculum coverage. If you fall behind, make a plan to catch up.
5. **POSTER AND RESOURCE PACK.** You will have seen that the *Possible Resource* section in the lesson plan will let you know which poster or reference pages you will need to use in a lesson.

Please note that you will only be given these resources once. It is important for you to manage and store these resources properly. Do this by:

- Writing your name on all resources
- Sticking Resource onto cardboard or paper
- Laminating all resources, or covering them in contact paper
- Filing the resource papers in plastic sleeves once you have completed a topic

Have a dedicated wall or notice board in your classroom for Natural Science and Technology.

- Use this space to display the resources for the topic
- Display the vocabulary words and meaning here, as well as the resources
- Try to make this an attractive and interesting space
- Display learners' work on this wall – this gives learners a sense of ownership and pride

PROGRAMME ORIENTATION

- 6. ASSESSMENT.** At the end of the lesson plans, you will find the CAPS assessment requirements for the term. You should refer to your prescribed textbooks and departmental resources for examples of the relevant assessments.

Lesson Plan Routine

Train your learners to know and anticipate the routine of Natural Science and Technology lessons. You will soon see that a good knowledge of this routine will improve time-on-task and general classroom discipline and that you will manage to work at a quicker pace.

Remember, every Natural Science and Technology lesson follows this routine:

- 1. Classroom Management:** settle learners by having two questions written on the chalkboard. Learners take out their exercise books and pens, and immediately answer the questions. Discuss the answers to the questions, and reward the successful learner.
- 2. Accessing Information:** have key information written on the chalkboard. Explain this to learners. Allow learners to copy this information into their books.
- 3. Checkpoint 1:** ask learners two questions to check their understanding.
- 4. Conceptual Development:** complete an activity to apply new knowledge or skills.
- 5. Checkpoint 2:** ask learners two questions to check their understanding.
- 6. Reference Points for Further Development:** links to textbook activities – you may choose to use these activities as additional classwork activities, or as homework activities.
- 7. Tracker:** fill in your tracker at the end of the week to track your progress.

PROGRAMME ORIENTATION

A vehicle to implement CAPS

Teaching Natural Sciences & Technology can be exciting and rewarding. These lesson plans have been designed to guide you to implement the CAPS policy in a way that makes the teaching and learning experience rewarding for both the teacher and the learners.

To support the policy's fundamentals of teaching Natural Sciences & Technology, these lesson plans use the CAPS content as a basis and:

- provide a variety of teaching techniques and approaches
- promote enjoyment and curiosity
- highlight the relationship between Natural Science and Technology and other subjects
- where appropriate, draw on and emphasise cultural contexts and indigenous knowledge systems
- show the relationship between science, learners, their societies and their environments
- aim to prepare learners for economic activity and self-expression

Content and Time Allocation

These lessons plans have been developed to comply with CAPS in respect of both content and time allocation. In developing these lesson plans, we took into consideration the realities of teachers and to this end, we made some simple adjustments, without deviating from policy, to make the teaching of these lesson plans more achievable. The kinds of adjustments made include using some of the practical tasks in the lesson plans for assessment purposes; and building in time for revision and exams during terms 2 and 4.

CAPS assigns one knowledge strand to form the basis of content in each term. These strands are as follows:

- Term 1: ***Life and Living***
- Term 2: ***Matter and Materials***
- Term 3: ***Energy and Change***
- Term 4: ***Planet Earth and Beyond***

In most terms, there are Technology knowledge strands that complement the Natural Sciences strands. There are three Technology strands, they are:

- ***Structures***
- ***Systems and Control***
- ***Processing***

PROGRAMME ORIENTATION

The distribution of these strands across the year is summarised in the table below:

Grade 5						
Term 1		Term 2		Term 3		Term 4
Strands NS & Tech		Strands NS & Tech		Strands NS & Tech		Strands NS & Tech
Life and Living	Structures	Matter and Materials	Processing	Energy and Change	Systems and Control	Systems and Control
Plants and animals on Earth	Skeletons and structures	Metals and non-metals	Processing materials	Stored energy in fuels	Systems for moving things	Planet Earth
Animal Skeletons		Uses of metals	Processed materials	Energy and electricity		Surface of the Earth
Food Chains				Energy and movement		Sedimentary Rocks
Life cycles						Fossils
-						

These lesson plans have been designed against the stipulated CAPS requirements with topics being allocated for the time prescribed by CAPS. (Remember that some slight changes have been incorporated to accommodate time for revision, tests and examinations).

PROGRAMME ORIENTATION

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The time allocation by topic is summarised in the table below.

Remember that one week equates to 3,5 hours or three lessons: two lessons of 1 hour each; and one lesson of 1½ hours.

TERM	GRADE 4		GRADE 5		GRADE 6	
	Topic	Time in weeks	Topic	Time in weeks	Topic	Time in weeks
Term 1: Life and Living	• Living and non-living things	2	• Plants and animals on Earth	2½	• Photosynthesis	2½
	• Structures of plants and animals	2½	• Animal Skeletons	1½	• Nutrients in Food	1½
	• What plants need to grow	1	• Food Chains	2½	• Nutrition	1½
	• Habitats of animals	1	• Life cycles	1½	• Food Processing	2½
	• Structures for animal shelters	2½	• Skeletons and Structures	2	• Eco Systems and food webs	2
		(10 wks)		(10 wks)		(10 wks)
Term 2: Matter and Materials	• Materials around us	3½	• Metals and non-metals	2	• Solids, liquids and gases	½
	• Solid materials	2	• Uses of metals	2½	• Mixtures	1
	• Strengthening materials	2	• Processing materials	3½	• Solutions as special mixtures	2½
	• Strong frame structures	2½	• Processed materials	2	• Dissolving	1
		(10 wks)		(10 wks)	• Mixtures and water resources	2½
				• Processes to purify water	2½	
					(10 wks)	

PROGRAMME ORIENTATION

Term 3: Energy and Change	• Energy and Energy transfer	2½	• Stored energy in fuels	3	• Electric circuits	2½
	• Energy around us	2½	• Energy and electricity	3	• Electrical conductors and insulators	2
	• Movement energy in a system	2½	• Energy and movement	1	• Systems to solve problems	2½
	• Energy and sound	2½	• Systems for moving things	3	• Mains electricity	3
		(10 wks)		(10 wks)		(10 wks)
Term 4: Planet Earth and Beyond	• Planet Earth	2	• Planet Earth	1	• The solar system	2½
	• The Sun	1	• Surface of the Earth	2½	• Movements of the earth and planets	1
	• The Earth & the Sun	1	• Sedimentary Rocks	2	• The movement of the Moon	1
	• The Moon	2	• Fossils	2½	• Systems looking into space	1
	• Rocket Systems	2			• Systems to explore the Moon and Mars	2½
		(8 wks)		(8 wks)		(8 wks)
TOTALS	38 weeks		38 weeks		38 weeks	

PROGRAMME ORIENTATION

REFLECTING ON THE LESSONS THAT YOU TEACH

It is important to reflect on your teaching. Through reflection, we become aware of what is working and what is not, what we need to change and what we do not. Reflecting on your use of these lesson plans will also help you use them more effectively and efficiently.

These lesson plans have been designed to help you deliver the content and skills associated with CAPS. For this reason, it is very important that you stick to the format and flow of the lessons. CAPS requires a lot of content and skills to be covered – this makes preparation and following the lesson structure very important.

Use the tool below to help you reflect on the lessons that you teach. You do not need to use this for every lesson that you teach – but it is a good idea to use it a few times when you start to use these lessons. This way, you can make sure that you are on track and that you and your learners are getting the most out of the lessons.

LESSON REFLECTION TOOL			
Preparation			
1.	What preparation was done?		
2.	Was preparation sufficient?		
3.	What could have been done better?		
4.	Were all of the necessary resources available?		
Classroom Management			
		Yes	No
5.	Was there a question written in the board?		
6.	Was there an answer written on the board?		
7.	Was the answer discussed with the learners in a meaningful way?		
8.	Overall reflection on this part of the lesson: What was done well? What could have been done better?		

PROGRAMME ORIENTATION

Accessing Information

		Yes	No
9.	Was the text and/ or diagrams written on the chalkboard before the lesson started?		
10.	Was the work on the board neat and easy for the learners to read?		
11.	Was the explanation on the content easy to follow?		
12.	Was the information on the board used effectively to help with the explanations?		
13.	Was any new vocabulary taught effectively? (in context and using strategies like PATS)		
14.	Were the learners actively engaged? (asked questions, asked for their opinions and to give ideas or suggestions)		
15.	Were the checklist questions used effectively?		
16.	Overall reflection on this part of the lesson: What was done well? What could have been done better?		

PROGRAMME ORIENTATION

Conceptual Development

		Yes	No
17.	Was the information taught in the 'Accessing Information' part of the lesson used to foreground the activity?		
18.	Were clear instructions given for the conceptual development activity?		
19.	Were the outcomes/answers to the activities explained to the learners?		
20.	Could the learners ask questions and were explanations given?		
21.	Was a model answer supplied to the learners? (written or drawn on the board)		
21.	Were the checklist questions used effectively?		
22.	At the end of the lesson, were the learners asked if they had questions or if they needed any explanations?		
23.	Overall reflection on this part of the lesson: What was done well? What could have been done better?		

TOPIC OVERVIEW:

Planet Earth

Term 4, Weeks 1A – 1C

A. TOPIC OVERVIEW

Term 4, Weeks 1a – 1c

- This topic runs for 1 weeks.
- This topic counts for 12% in the end of year final exam.
- It is presented over 3 lessons.
- This topic's position in the term is as follows:

LESSON	WEEK 1			WEEK 2			WEEK 3			WEEK 4			WEEK 5		
		A	B	C	A	B	C	A	B	C	A	B	C	A	B

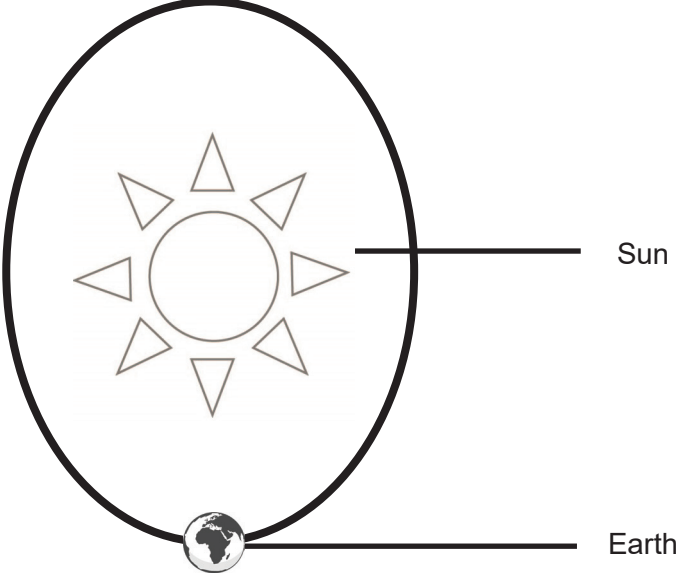

LESSON	WEEK 6			WEEK 7			WEEK 8			WEEK 9			WEEK 10		
		A	B	C	A	B	C	A	B	C	A	B	C	A	B

B. SEQUENTIAL TABLE

GRADE 4	GRADE 5	GRADE 6 & 7
LOOKING BACK	CURRENT	LOOKING FORWARD
<ul style="list-style-type: none"> • The Earth is a sphere and is made of rock • The Earth is a planet in space • We can see the sun, moon and stars from Earth 	<ul style="list-style-type: none"> • The Earth travels in an orbit around the sun • It takes 365 days to orbit the sun once; this is called a year • The Earth spins on its own axis • It takes 24 hours to spin once; this is called a day 	<ul style="list-style-type: none"> • The sun is at the centre of our solar system • There are eight planets that orbit the sun • Each planet has its own features • The planets take varied lengths of time to revolve around the sun • The Earth's seasons and solar energy • Relationship of the moon to Earth; gravity; tides • Early indigenous knowledge

C. SCIENTIFIC AND TECHNOLOGICAL VOCABULARY

Ensure that you teach the following vocabulary at the appropriate place in the topic:

	TERM	EXPLANATION
1.	orbit	<p>The pathway that a planet (or other object) takes around the Sun. The Earth orbits the Sun every 365 days.</p> 
2.	planet	<p>A planet is a <u>celestial</u> body that orbits a star. Eight planets orbit our sun. Planets are different from stars. Stars make their own heat and light.</p>
3.	solar system	<p>Our solar system is made up of the eight planets and their moons, together with asteroids, comets and other objects, that orbit the sun.</p>
4.	anti-clockwise	<p>Moving in the opposite direction to which the hands of a clock move.</p>
5.	relative to	<p>To be compared to, but scaled up or scaled down in size.</p>
6.	axis	<p>An imaginary line about which an object turns. The Earth's axis runs through the North Pole and the South Pole.</p> 

D. UNDERSTANDING THE USES / VALUE OF SCIENCE

If you are interested in the Solar System, you might want to become an astronomer or an astronaut. An astronomer is a scientist who studies objects in Space. An astronaut travels in Space. There are large telescopes in South Africa. The building of these telescopes have needed engineers, scientists, information technologists and astronomers.

E. PERSONAL REFLECTION

Reflect on your teaching at the end of each topic:

Date completed:	
Lesson successes:	
Lesson challenges:	
Notes for future improvement:	

1 A

Term 4, Week 1, Lesson A

Lesson Title: The Earth Moves

Time for lesson: 1½ hours

A POLICY AND OUTCOMES

Sub-Topic	The Earth orbits the Sun
CAPS Page Number	42

Lesson Objectives

By the end of the lesson, learners will be able to:

- describe the Earth's orbit around the sun
- draw the Earth's orbit around the sun
- explain that the Earth takes 365 days to orbit the sun

Specific Aims	1. DOING SCIENCE & TECHNOLOGY	
	2. KNOWING THE SUBJECT CONTENT & MAKING CONNECTIONS	✓
	3. UNDERSTANDING THE USES OF SCIENCES & INDIGENOUS KNOWLEDGE	

SCIENCE PROCESS SKILLS

1. Accessing & recalling Information	✓	7. Raising Questions		13. Interpreting Information	✓
2. Observing	✓	8. Predicting		14. Designing	✓
3. Comparing		9. Hypothesizing		15. Making/ constructing	
4. Measuring		10. Planning Investigations		16. Evaluating and improving products	
5. Sorting & Classifying		11. Doing Investigations	✓	17. Communicating	
6. Identifying problems & issues		12. Recording Information	✓		

B POSSIBLE RESOURCES

For this lesson, you will need:

IDEAL RESOURCES	IMPROVISED RESOURCES
Resource 1: 'The Earth revolves around the Sun'	
Resource 2: Activity: 'The Earth's orbit around the Sun'	

C CLASSROOM MANAGEMENT

1. Make sure that you are ready and prepared.
2. Write the following question onto the chalkboard before the lesson starts:

The Earth is round like a ball. What do we call this shape?

3. Learners should enter the classroom and answer the question in their workbooks.
4. Discuss the answer with the learners.
5. Write the model answer onto the chalkboard.

A sphere

D ACCESSING INFORMATION

1. Write the following onto the chalkboard (always try to do this before the lesson starts):

THE EARTH'S ORBIT

1. The Earth is a planet.
2. In our solar system, there are eight planets.
3. The Sun is at the centre of our solar system.
4. The planets travel around the Sun.
5. The pathway on which they travel is called an orbit.
6. The Earth takes 365 days to orbit the Sun once.
7. We call this a year.
8. The Earth orbits the Sun in an **anti-clockwise** direction.

2. Explain this to the learners as follows:
 - a. The Earth is the third planet from the Sun.
 - b. All the **planets** in our solar system travel around the Sun.
 - c. This pathway is known as an **orbit**.
 - d. The Sun is at the centre of our solar system.

TOPIC: Planet Earth

- e. The Earth takes 365 days to orbit the Sun once.
 - f. This is known as a year.
3. Give learners some time to copy this information into their workbooks.

Checkpoint 1

Ask the learners the following questions to check their understanding at this point:

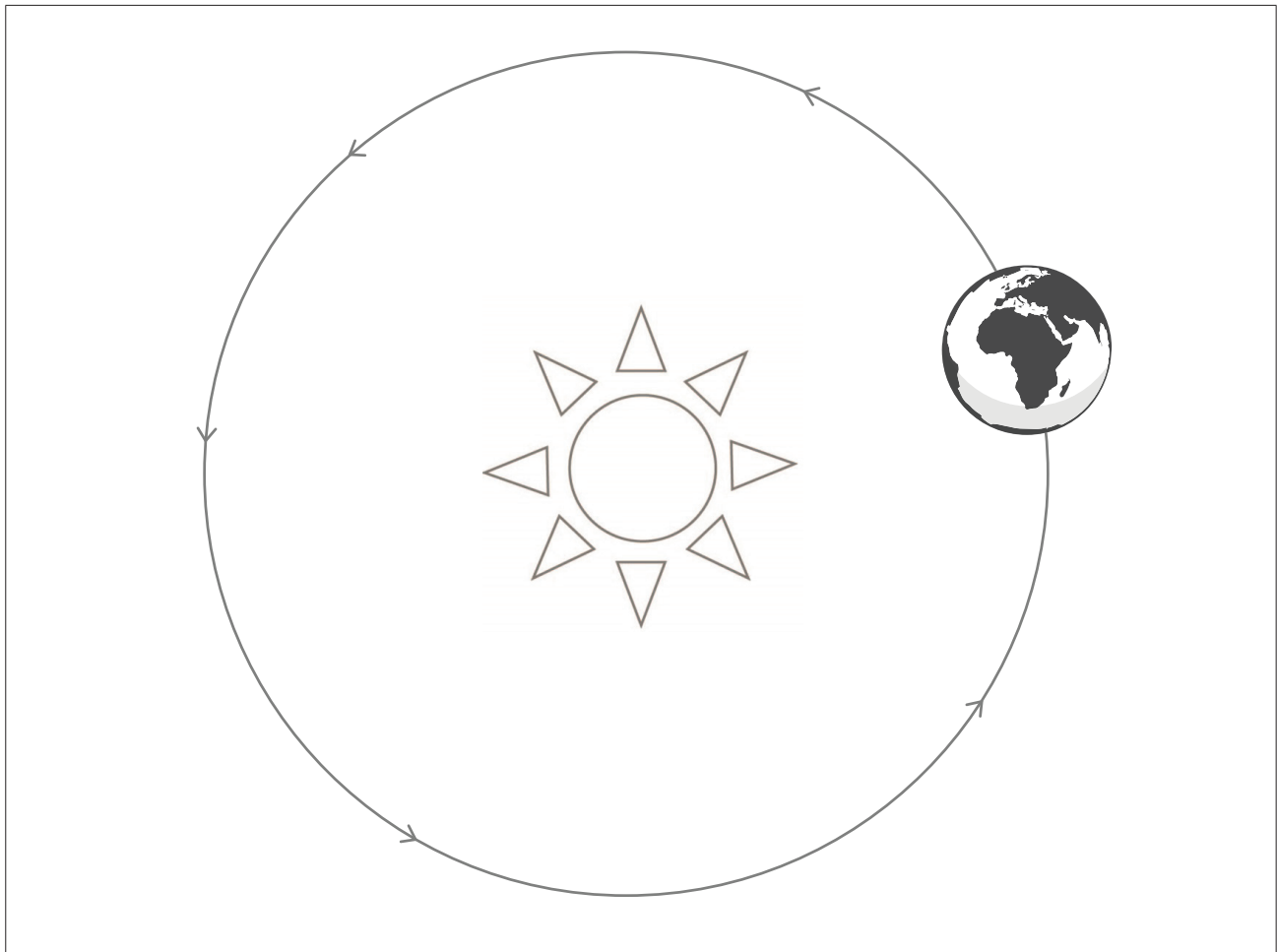
- a. What do we call the pathway that planets travel on around the sun?
- b. How long does it take the Earth to orbit the sun?

Answers to the checkpoint questions are as follows:

- a. An orbit
- b. 365 days (1 year)

E CONCEPTUAL DEVELOPMENT

1. Draw the following onto the chalkboard:



TOPIC: Planet Earth

2. Explain this to the learners as follows:
 - a. The Sun is the centre of our solar system.
 - b. The Earth travels in a circular pathway around the Sun.
 - c. This is called the Earth's orbit.
 - d. Earth orbits the Sun in an anti-clockwise direction.
 - e. It takes the Earth 365 days to orbit the Sun once.
 - f. This amount of time is called a year.
3. Tell learners to copy the drawing from the chalkboard into their workbooks.
4. Give learners some time to complete this drawing in their workbooks.
5. Show learners Resource 1: 'The Earth's orbit around the sun'.
6. Explain the following to the learners:
 - a. The diagram shows the pathway that the Earth takes around the sun.
 - b. The arrows show the anti-clockwise direction in which the Earth orbits.
 - c. The Earth's orbit takes 365 days.
7. This task needs to be prepared before the lesson. Look at Resource 2: 'Activity: The Earth orbiting the Sun'. Either cut out or trace and cut out the pictures of the Sun and the Earth.
8. Complete the following activity with the learners:

Take the learners outside to a large area. Take the pictures of the Sun and the Earth with you. Choose two learners, and do the following:

- a. Get one learner to hold the picture of the Sun.
 - b. This learner must stand in the centre of the large area.
 - c. Get another learner to hold the picture of the Earth.
 - d. Get this second learner to take 15 big steps away from the learner representing the Sun.
 - e. The learner representing the Earth must turn left and walk in a circle around the sun keeping the same distance from the sun as he / she walks.
-
8. Explain the following to the learners:
 - a. The pathway that the learner is making around the sun is called the Earth's orbit.
 - b. This orbit takes the Earth 365 days.
 - c. We call this a year.
 - d. The Earth orbits the sun in an anticlockwise direction (the learner turned left to walk around the sun).
 - e. The sizes of the Sun and Earth that the learners are holding are **relative**. The Sun is much bigger than Earth.

TOPIC: Planet Earth

Checkpoint 2

Ask the learners the following questions to check their understanding at this point:

- a. What object is at the centre of our solar system?
- b. In what direction does the Earth orbit the sun?

Answers to the checkpoint questions are as follows:

- a. The sun
- b. Anticlockwise

9. Ask the learners if they have any questions and provide answers and explanations.

F REFERENCE POINTS FOR FURTHER DEVELOPMENT

If you need additional information or activities on this topic, you can find these in your textbook on the following pages:

NAME OF TEXTBOOK	TOPIC	PAGE NUMBER
Study & Master	Planet Earth	142-143
Viva	Planet Earth	166-168
Platinum	Planet Earth	162-163
Solutions for All	Planet Earth	197-198
Day-by-Day	Planet Earth	139-140
Oxford	Planet Earth	162-164
Spot On	Planet Earth	74
Top Class	Planet Earth	111-112
Sasol Inzalo BkB	Planet Earth	80-84

G ADDITIONAL ACTIVITIES / READING

In addition, further reading, listening or viewing activities related to this sub-topic are available through the following web links:

1. <https://goo.gl/UiJSu2> (1/2 min) [Earth Orbit]
2. <https://goo.gl/Cq9KqK> (3 1/2 mins) [Rotation and Revolution of the Earth]

1 B

Term 4, Week 1, Lesson B

Lesson Title: The Earth Moves

Time for lesson: 1 hour

A POLICY AND OUTCOMES

Sub-Topic	The Earth spins
CAPS Page Number	42

Lesson Objectives

By the end of the lesson, learners will be able to:

- demonstrate the Earth's spinning on its own axis
- draw the Earth and its axis
- explain that the Earth takes 24 hours to spin once on its axis

Specific Aims	1. DOING SCIENCE & TECHNOLOGY	✓
	2. KNOWING THE SUBJECT CONTENT & MAKING CONNECTIONS	✓
	3. UNDERSTANDING THE USES OF SCIENCES & INDIGENOUS KNOWLEDGE	

SCIENCE PROCESS SKILLS

1. Accessing & recalling Information	✓	7. Raising Questions		13. Interpreting Information	✓
2. Observing	✓	8. Predicting		14. Designing	
3. Comparing		9. Hypothesizing		15. Making/ constructing	
4. Measuring		10. Planning Investigations		16. Evaluating and improving products	
5. Sorting & Classifying		11. Doing Investigations	✓	17. Communicating	
6. Identifying problems & issues		12. Recording Information	✓		

TOPIC: Planet Earth

B POSSIBLE RESOURCES

For this lesson, you will need:

IDEAL RESOURCES	IMPROVISED RESOURCES
Resource 3: 'The Earth spinning on its axis'	Orange or other round fruit
Globe	pencil

C CLASSROOM MANAGEMENT

1. Make sure that you are ready and prepared.
2. Write the following question onto the chalkboard before the lesson starts:

How many days does it take the Earth to orbit the sun once?

3. Learners should enter the classroom and answer the question in their workbooks.
4. Discuss the answer with the learners.
5. Write the model answer onto the chalkboard.

365 days

D ACCESSING INFORMATION

1. Write the following onto the chalkboard (always try to do this before the lesson starts):

THE EARTH SPINS ON ITS OWN AXIS

1. The Earth has an imaginary line running through it.
2. This line goes from the North Pole to the South Pole.
3. This line is called an axis.
4. The Earth spins around its axis.
5. The Earth spins in an anti-clockwise direction.
6. The Earth's axis is not upright.
7. The Earth's axis is tilted.

2. Explain this to the learners as follows:
 - a. The axis of the Earth goes from the North Pole to the South Pole.
 - b. The Earth spins around this line.
 - c. It spins in an anti-clockwise direction. It turns to the left.
 - d. The Earth's axis is not straight up, it is tilted.
3. Give learners some time to copy the information written on the chalkboard into their workbook

TOPIC: Planet Earth

Checkpoint 1

Ask the learners the following questions to check their understanding at this point:

- a. What is the imaginary line running through the Earth called?
- b. In what direction does the Earth spin?

Answers to the checkpoint questions are as follows:

- a. The Earth's axis
- b. Anti-clockwise

E

CONCEPTUAL DEVELOPMENT

1. Show learners Resource 3: 'The Earth spinning on its axis'.
2. Explain to the learners as follows:
 - a. Show that the orange has a pencil stuck through it.
 - b. The pencil is like the axis of the Earth.
 - c. If you move the orange it will spin around the pencil.
 - d. The orange spinning, is like the Earth spinning.
 - e. The Earth spins in an anti-clockwise direction. The Earth turns to its left.
 - f. Show learners how the axis is not straight up; it is tilted.
3. Ask the learners to do the following:
 - a. Stand up.
 - b. Put up their left hands.
 - c. Spin (turn on the same spot) to the left.
 - d. Explain that this is spinning in an anti-clockwise direction.

Checkpoint 2

Ask the learners the following questions to check their understanding at this point:

- a. Through which two points on the Earth does its axis run?
- b. Is the Earth's axis upright or tilted?

Answers to the checkpoint questions are as follows:

- a. The North Pole and the South Pole
- b. Tilted

4. Ask the learners if they have any questions and provide answers and explanations.

TOPIC: Planet Earth

F REFERENCE POINTS FOR FURTHER DEVELOPMENT

If you need additional information or activities on this topic, you can find these in your textbook on the following pages:

NAME OF TEXTBOOK	TOPIC	PAGE NUMBER
Study & Master	Planet Earth	144
Viva	Planet Earth	168-169
Platinum	Planet Earth	164-165
Solutions for All	Planet Earth	193-196
Day-by-Day	Planet Earth	141-144
Oxford	Planet Earth	164-165
Spot On	Planet Earth	75
Top Class	Planet Earth	112-113
Sasol Inzalo BkB	Planet Earth	74-75

G ADDITIONAL ACTIVITIES / READING

In addition, further reading, listening or viewing activities related to this sub-topic are available through the following web links:

1. <https://goo.gl/yexHhm> (1 1/2 mins) [Animation of Earth spinning – day and night]

1 C

Term 4, Week 1, Lesson C

Lesson Title: The Earth Moves

Time for lesson: 1 hour

A

POLICY AND OUTCOMES

Sub-Topic	Day and Night
CAPS Page Number	42

Lesson Objectives

By the end of the lesson, learners will be able to:

- demonstrate how day and night occur
- explain that the Earth takes 24 hours to rotate fully

Specific Aims	1. DOING SCIENCE & TECHNOLOGY	
	2. KNOWING THE SUBJECT CONTENT & MAKING CONNECTIONS	✓
	3. UNDERSTANDING THE USES OF SCIENCES & INDIGENOUS KNOWLEDGE	

SCIENCE PROCESS SKILLS

1. Accessing & recalling Information	✓	7. Raising Questions	✓	13. Interpreting Information	✓
2. Observing	✓	8. Predicting		14. Designing	
3. Comparing		9. Hypothesizing		15. Making/ constructing	
4. Measuring		10. Planning Investigations		16. Evaluating and improving products	
5. Sorting & Classifying		11. Doing Investigations	✓	17. Communicating	
6. Identifying problems & issues		12. Recording Information	✓		

TOPIC: Planet Earth

B POSSIBLE RESOURCES

For this lesson, you will need:

IDEAL RESOURCES	IMPROVISED RESOURCES
Globe, torch	big ball, candle or other source of light
Resource 3: 'The Earth spinning on its axis'	

C CLASSROOM MANAGEMENT

1. Make sure that you are ready and prepared.
2. Write the following question onto the chalkboard before the lesson starts:

Is the Earth's axis upright or tilted?

3. Learners should enter the classroom and answer the question in their workbooks.
4. Discuss the answer with the learners.
5. Write the model answer onto the chalkboard.

Tilted

D ACCESSING INFORMATION

1. Write the following onto the chalkboard (always try to do this before the lesson starts):

DAY AND NIGHT

1. The Earth spins on its own axis.
 2. It takes 24 hours to rotate once fully.
 3. We call this amount of time a day.
2. Explain this to the learners as follows:
 - a. Show learners Resource 3: 'The Earth spinning on its axis'.
 - b. The Earth takes 24 hours to spin once fully.
 3. Give learners some time to copy the information written on the chalkboard into their workbooks.

TOPIC: Planet Earth

Checkpoint 1

Ask the learners the following questions to check their understanding at this point:

- a. How many hours does it take for the Earth to spin once on its axis?
- b. What do we call this amount of time?

Answers to the checkpoint questions are as follows:

- a. 24 hours
- b. A day

E

CONCEPTUAL DEVELOPMENT

1. Make sure you have a globe (or big ball) and a torch (or candle or other source of light).
2. Find a dark area of the school or close the door of the classroom and go to a corner away from windows.
3. Do the following activity with the learners:

The following activity will demonstrate the Earth spinning on its axis:

- a. Place the globe or ball on a table or flat surface.
- b. Ask a learner to shine the torch on the globe or ball and to hold it steady.
- c. Slowly turn the globe or ball in an anti-clockwise direction.
- d. Point out to the learners that whilst one side of the globe or ball is in lightness, the other side is in darkness.
- e. The spinning of the Earth on its axis causes day and night.
- f. If you have a globe, ask learners to find South Africa. Show the learners how South Africa goes from day to night to day again as the globe spins around once.
- g. If you have a ball, make a mark on the ball. Show learners how the marked spot goes from light to dark to light again as the ball spins around once.

4. Show learners Resource 4: 'A Globe 'and Resource 5: 'Day and Night'.
5. Explain the following to the learners:
 - a. A globe is a model of the Earth.
 - b. It has a tilted axis.
 - c. The photograph of the Earth clearly shows day and night.
6. If you have time, ask the learners what they think would happen if there was no day and night. Allow them time to discuss this. (*Half the Earth would get very hot and the other half would be very cold; there would be no life on the planet.*)

TOPIC: Planet Earth

Checkpoint 2

Ask the learners the following questions to check their understanding at this point:

- a. Why does the Earth have night and day?
- b. What is a globe?

Answers to the checkpoint questions are as follows:

- a. Because it is spinning on its own axis and it turns towards and then away from the Sun.
- b. It is a model of the Earth

7. Ask the learners if they have any questions and provide answers and explanations.

F REFERENCE POINTS FOR FURTHER DEVELOPMENT

If you need additional information or activities on this topic, you can find these in your textbook on the following pages:

NAME OF TEXTBOOK	TOPIC	PAGE NUMBER
Study & Master	Planet Earth	144
Viva	Planet Earth	168
Platinum	Planet Earth	164
Solutions for All	Planet Earth	194
Day-by-Day	Planet Earth	142-143
Oxford	Planet Earth	165
Spot On	Planet Earth	75
Top Class	Planet Earth	113
Sasol Inzalo BkB	Planet Earth	74-79

G ADDITIONAL ACTIVITIES / READING

In addition, further reading, listening or viewing activities related to this sub-topic are available through the following web links:

1. <https://goo.gl/QJYNgQ> (1/2 min) [Why do we have day and night?]

TOPIC OVERVIEW:

Surface of the Earth

Term 4, Weeks 2A – 4A

A. TOPIC OVERVIEW

Term 4, Weeks 2a – 4a

- This topic runs for 2½ weeks.
- It is presented over 7 lessons.
- This topic counts for 28% in the end of year final exam.
- This topic's position in the term is as follows:

LESSON	WEEK 1			WEEK 2			WEEK 3			WEEK 4			WEEK 5		
		A	B	C	A	B	C	A	B	C	A	B	C	A	B

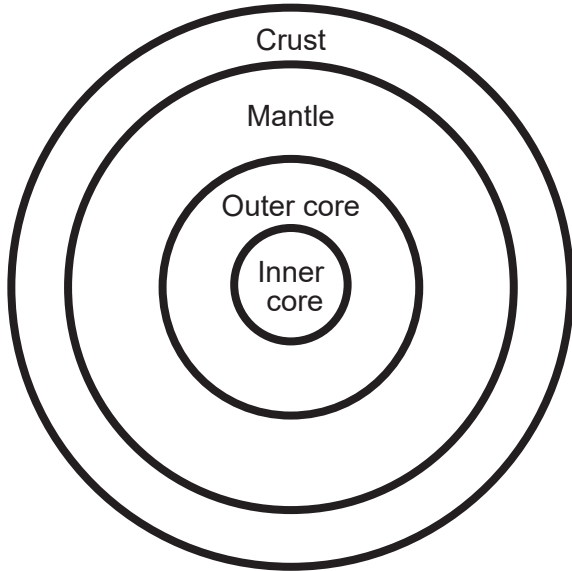
LESSON	WEEK 6			WEEK 7			WEEK 8			WEEK 9			WEEK 10		
		A	B	C	A	B	C	A	B	C	A	B	C	A	B

B. SEQUENTIAL TABLE

GRADE 4	GRADE 5	GRADE 6 & 7
LOOKING BACK	CURRENT	LOOKING FORWARD
<ul style="list-style-type: none"> • Earth gets the right amount of sun to support life 	<ul style="list-style-type: none"> • The Earth's crust • How soil is made • Soil types 	

C. SCIENTIFIC AND TECHNOLOGICAL VOCABULARY

Ensure that you teach the following vocabulary at the appropriate place in the topic:

	TERM	EXPLANATION
1.	crust	<p>This is the outermost layer of a planet.</p> 
2.	mantle	The mantle lies between the crust and the core. It makes up most of the Earth.
3.	core	The core is the innermost layer of the Earth. It is very, very hot.
4.	decompose	To decompose means to become rotten or break into much smaller bits.
5.	nutrients	These are substances that provide what is needed for life and growth.
6.	fair	To treat things equally.
7.	funnel	A funnel is a tube that is wide at the top and narrow at the bottom. It is used for pouring something into a small opening.
8.	erosion	This is the wearing away of soil by water or wind.
9.	contour	Lines that follow the natural lines of the slope.
10.	fertile	If soil is fertile, it means it is good to grow things.
11.	sphere	A shape like a ball.

D. UNDERSTANDING THE USES / VALUE OF SCIENCE

Understanding the surface of the Earth allows us to use soil for different purposes, such as growing food, growing cotton for clothes, for making cement, for building. Soil also filters water so that it stays clean. We need to understand this so that we can look after the soil as it is necessary for life on Earth.

E. PERSONAL REFLECTION

Reflect on your teaching at the end of each topic:

Date completed:	
Lesson successes:	
Lesson challenges:	
Notes for future improvement:	

A POLICY AND OUTCOMES

Sub-Topic	The crust of the Earth
CAPS Page Number	43

Lesson Objectives

By the end of the lesson, learners will be able to:

- explain how soil, water, air and sunlight support life on Earth
- describe how rocks and soil make up the crust of the Earth
- draw and label a diagram of the crust of the Earth

Specific Aims	1. DOING SCIENCE & TECHNOLOGY	
	2. KNOWING THE SUBJECT CONTENT & MAKING CONNECTIONS	✓
	3. UNDERSTANDING THE USES OF SCIENCES & INDIGENOUS KNOWLEDGE	

SCIENCE PROCESS SKILLS

1. Accessing & recalling Information	✓	7. Raising Questions	✓	13. Interpreting Information	✓
2. Observing	✓	8. Predicting		14. Designing	
3. Comparing		9. Hypothesizing		15. Making/ constructing	
4. Measuring		10. Planning Investigations		16. Evaluating and improving products	
5. Sorting & Classifying		11. Doing Investigations		17. Communicating	✓
6. Identifying problems & issues		12. Recording Information			

TOPIC: Surface of the Earth

B POSSIBLE RESOURCES

For this lesson, you will need:

IDEAL RESOURCES	IMPROVISED RESOURCES
Resource 6: 'The crust, mantle and core of the Earth '	
Resource 7: 'A gold mine'	
Resource 8: 'A cross-section of an avocado'	
Resource 10: 'Layers of the Earth's Crust'	

C CLASSROOM MANAGEMENT

1. Make sure that you are ready and prepared.
2. Write the following question onto the chalkboard before the lesson starts:

How long does it take for the Earth to rotate once on its own axis?

3. Learners should enter the classroom and answer the question in their workbooks.
4. Discuss the answer with the learners.
5. Write the model answer onto the chalkboard.

24 hours

D ACCESSING INFORMATION

1. Write the following onto the chalkboard (always try to do this before the lesson starts):

THE EARTH'S CRUST

1. The surface of the Earth is called the crust.
2. The crust is the outer layer of the Earth.
3. It is about 70 km thick.
4. The crust is made up of rocks and soil.
5. Sometimes water, trees, plants and buildings cover the crust.

TOPIC: Surface of the Earth

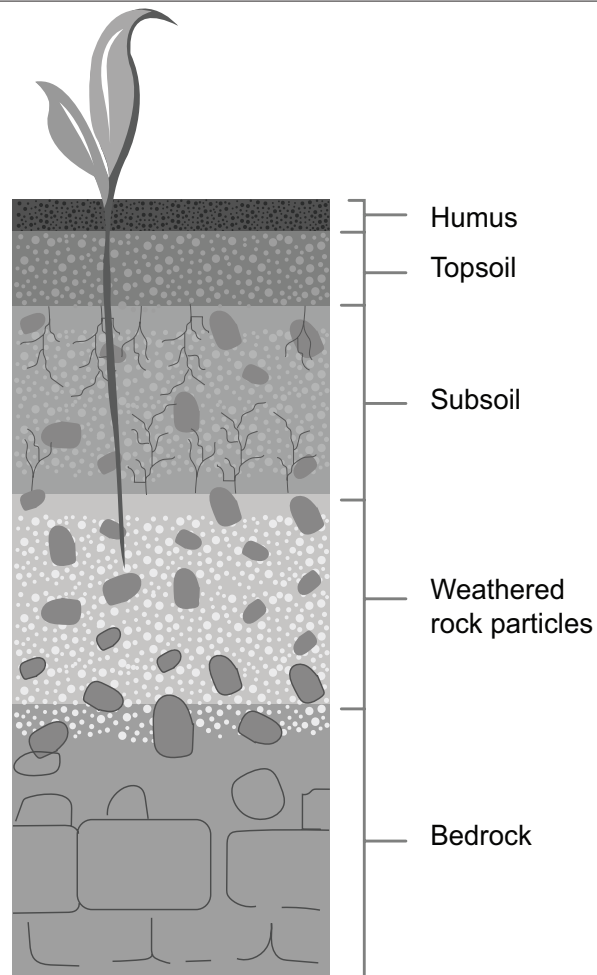


Diagram showing the Earth's Crust

6. Humus is the top layer.
 7. Humus is made from old leaves and plants.
 8. Topsoil is the second layer.
 9. Animals and plants depend on topsoil to live.
 10. Subsoil is often sandy.
 11. The bottom layer is bedrock.
 12. Sometimes, about 1km deep, there will be oil and gas.
2. Explain this to the learners as follows:
 - a. Show learners Resource 6: 'The crust, mantle and core of the Earth'.
 - b. The Earth's crust is the outside layer.
 - c. The crust is about 70 km thick.
 - d. Rivers, oceans, tress, plants and buildings cover the crust.
 - e. Oil and gas can be found deep down.
 - f. Show learners Resource 10: 'Layers of the Earth's crust'.
 - g. Point out all the different layers of the crust, starting at the top.
 3. Give learners some time to copy the information written on the chalkboard as well as the diagram into their workbooks.

TOPIC: Surface of the Earth

Checkpoint 1

Ask the learners the following questions to check their understanding at this point:

- a. What is the outer layer of the Earth called?
- b. Which layer in the crust do animals and plants depend on to live?

Answers to the checkpoint questions are as follows:

- a. The crust
- b. The topsoil

E

CONCEPTUAL DEVELOPMENT

1. Show learners Resource 6: 'The crust, mantle and core of the Earth' and Resource 7: 'A gold mine'.
2. Explain the following to the learners:
 - a. The Earth gets hotter the closer to the centre (core) it gets.
 - b. The crust is 70 km thick.
 - c. Humans have gone 5 km deep to find and mine gold.
 - d. The deeper they go, the hotter it gets.
 - e. The Earth's crust goes under the sea as well.
3. Show learners Resource 7: 'A cross-section of an avocado'.
4. Explain the following to the learners:
 - a. A cross-section is what you see if you cut something in half or in quarters.
 - b. The Earth is like an avocado.
 - c. It has a hard crust, a softer inside called a mantle, and a core.
 - d. The Earth's core is very, very hot.
 - e. It is as hot as the surface of the Sun.
5. Write the following onto the chalkboard (always try to do this before the lesson starts):

THE EARTH'S LAYERS

1. The Earth is a **sphere**.
2. It has three main layers.
3. These are the crust, the mantle and the core.

TOPIC: Surface of the Earth

Checkpoint 2

Ask the learners the following questions to check their understanding at this point:

- a. How thick is the Earth's crust?
- b. Name the three main layers that make up the Earth.

Answers to the checkpoint questions are as follows:

- a. 70 km
- b. The crust, the mantle and the core

7. Ask the learners if they have any questions and provide answers and explanations.

F REFERENCE POINTS FOR FURTHER DEVELOPMENT

If you need additional information or activities on this topic, you can find these in your textbook on the following pages:

NAME OF TEXTBOOK	TOPIC	PAGE NUMBER
Study & Master	Surface of the Earth	147
Viva	Surface of the Earth	172
Platinum	Surface of the Earth	-
Solutions for All	Surface of the Earth	202
Day-by-Day	Surface of the Earth	-
Oxford	Surface of the Earth	-
Spot On	Surface of the Earth	75
Top Class	Surface of the Earth	115
Sasol Inzalo BkB	Surface of the Earth	88-96

G ADDITIONAL ACTIVITIES / READING

In addition, further reading, listening or viewing activities related to this sub-topic are available through the following web links:

1. <https://goo.gl/ZdpsE5> (3 mins) [Structure of the Earth]
2. <https://goo.gl/fdhTe6> (5 mins) [Layers of the Earth]

TOPIC: Surface of the Earth

2 B

Term 4, Week 2, Lesson B

Lesson Title: Rocks & Change

Time for lesson: 1½ hours

A POLICY AND OUTCOMES

Sub-Topic	Soil, sunlight, water, air support life on Earth.
CAPS Page Number	43

Lesson Objectives

By the end of the lesson, learners will be able to:

- explain that plants need soil, sunlight, water and air to survive
- record data in a table
- analyse the data to produce a bar graph

Specific Aims	1. DOING SCIENCE & TECHNOLOGY	✓
	2. KNOWING THE SUBJECT CONTENT & MAKING CONNECTIONS	✓
	3. UNDERSTANDING THE USES OF SCIENCES & INDIGENOUS KNOWLEDGE	

SCIENCE PROCESS SKILLS

1. Accessing & recalling Information	✓	7. Raising Questions	✓	13. Interpreting Information	✓
2. Observing		8. Predicting		14. Designing	
3. Comparing		9. Hypothesizing		15. Making/ constructing	
4. Measuring	✓	10. Planning Investigations		16. Evaluating and improving products	
5. Sorting & Classifying		11. Doing Investigations	✓	17. Communicating	✓
6. Identifying problems & issues		12. Recording Information	✓		

TOPIC: Surface of the Earth

B POSSIBLE RESOURCES

For this lesson, you will need:

IDEAL RESOURCES	IMPROVISED RESOURCES
two clear containers	empty 2 litre coke bottles cut halfway down for containers
topsoil	
very sandy soil	
two seedlings	

C CLASSROOM MANAGEMENT

1. Make sure that you are ready and prepared.
2. Write the following question onto the chalkboard before the lesson starts:

What is the crust of the Earth?

3. Learners should enter the classroom and answer the question in their workbooks.
4. Discuss the answer with the learners.
5. Write the model answer onto the chalkboard.

The crust of the Earth is the outer layer that supports life.

D ACCESSING INFORMATION

1. Draw the following table onto the chalkboard (always try to do this before the lesson starts):

LIFE ON EARTH

1. Topsoil is a thin layer on the Earth's crust.
 2. Plants need topsoil to grow in.
 3. Animals need plants to survive.
 4. Plants make the oxygen that humans and animals need to breathe.
 5. Plants and animals also need energy from the sun.
 6. Plants and animals need water to survive.
2. Explain this to the learners as follows:
 - a. Earth is the only planet that supports life.
 - b. The topsoil on the Earth's crust is necessary for plants to grow.
 - c. Animals eat the plants to survive.
 - d. Plants make oxygen which animals need to breathe.
 - e. Plants and animals also need water survive.

TOPIC: Surface of the Earth

3. Give learners some time to copy the information written on the chalkboard into their workbooks.

Checkpoint 1

Ask the learners the following questions to check their understanding at this point:

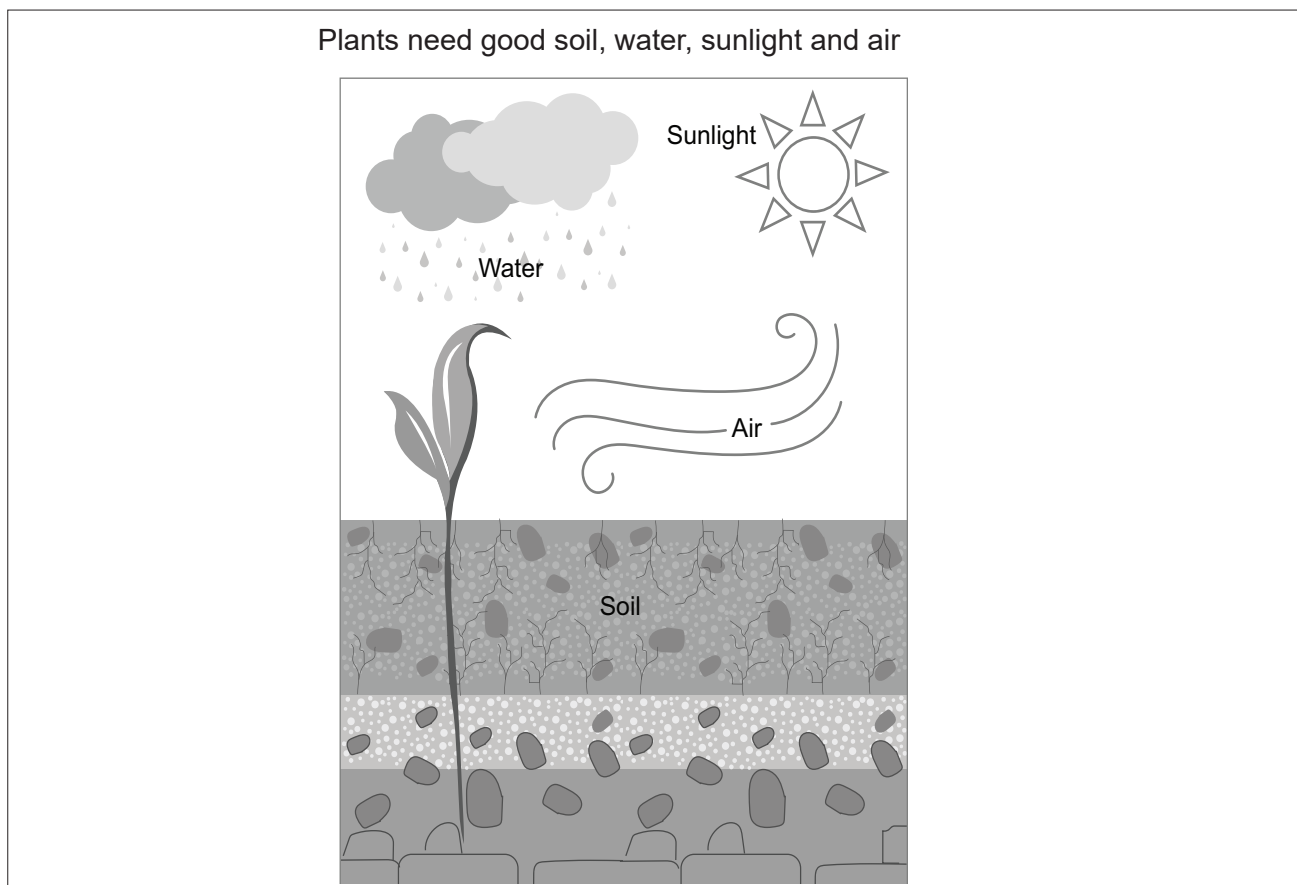
- a. Why is topsoil important?
- b. What do plants make that animals need in order to breathe?

Answers to the checkpoint questions are as follows:

- a. Plants need topsoil to grow.
- b. Oxygen

E CONCEPTUAL DEVELOPMENT

1. Prepare for this lesson by having the following ready:
 - a. Two containers in which to plant seedlings
 - b. Enough good soil (topsoil) for one container
 - c. Enough very sandy soil for the other container
 - d. Two seedlings
 - e. Water
2. Draw the following onto the chalkboard (always try to do this before the lesson starts):



TOPIC: Surface of the Earth

3. Give learners time to draw the above diagram into their workbooks.
4. Do the following activity with the learners:

Ask learners to watch you while you prepare the two containers. Do the following:

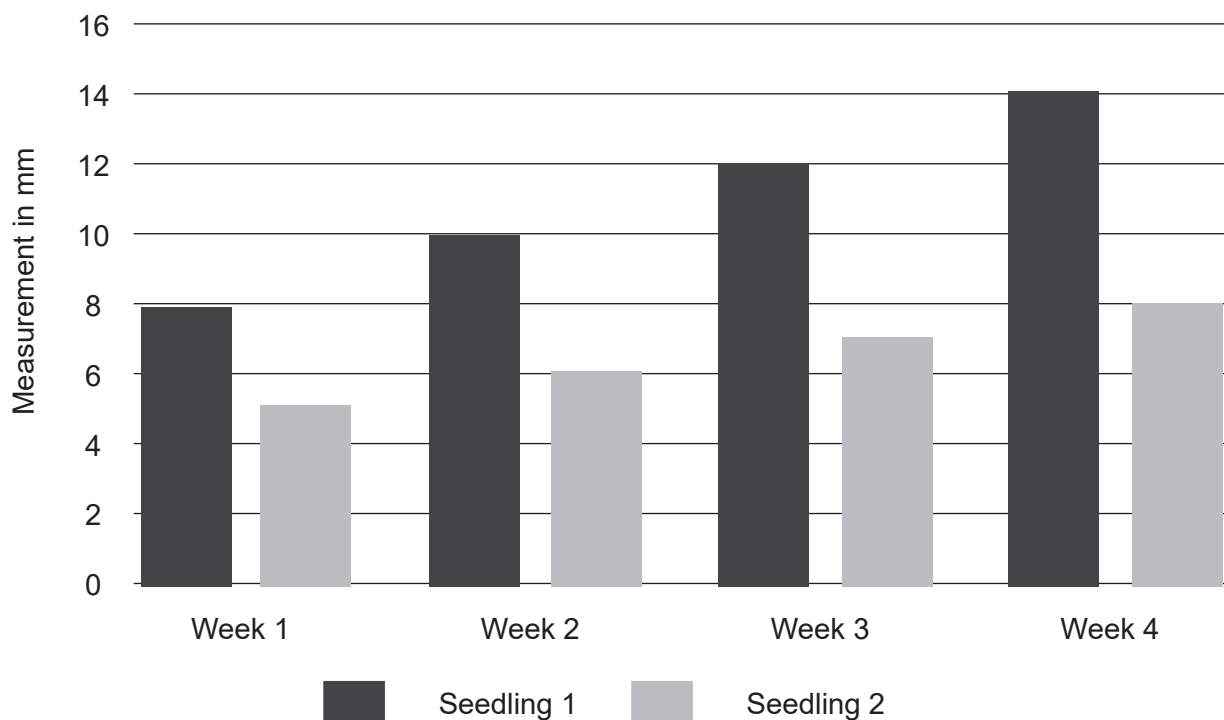
- a. Fill one container with good topsoil.
- b. Fill the second container with the very sandy soil.
- c. Plant the two seedlings – one in each container.
- d. Give the seedlings a bit of water.
- e. Ask one learner to give the seedlings a bit of water each day.
- f. Ask another learner to measure how high the seedlings grow each week for four weeks. The measurements must be put up on the chalkboard for all the learners to enter on their tables.
- g. Put the seedlings on a window sill where they will get a bit of sun.

5. Write the following onto the chalkboard (always try to do this before the lesson starts):

Table for recording heights of seedlings				
	Week 1	Week 1	Week 1	Week 1
Seedling 1	mm	mm	mm	mm
Seedling 2	mm	mm	mm	mm

Example of a bar graph to show the growth of seedlings

Prepare a chart for 4 weeks.



TOPIC: Surface of the Earth

6. Explain the following to the learners:
 - a. The seedlings will be measured at the beginning of a science lesson each week for four weeks.
 - b. They will be measured from the top of the soil to the top of the plant.
 - c. Each learner will record these results in a table. This needs to be recorded weekly.
 - d. Each learner will then draw a bar graph from these results. This needs to be done at the end of four weeks.

Checkpoint 2

Ask the learners the following questions to check their understanding at this point:

- a. What type of soil do plants need in order to grow well?
- b. What other three things do plants need in order to grow?

Answers to the checkpoint questions are as follows:

- a. Topsoil
- b. Air, water, sun

7. Ask the learners if they have any questions and provide answers and explanations.

F REFERENCE POINTS FOR FURTHER DEVELOPMENT

If you need additional information or activities on this topic, you can find these in your textbook on the following pages:

NAME OF TEXTBOOK	TOPIC	PAGE NUMBER
Study & Master	Surface of the Earth	148-149
Viva	Surface of the Earth	174
Platinum	Surface of the Earth	168-169
Solutions for All	Surface of the Earth	204-205
Day-by-Day	Surface of the Earth	147
Oxford	Surface of the Earth	168-169
Spot On	Surface of the Earth	76
Top Class	Surface of the Earth	117
Sasol Inzalo BkB	Surface of the Earth	91, 97

G ADDITIONAL ACTIVITIES / READING

In addition, further reading, listening or viewing activities related to this sub-topic are available through the following web links:

1. <https://goo.gl/t8JzW9> (5 mins) [Natural Resources]

A POLICY AND OUTCOMES

Sub-Topic	Land is made up of rocks, subsoil and topsoil.
CAPS Page Number	43

Lesson Objectives

By the end of the lesson, learners will be able to:

- explain that soil comes from rocks
- explore how rocks are weathered and become soil
- describe the three different types of soil

Specific Aims	1. DOING SCIENCE & TECHNOLOGY	
	2. KNOWING THE SUBJECT CONTENT & MAKING CONNECTIONS	✓
	3. UNDERSTANDING THE USES OF SCIENCES & INDIGENOUS KNOWLEDGE	

SCIENCE PROCESS SKILLS

1. Accessing & recalling Information	✓	7. Raising Questions		13. Interpreting Information	✓
2. Observing	✓	8. Predicting		14. Designing	✓
3. Comparing		9. Hypothesizing		15. Making/ constructing	✓
4. Measuring		10. Planning Investigations	✓	16. Evaluating and improving products	
5. Sorting & Classifying		11. Doing Investigations		17. Communicating	
6. Identifying problems & issues		12. Recording Information			

TOPIC: Surface of the Earth

B POSSIBLE RESOURCES

For this lesson, you will need:

IDEAL RESOURCES	IMPROVISED RESOURCES
Resource 10: 'Layers of the Earth's Crust'	
Resource 11: 'How Rocks are Formed'	

C CLASSROOM MANAGEMENT

1. Make sure that you are ready and prepared.
2. Write the following question onto the chalkboard before the lesson starts:

What type of soil do plants need in order to grow well?

3. Learners should enter the classroom and answer the question in their workbooks.
4. Discuss the answer with the learners.
5. Write the model answer onto the chalkboard.

Topsoil

D ACCESSING INFORMATION

1. Write the following table onto the chalkboard (always try to do this before the lesson starts):

ROCKS BREAK INTO SOIL

1. The Earth's crust is made up of rocks, subsoil and topsoil.
 2. Rocks break into big stones which break into small stones.
 3. Small stones break into fine grains of sand.
 4. Sand, together with dead plants and animals, form soil.
 5. Dead plants decompose to form humus.
 6. Topsoil provides food for plants.
2. Explain this to the learners as follows:
 - a. Plants and animals need soil in order to survive.
 - b. Rocks break down into fine grains of sand.
 - c. This takes many, many years.
 - d. The sand mixes with dead plants and dead animals to form topsoil.
 - e. Topsoil is full of nutrients (food) for plants.
 - f. Ask learners to look at the diagram they drew called 'Diagram showing the Earth's Crust'. (Lesson 2A) (Resource 10: 'Layers of the Earth's Crust')
 - g. Humus, which is made from decomposed plants, is at the top of the Earth's crust.
 - h. This mixes with sand to form topsoil.
 - i. Topsoil provides nutrients (food) for plants.

TOPIC: Surface of the Earth

3. Give learners some time to copy the information written on the chalkboard into their workbooks.

Checkpoint 1

Ask the learners the following questions to check their understanding at this point:

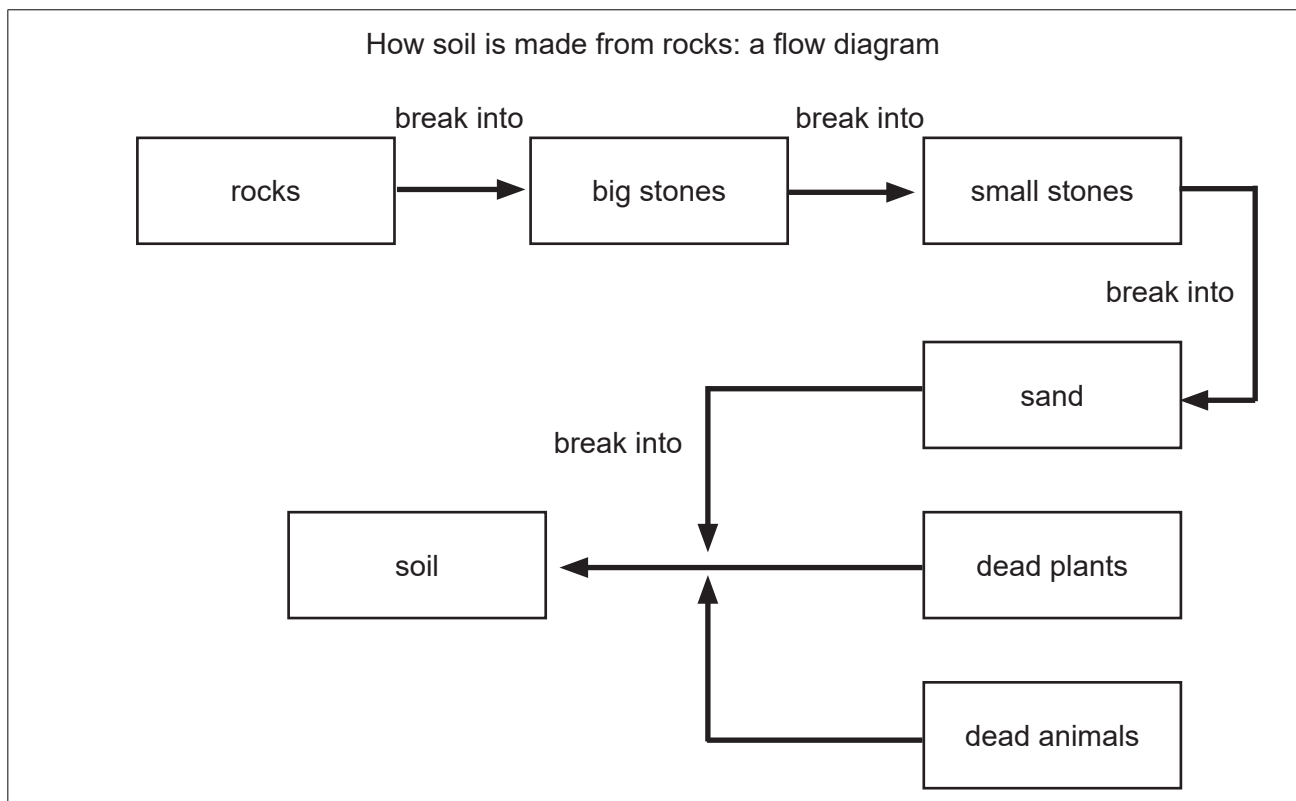
- a. How is soil made?
- b. What type of soil gives plants their food?

Answers to the checkpoint questions are as follows:

- a. Rocks break into big stones which break into small stones which break into fine grains of sand; sand mixes with dead plants and animals to make soil.
- b. Topsoil

E CONCEPTUAL DEVELOPMENT

1. Show learners Resource 11: 'How Rocks are Formed'.
2. Explain the following to the learners:
 - a. Rocks are broken into stones by the roots of trees and plants.
 - b. Animals and people break stones into smaller stones by walking on them.
 - c. Rain can break rocks.
 - d. Rain can cool down rocks quickly which makes them break if they have been hot from the sun.
3. Draw the following onto the chalkboard (always try to do this before the lesson starts):



TOPIC: Surface of the Earth

4. Explain the following to the learners:
 - a. The diagram on the chalkboard is a flow diagram.
 - b. This flow diagram shows the steps of how rocks are changed into soil.
 - c. A flow diagram has arrows which shows which step comes next.
 - d. Rocks break into big stones which break into small stones.
 - e. Small stones break into sand.
 - f. Sand mixes with dead plants and dead animals to make soil.
5. Give learners some time to draw the above diagram into their workbooks.

Checkpoint 2

Ask the learners the following questions to check their understanding at this point:

- a. What three things make soil?
- b. What is humus made from?

Answers to the checkpoint questions are as follows:

- a. Sand, dead plants, dead animals
- b. Decomposed plants

6. Ask the learners if they have any questions and provide answers and explanations.

F REFERENCE POINTS FOR FURTHER DEVELOPMENT

If you need additional information or activities on this topic, you can find these in your textbook on the following pages:

NAME OF TEXTBOOK	TOPIC	PAGE NUMBER
Study & Master	Surface of the Earth	148-149
Viva	Surface of the Earth	175-178
Platinum	Surface of the Earth	170-172
Solutions for All	Surface of the Earth	202-207
Day-by-Day	Surface of the Earth	148
Oxford	Surface of the Earth	126-128
Spot On	Surface of the Earth	76-77
Top Class	Surface of the Earth	116-118
Sasol Inzalo BkB	Surface of the Earth	99-106

TOPIC: Surface of the Earth

G

ADDITIONAL ACTIVITIES / READING

In addition, further reading, listening or viewing activities related to this sub-topic are available through the following web links:

1. http://www.ducksters.com/science/earth_science/soil_science.php
2. <https://goo.gl/uvM793> (8 1/2 mins) [Water breaks down rocks]

3 A

Term 4, Week 3, Lesson A

Lesson Title: Soil Types

Time for lesson: 1 hour

A POLICY AND OUTCOMES

Sub-Topic	Different types of soil
CAPS Page Number	43

Lesson Objectives

By the end of the lesson, learners will be able to:

- identify the three main types of soil
- explain how to investigate how much sand, silt and clay there is in soil
- name which types of soil hold water better
- name which soil type is better for plants to grow

Specific Aims	1. DOING SCIENCE & TECHNOLOGY	✓
	2. KNOWING THE SUBJECT CONTENT & MAKING CONNECTIONS	✓
	3. UNDERSTANDING THE USES OF SCIENCES & INDIGENOUS KNOWLEDGE	✓

SCIENCE PROCESS SKILLS

1. Accessing & recalling Information	✓	7. Raising Questions	✓	13. Interpreting Information	✓
2. Observing	✓	8. Predicting		14. Designing	
3. Comparing		9. Hypothesizing		15. Making/ constructing	
4. Measuring		10. Planning Investigations		16. Evaluating and improving products	
5. Sorting & Classifying		11. Doing Investigations		17. Communicating	✓
6. Identifying problems & issues		12. Recording Information	✓		

TOPIC: Surface of the Earth

B POSSIBLE RESOURCES

For this lesson, you will need:

IDEAL RESOURCES	IMPROVISED RESOURCES
Resource 12: 'Clay'	
3 empty jars or bottles	

C CLASSROOM MANAGEMENT

1. Make sure that you are ready and prepared.
2. Write the following question onto the chalkboard before the lesson starts:

Name one way in which rocks are broken in nature.

3. Learners should enter the classroom and answer the question in their workbooks.
4. Discuss the answer with the learners.
5. Write the model answer onto the chalkboard.

There are two possible answers: The roots of trees and plants grow into the rocks and break them; Rain can cool rocks down quickly and this breaks them.

D ACCESSING INFORMATION

1. Write the following onto the chalkboard (always try to do this before the lesson starts):

SOIL TYPES

1. There are three main types of soil: clay, loam and sand.
2. Each of the types of soil have different sized grains.
3. All three types have air and water in them.

SANDY SOIL

1. Sandy soil is made from large grains and is very loose.
2. Sandy soil is easily blown away or washed away.
3. Plants do not grow easily in sand soil.

CLAY

1. Clay is made from very small grains and sticks together when wet.
2. Clay holds lots of water.

LOAM

1. Loam is a mixture of clay, sand and humus.
2. Loam soil is the best type for growing plants. It is the most fertile.

TOPIC: Surface of the Earth

2. Explain this to the learners as follows:
 - a. If the learners walk around, they will see different types of soil.
 - b. The three main types of soil are sandy soil, clay and loam.
 - c. The main difference is the size of the sand grains in these soils.
 - d. Sandy soil has large grains, clay has small grains, and loam has a mixture of the two.
 - e. Sandy soil gets hot quickly whereas loam soil does not.
 - f. Some types of soil are blown or washed away easily, others are not.
 - g. Loam soil is the best for growing plants.
3. Give learners some time to copy the information written on the chalkboard into their workbooks.

Checkpoint 1

Ask the learners the following questions to check their understanding at this point:

- a. Which type of soil has the large grains of sand?
- b. Which type of soil is easily blown or washed away?

Answers to the checkpoint questions are as follows:

- a. Sandy soil
- b. Sandy soil

E

CONCEPTUAL DEVELOPMENT

1. To do this activity, each group will need the following:
 - 3 jars
 - 3 funnels
 - cotton wool
 - water
 - 3 different soil samples
2. Ensure you have these materials prepared for each group before the lesson starts.
3. Tell the learners that they are going to be doing a soil investigation.
4. Divide the learners into groups so that each group will have access to the materials.
5. Write the following onto the chalkboard (always try to do this before the lesson starts):

TOPIC: Surface of the Earth

PRACTICAL TASK

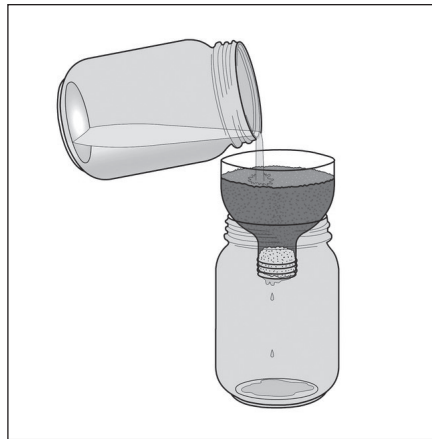
1. This practical task will be done in groups.
2. Each group will be doing tasks to explore the different types of soil and to see if they understand how to tell the difference between each soil type.
3. Each person in the group must participate in the investigation and complete the answers to the written activities in their workbooks.
4. The required resources must be made available before the day of the lesson.
5. Each group will need the following materials and equipment to do the investigation:
 - 3 jars
 - 3 funnels
 - cotton wool
 - water
 - 3 different soil samples – Make sure that you get different types of soil (sandy, clay and loam) – this will ensure that the learners are able to see the different types of soil. You may not be able to find all three on the school ground and may have to ask different people to bring you sample of soil from their home area.
6. Read through the practical task with the learners.
7. Remind the learners that particles of sand, the spaces between particles and the texture all influence water retention.
8. Remind the learners of the different soil types:
 - **Sandy soil:**
 - large sand grains
 - loosely packed
 - **Clay:**
 - small sand grains
 - not loose
 - wet
 - **Loam:**
 - medium sized grains
 - very loose
9. Tell the learners that today they are going to be investigating the different types of soil.
10. Have each group collect the equipment they will need for the task.
11. Tell the learners that they will have 5 minutes to set up the experiment and then they will be given the tasks to complete.

TOPIC: Surface of the Earth

12. The following will need to be written onto the chalkboard. (Try to do this before the lesson starts):

Experiment set-up (method)

- set up your three jars, with a funnel in each
- block the one end of the funnel with cotton wool
- add the samples at the top of each (keep each sample separate – don't mix them together)
- add water in each funnel and observe how much water is released into the jar
- the jar with the most water will be a type of soil that cannot hold a lot of water whereas the jar with less water will be a soil type that can hold a lot of water.



13. Read through the experiment set-up (method) with the learners.

14. Ask them if they have any questions.

15. Tell the learners they have 5 minutes to set up the experiment.

16. Supervise the learners whilst they complete the task and answer any questions they may have.

17. After 5 minutes call the learners back to attention.

18. Tell the learners that they are now going to complete the questions on the sheet (or from the board).

19. The following will need to be written on the chalkboard if you cannot make copies for learners:

TOPIC: Surface of the Earth

TASK: (15 marks)

Observation:

1. Complete the following table. (3)

	Sample A	Sample B	Sample C
Size of soil grains			
Colour/ texture of soil			
How much water can the soil hold?			

Analysis:

2. Identify which of the 3 soil types your samples can be classified as. (3)

- 3.1. Do you think a plant will be able to grow in any of these soil samples? (1)

- 3.2. If yes, which one/s? _____ (1)

4. Draw a diagram showing your investigation and the results you observed. (5)

Conclusion:

5. What can you conclude from this investigation? (2)

20. Read through the questions with the learners.

21. Ask them if they have any questions.

22. Tell the learners they have 15 minutes to answer these questions in their workbooks.

23. Supervise the learners whilst they complete the task and answer any questions they may have.

24. After 15 minutes call the learners back to attention.

25. Tell learners that each person in the group must record their individual answers in their workbooks for assessment.

26. Supervise the learners whilst they complete the task and answer any questions they may have.

27. After 15 minutes call the learners back to attention.

28. Tell the learners to return all equipment and to tidy their work areas.

29. Collect books for assessment.

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F REFERENCE POINTS FOR FURTHER DEVELOPMENT

If you need additional information or activities on this topic, you can find these in your textbook on the following pages:

NAME OF TEXTBOOK	TOPIC	PAGE NUMBER
Study & Master	Surface of the Earth	149-150
Viva	Surface of the Earth	179-180
Platinum	Surface of the Earth	173-174
Solutions for All	Surface of the Earth	208-211
Day-by-Day	Surface of the Earth	149-151
Oxford	Surface of the Earth	130-135
Spot On	Surface of the Earth	77-79
Top Class	Surface of the Earth	118-119
Sasol Inzalo BkB	Surface of the Earth	114-121

G ADDITIONAL ACTIVITIES / READING

In addition, further reading, listening or viewing activities related to this sub-topic are available through the following web links:

1. <https://goo.gl/KoM9vy> (3 1/2 mins) [Types of Soil]

3 B

Term 4, Week 3, Lesson B

Lesson Title: Soil Types

Time for lesson: 1½ hours

A POLICY AND OUTCOMES

Sub-Topic	Soil - Water retention
CAPS Page Number	43

Lesson Objectives

By the end of the lesson, learners will be able to:

- explain that different types of soil hold different amounts of water
- work through a scientific method to come to a conclusion

Specific Aims	1. DOING SCIENCE & TECHNOLOGY	✓
	2. KNOWING THE SUBJECT CONTENT & MAKING CONNECTIONS	✓
	3. UNDERSTANDING THE USES OF SCIENCES & INDIGENOUS KNOWLEDGE	✓

SCIENCE PROCESS SKILLS

1. Accessing & recalling Information	✓	7. Raising Questions	✓	13. Interpreting Information	✓
2. Observing	✓	8. Predicting		14. Designing	
3. Comparing		9. Hypothesizing		15. Making/ constructing	
4. Measuring		10. Planning Investigations		16. Evaluating and improving products	
5. Sorting & Classifying		11. Doing Investigations		17. Communicating	
6. Identifying problems & issues		12. Recording Information			

TOPIC: Surface of the Earth

B POSSIBLE RESOURCES

For this lesson, you will need:

IDEAL RESOURCES	IMPROVISED RESOURCES
Three glass jars the same size	The bottom of plastic cooldrink bottles
Cotton wool	Absorbent paper like paper kitchen towel
Three different types of soil	
Resource 13: 'Investigation'	
Three funnels/ coke bottles cut as funnels	

C CLASSROOM MANAGEMENT

1. Make sure that you are ready and prepared.
2. Write the following question onto the chalkboard before the lesson starts:

Name the three different types of soil.

3. Learners should enter the classroom and answer the question in their workbooks.
4. Discuss the answer with the learners.
5. Write the model answer onto the chalkboard.

Sandy soil, clay and loam.

D ACCESSING INFORMATION

1. Write the following table onto the chalkboard (always try to do this before the lesson starts):

WATER IN SOIL

1. Some soils hold water well and others do not.
2. Different types of soil are used for different things.
3. Loam is full of nutrients and is used for farming.
4. Sandy soil is needed for building.
5. Clay is used for making pots, building traditional houses, and making art works.

TOPIC: Surface of the Earth

2. Explain this to the learners as follows:
 - a. It is important for farmers and builders to know which type of soil holds water well or not.
 - b. Different soils are used for different things.
 - c. Clay is used for making pots, traditional houses and sculptures.
 - d. Sandy soil is used for building.
 - e. Loam soil is used to grow plants.
 - f. In the previous lesson, we found out that clay holds lots of water.
 - g. We are going to do an investigation to find out which types of soil hold the most water.
3. Give learners some time to copy the information written on the chalkboard into their workbooks.

Checkpoint 1

Ask the learners the following questions to check their understanding at this point:

- a. Why do farmers need loam soil?
- b. What is clay used for?

Answers to the checkpoint questions are as follows:

- a. It is full of nutrients (food) so plants can grow well in it.
- b. Possible answers: making pots, building traditional houses, making artwork

E

CONCEPTUAL DEVELOPMENT

1. Write the following onto the chalkboard.

INVESTIGATION

AIM: To find out which soil holds more water?

PREDICTION (what do you think will happen)

MATERIALS (what you will need)

METHOD (what you will do)

- a. Set up the jars with labels
- b. Put the funnels with the cotton wool in the bottom into the jars
- c. Place the same amount of soil in each funnel (measure with a table spoon). One type of soil per jar
- d. Pour the same amount of water over the three soils
- e. Wait three minutes
- f. Measure the amount of water at the bottom of each jar with a ruler

RESULTS (what happened)

CONCLUSION (what you learnt)

TOPIC: Surface of the Earth

2. Explain this task to the learners as follows:
 - a. This is an investigation to find out which type of soil holds more water.
 - b. Learners will be comparing different types of soil.
 - c. When comparing, it must be **fair**.
 - d. To be fair, containers used must be the same size, the amount of soil put into the containers must be the same, the amount of water to be poured over the three soils must be the same.
3. Ask learners to do the following in their workbooks:
 - a. Copy the main heading and the aim.
 - b. Write the headings for the prediction and materials leaving space for answers.
 - c. Write an answer for 'prediction'.
 - d. Discuss these answers with the learners. (Learners do not have to have a correct prediction as this is what they are going to find out by doing the investigation)
 - e. Show learners Resource 13: 'Investigation'.
 - f. While looking at Resource 13: 'Investigation', ask learners to fill in all the materials they will need for the investigation.

INVESTIGATION

AIM: To find out which type of soil holds the most water

PREDICTION: The clay soil will hold the most water

MATERIALS

1. *Three jars with labels (Soil A, Soil B, Soil C)*
2. *Three tops of 2l cooldrink bottles cut for **funnels***
3. *Cotton wool (or other absorbent material)*
4. *Three different types of soil*
5. *Measuring cup*
6. *Jug or container for water (mark a level on the jug)*
7. *Water*

4. Ask learners to do the following:
 - a. Copy the Method heading and the steps into their workbooks.
5. The teacher should then conduct the investigation as a demonstration in front of the class.
6. Ask learners to do the following:
 - a. Copy the Results heading into their workbooks.
 - b. Tell learners to write down the results.
 - c. Copy the Conclusion heading into their workbooks.
 - d. Tell learners to write down a conclusion (what they found out).
 - e. Discuss what they have written down.

TOPIC: Surface of the Earth

Possible answers:

RESULTS

The water in Soil A's container measured 5,5 cm.

The water in Soil B's container measured 6,8 cm.

The water in Soil C's container measured 4,3 cm.

CONCLUSION

Soil C must have held the most water as the least came out of the soil into the container.

Soil B must have held the least water as the most water came out of the soil into the container.

Soil C, which is clay, held the most water.

Soil B, which is sandy soil, held the least water.

Therefore, clay soil holds the most water.

Checkpoint 2

Ask the learners the following questions to check their understanding at this point:

- a. What type of soil holds the most water?
- b. What is a prediction?

Answers to the checkpoint questions are as follows:

- a. Clay
- b. What you think is going to happen

6. Ask the learners if they have any questions and provide answers and explanations.

F REFERENCE POINTS FOR FURTHER DEVELOPMENT

If you need additional information or activities on this topic, you can find these in your textbook on the following pages:

NAME OF TEXTBOOK	TOPIC	PAGE NUMBER
Study & Master	Surface of the Earth	-
Viva	Surface of the Earth	-
Platinum	Surface of the Earth	177
Solutions for All	Surface of the Earth	210-211
Day-by-Day	Surface of the Earth	152
Oxford	Surface of the Earth	134-135
Spot On	Surface of the Earth	80
Top Class	Surface of the Earth	122
Sasol Inzalo BkB	Surface of the Earth	124-128

3 C

Term 4, Week 3, Lesson C

Lesson Title: Soil types

Time for lesson: 1 hour

A POLICY AND OUTCOMES

Sub-Topic	Organisms in the soil
CAPS Page Number	43

Lesson Objectives

By the end of the lesson, learners will be able to:

- identify all the parts that make up soil
- make a prediction

Specific Aims	1. DOING SCIENCE & TECHNOLOGY	✓
	2. KNOWING THE SUBJECT CONTENT & MAKING CONNECTIONS	✓
	3. UNDERSTANDING THE USES OF SCIENCES & INDIGENOUS KNOWLEDGE	

SCIENCE PROCESS SKILLS

1. Accessing & recalling Information	✓	7. Raising Questions	✓	13. Interpreting Information	✓
2. Observing	✓	8. Predicting		14. Designing	
3. Comparing		9. Hypothesizing		15. Making/ constructing	
4. Measuring		10. Planning Investigations		16. Evaluating and improving products	
5. Sorting & Classifying		11. Doing Investigations		17. Communicating	✓
6. Identifying problems & issues		12. Recording Information			

TOPIC: Surface of the Earth

B POSSIBLE RESOURCES

For this lesson, you will need:

IDEAL RESOURCES	IMPROVISED RESOURCES
Resource 14: 'Looking closely at soil'	
A cupful of loam soil	
A piece of white paper	

C CLASSROOM MANAGEMENT

1. Make sure that you are ready and prepared.
2. Write the following question onto the chalkboard before the lesson starts:

Name the three different types of soil.

3. Learners should enter the classroom and answer the question in their workbooks.
4. Discuss the answer with the learners.
5. Write the model answer onto the chalkboard.

Sandy soil, clay and loam.

D ACCESSING INFORMATION

1. Write the following table onto the chalkboard (always try to do this before the lesson starts):

OTHER PARTS THAT MAKE UP SOIL

1. Soil is made up of many things, not just sand grains.
 2. Different types of soil hold different amounts of water.
 3. Soil also has air in it.
 4. Soil is also full of living organisms.
 5. Dead animals and plants add nutrients to the soil.
2. Explain this to the learners as follows:
 - a. In the investigation, we found out that clay holds lots of water.
 - b. Soil is made up of other things too, like air, small living organisms and dead organisms.
 - c. It is often said that a handful of soil has more living organisms than there are people on Earth.
 3. Give learners some time to copy the information from the chalkboard into their workbooks.

TOPIC: Surface of the Earth

Checkpoint 1

Ask the learners the following questions to check their understanding at this point:

- a. Name three things besides sand particles, that make up soil.
- b. Which type of soil holds the most water?

Answers to the checkpoint questions are as follows:

- c. Any three of these: air, water, dead plants, dead animals, living small organisms.
- d. Clay

E

CONCEPTUAL DEVELOPMENT

1. Show the learners Resource 14: 'Looking closely at soil'.
2. Explain this to the learners as follows:
 - a. There are many small living organisms in soil, as well as sand grains, parts of dead animals and plants.
 - b. You would have to look through a magnifying glass to see some of the organisms.
 - c. These small living organisms spend most or all their time underground.
 - d. Earthworms are a good example of a small living organisms.
 - e. Earthworms eat plant material and organic matter which turns into food for other organisms.
3. Write the following on the chalkboard (always try to do this before the lesson starts):

WHAT IS IN THE SOIL?

4. Explain to the learners that they must make a list of everything that they see in the soil that you are going to show them.
5. Collect some loam soil before the lesson.
6. Do the following activity with the learners:

Gather your learners around a table with a piece of white paper on it. Do the following:

- a. Pour the soil onto the paper.
- b. Spread the soil out.
- c. Ask the learners what they can see.
- d. If there is a magnifying glass, let learners look through the magnifying glass at the soil.

7. Give learners time to complete this in their workbooks.
8. Answers will vary according to the soil sample. Discuss the answers with your class.
Possible answers are given below:

TOPIC: Surface of the Earth

WHAT IS IN THE SOIL?

large sand particles

small sand particles

bits of leaves

small bits of plants

small bits of animals: wings from flies

an earthworm

Checkpoint 2

Ask the learners the following questions to check their understanding at this point:

- Give an example of a small live organism.
- Name two things that you found in the soil sample.

Answers to the checkpoint questions are as follows:

- Earthworm
- (Any answer from the list written in their workbooks)

9. Ask the learners if they have any questions and provide answers and explanations.

F REFERENCE POINTS FOR FURTHER DEVELOPMENT

If you need additional information or activities on this topic, you can find these in your textbook on the following pages:

NAME OF TEXTBOOK	TOPIC	PAGE NUMBER
Study & Master	Surface of the Earth	151
Viva	Surface of the Earth	184
Platinum	Surface of the Earth	176-179
Solutions for All	Surface of the Earth	-
Day-by-Day	Surface of the Earth	153
Oxford	Surface of the Earth	132
Spot On	Surface of the Earth	-
Top Class	Surface of the Earth	-
Sasol Inzalo BkB	Surface of the Earth	107-108

G ADDITIONAL ACTIVITIES / READING

In addition, further reading, listening or viewing activities related to this sub-topic are available through the following web links:

- <https://goo.gl/dzjYKv> (4 mins) [Types of Soil]

4 A

Term 4, Week 4, Lesson A

Lesson Title: Soil Types

Time for lesson: 1 hour

A POLICY AND OUTCOMES

Sub-Topic	Topsoil
CAPS Page Number	43

Lesson Objectives

By the end of the lesson, learners will be able to:

- explain the importance of topsoil
- describe erosion
- suggest ways in which to lessen erosion

Specific Aims	1. DOING SCIENCE & TECHNOLOGY	
	2. KNOWING THE SUBJECT CONTENT & MAKING CONNECTIONS	✓
	3. UNDERSTANDING THE USES OF SCIENCES & INDIGENOUS KNOWLEDGE	

SCIENCE PROCESS SKILLS

1. Accessing & recalling Information	✓	7. Raising Questions		13. Interpreting Information	✓
2. Observing	✓	8. Predicting		14. Designing	
3. Comparing		9. Hypothesizing		15. Making/ constructing	
4. Measuring		10. Planning Investigations		16. Evaluating and improving products	
5. Sorting & Classifying		11. Doing Investigations	✓	17. Communicating	✓
6. Identifying problems & issues		12. Recording Information	✓		

TOPIC: Surface of the Earth

B POSSIBLE RESOURCES

For this lesson, you will need:

IDEAL RESOURCES	IMPROVISED RESOURCES
Resource 15: 'Preventing Erosion'	

C CLASSROOM MANAGEMENT

1. Make sure that you are ready and prepared.
2. Write the following question onto the chalkboard before the lesson starts:

Give an example of a small living organism found in topsoil.

3. Learners should enter the classroom and answer the question in their workbooks.
4. Discuss the answer with the learners.
5. Write the model answer onto the chalkboard.

Earthworms.

D ACCESSING INFORMATION

1. Write the following table onto the chalkboard (always try to do this before the lesson starts):

THE IMPORTANCE OF TOPSOIL

1. The first 10 to 20 centimetres of soil is the topsoil.
2. Topsoil contains water and nutrients.
3. The nutrients travel from the topsoil up the roots of a plant to the plant.
4. It takes more than 500 years to make 25mm of topsoil.
5. Topsoil is the most fertile layer of soil.

EROSION

1. This is what happens when topsoil is washed or blown away.
2. Strong winds, heavy rainfall and cutting down of trees make erosion worse.

SOIL CONSERVATION

1. This is the protection of soil against erosion.
2. Trees, bushes and plants should be planted to prevent erosion.

2. Explain this to the learners as follows:
 - a. Topsoil supports life as plants need topsoil to grow.
 - b. Topsoil is full of nutrients.
 - c. It takes 500 years to make a thin layer of topsoil. It is therefore very precious.
 - d. Erosion is the washing or blowing away of topsoil.
 - e. Soil conservation is the protection of soil against erosion.

TOPIC: Surface of the Earth

3. Give learners some time to copy the information written on the chalkboard into their workbooks.

Checkpoint 1

Ask the learners the following questions to check their understanding at this point:

- a. What is erosion?
- b. Which is the most fertile layer of soil?

Answers to the checkpoint questions are as follows:

- a. This is when topsoil is washed or blown away.
- b. Topsoil

E

CONCEPTUAL DEVELOPMENT

1. Write the following onto the chalkboard (always try to do this before the lesson starts):

Keeping soil healthy is important for farmers.

Soil is one of the most valuable natural resources.

2. Explain this to the learners as follows:
 - a. It is important to keep soil healthy.
 - b. Without good soil, plants would not grow and we would not get food.
3. Give learners some time to copy this into their workbooks.
4. Ask learners if they have seen erosion in the area in which they live or when they have travelled anywhere. Discuss this with them.
5. Show learners Resource 15: 'Preventing Erosion'.
6. Explain the following task to them:
 - a. A farmer has dug a dam.
 - b. The farmer wants to prevent erosion around the dam.
 - c. He investigates whether soil, sticks or grass will keep the soil from being washed into the dam.
 - d. He then does a second investigation.
 - e. He investigates whether a few plants or more plants would be better to prevent erosion.
 - f. The learner's task is to describe what the farmer did in both situations.
 - g. The learner must then write what the farmer should do around the dam to keep the soil from eroding away.
7. Write the model answer onto the chalkboard:

TOPIC: Surface of the Earth

Case Study 1

The farmer cut 2 bottles in half. He filled one half with soil, one half with sticks and one with soil and grass. The farmer tied cups to the bottles to catch the water. He poured water over the three different types of material and observed what happened.

Case Study 2

The farmer planted three boxes with different amounts of grass in them. The farmer planted a little in one, a medium amount in the second and a lot in the third. The farmer poured water over the three boxes and observed what happened.

Conclusion

The farmer should plant a lot of grass around the dam to keep the soil from eroding.

Checkpoint 2

Ask the learners the following questions to check their understanding at this point:

- a. How can erosion be prevented?
- b. What is soil conservation?

Answers to the checkpoint questions are as follows:

- c. By always having a covering of plants or by planting in rows against the flow of the direction of the water.
- d. It is the protection of soil against erosion.

8. Ask the learners if they have any questions and provide answers and explanations.

TOPIC: Surface of the Earth

F REFERENCE POINTS FOR FURTHER DEVELOPMENT

If you need additional information or activities on this topic, you can find these in your textbook on the following pages:

NAME OF TEXTBOOK	TOPIC	PAGE NUMBER
Study & Master	Surface of the Earth	151
Viva	Surface of the Earth	184
Platinum	Surface of the Earth	178-179
Solutions for All	Surface of the Earth	205
Day-by-Day	Surface of the Earth	154
Oxford	Surface of the Earth	134
Spot On	Surface of the Earth	-
Top Class	Surface of the Earth	125
Sasol Inzalo BkB	Surface of the Earth	-

G ADDITIONAL ACTIVITIES / READING

In addition, further reading, listening or viewing activities related to this sub-topic are available through the following web links:

1. <http://easyscienceforkids.com/all-about-soil/>
2. <https://goo.gl/uJCfCl> (6 1/2 mins) [Soil Erosion Lesson for Kids]
3. <https://goo.gl/SfqmiR> (7 1/2 mins) [Erosion and Soil]

TOPIC OVERVIEW:

Sedimentary rocks

Term 4, Weeks 4B – 6A

A. TOPIC OVERVIEW

Term 4, Weeks 4b – 6a

- This topic runs for 2 weeks.
- It is presented over 6 lessons.
- This topic counts for 24% in the end of year final exam.
- This topic's position in the term is as follows:

LESSON	WEEK 1			WEEK 2			WEEK 3			WEEK 4			WEEK 5		
	A	B	C	A	B	C	A	B	C	A	B	C	A	B	C

LESSON	WEEK 6			WEEK 7			WEEK 8			WEEK 9			WEEK 10		
	A	B	C	A	B	C	A	B	C	A	B	C	A	B	C

B. SEQUENTIAL TABLE

GRADE 4	GRADE 5	GRADE 6 & 7
LOOKING BACK	CURRENT	LOOKING FORWARD
<ul style="list-style-type: none"> • n/a 	<ul style="list-style-type: none"> • Explain the formation of sedimentary rock; describe examples of sedimentary rock – shale, sandstone, limestone • Uses of sedimentary rock – cement; buildings 	<ul style="list-style-type: none"> • n/a

C. SCIENTIFIC AND TECHNOLOGICAL VOCABULARY

Ensure that you teach the following vocabulary at the appropriate place in the topic:

	TERM	EXPLANATION
1.	sediment	A layer of solid particles that has settled at the bottom of liquid.
2.	compacted	When layers of a material have been squashed together, normally by something heavy being placed on top of the layers; this causes the layers to stick together.
3.	process	A series of actions; many steps taken from the beginning to the end.

4.	deposit	To put down and leave it behind.
5.	formed	How something is made.
6.	observe	To notice something carefully; to watch carefully the way something happens.
7.	visible	It can be seen.
8.	identify	To recognise something or someone; prove what something is.
9.	stages	Part of an activity.
10.	dissolves	The breaking down of a material in a liquid; stirring something in liquid until it becomes part of that liquid.
11.	quarry	A place on the surface of the Earth for cutting out big pieces of rock.
12.	mine	The process of getting mineral rich rocks out of the ground.
13.	ground	To have reduced something to fine particles by crushing.
14.	fine	Very small, not coarse.
15.	fertiliser	Natural or chemical substance put on in the soil to help plants grow.
16.	insecticide	A substance used to kill insects, especially those that damage plants.

D. UNDERSTANDING THE USES / VALUE OF SCIENCE

Geologists are scientists who study rocks and sand. Geologists do an important job as they find where sand is for building and where gold is for mining. Scientists who know about soil help farmers to grow better crops. It is important to conserve our soil as soil supports life on Earth.

E. PERSONAL REFLECTION

Reflect on your teaching at the end of each topic:

Date completed:	
Lesson successes:	
Lesson challenges:	
Notes for future improvement:	

TOPIC: Sedimentary Rocks

4 B

Term 4, Week 4, Lesson B

Lesson Title: Sedimentary Rocks

Time for lesson: 1½ hours

A POLICY AND OUTCOMES

Sub-Topic	Formation of sedimentary rock
CAPS Page Number	44

Lesson Objectives

By the end of the lesson, learners will be able to:

- describe what sedimentary rock is
- explain how rock breaks down into smaller grains

Specific Aims	1. DOING SCIENCE & TECHNOLOGY	✓
	2. KNOWING THE SUBJECT CONTENT & MAKING CONNECTIONS	✓
	3. UNDERSTANDING THE USES OF SCIENCES & INDIGENOUS KNOWLEDGE	

SCIENCE PROCESS SKILLS

1. Accessing & recalling Information	✓	7. Raising Questions	✓	13. Interpreting Information	✓
2. Observing	✓	8. Predicting		14. Designing	
3. Comparing	✓	9. Hypothesizing		15. Making/ constructing	
4. Measuring		10. Planning Investigations	✓	16. Evaluating and improving products	
5. Sorting & Classifying		11. Doing Investigations	✓	17. Communicating	
6. Identifying problems & issues		12. Recording Information	✓		

TOPIC: Sedimentary Rocks

B POSSIBLE RESOURCES

For this lesson, you will need:

IDEAL RESOURCES	IMPROVISED RESOURCES
Small, clear, plastic bottle and cap	
Sandy soil, fine sand, topsoil, water, dead plant materials (roots, leaves, stems)	
Funnel made from paper – turn into a cone shape and stick down with a piece of cellotape	

C CLASSROOM MANAGEMENT

1. Make sure that you are ready and prepared.
2. Write the following question onto the chalkboard before the lesson starts:

What is the outer layer of the Earth called?

3. Learners should enter the classroom and answer the question in their workbooks.
4. Discuss the answer with the learners.
5. Write the model answer onto the chalkboard.

The Earth's crust.

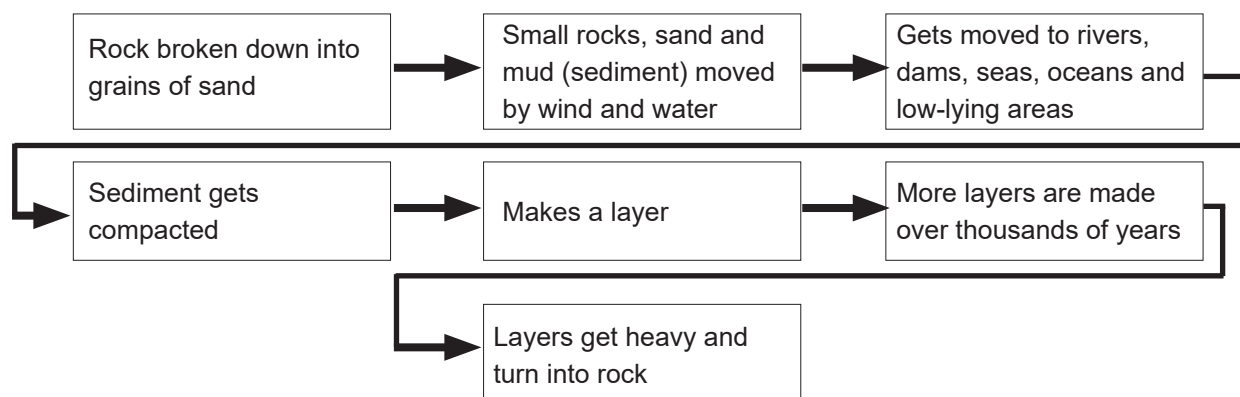
D ACCESSING INFORMATION

1. Remind learners that in a previous lesson, they learnt how rocks break up into smaller and smaller pieces until they become grains of sand.
2. Draw and label the following onto the chalkboard (always try to do this before the lesson starts):

FORMATION OF SEDIMENTARY ROCK

1. Sedimentary rock covers nearly three-quarters of the Earth's surface.
2. Sedimentary rock is made over a very long time.
3. Each layer shows a different year or time that the sediment turned to rock.

Flow chart of how sedimentary rock is made



TOPIC: Sedimentary Rocks

3. Explain this to the learners as follows:
 - a. Most of the Earth is covered in sedimentary rock.
 - b. Rocks are broken down into sand.
 - c. Small rocks, sand and mud are known as sediment.
 - d. This sediment is moved by rain and wind into rivers, dams, oceans, and seas.
 - e. It then gets compacted (squashed).
 - f. This process happens again and again over hundreds of years.
 - g. Layers are formed (made).
 - h. The layers get heavy and form sedimentary rock.
4. Give learners some time to copy the information from the chalkboard into their workbooks.

Checkpoint 1

Ask the learners the following questions to check their understanding at this point:

- a. What is the type of rock called that covers most of the Earth?
- b. What is sediment made up of?

Answers to the checkpoint questions are as follows:

- a. Sedimentary rock.
- b. Small rocks, sand and mud.

E CONCEPTUAL DEVELOPMENT

1. Explain the following to the learners:
 - a. Imagine layers of paper.
 - b. One piece of paper is not heavy, but many pieces together becomes very heavy.
 - c. This is the same for small rocks, sand and mud, which then make layers, which then get compacted into rocks.
 - d. Remember that this process takes thousands of years.
2. Write the following onto the chalkboard (always try to do this before the lesson starts) in preparation for making a Sedimentary Layer model: Complete this table at the beginning of the lesson

<u>First observations</u>				
	Straight away	After 1 minute	After 2 minutes	After 10 minutes
How clear is the water?				
What is sinking?				
What is floating?				
What has changed since your last observation?	N/A			

TOPIC: Sedimentary Rocks

Final observation

- a. Have the sediments separated into layers?
- b. How many layers are there?
- c. What fell to the bottom?
- d. How are the lower layers different from the higher ones?

3. Do the following activity with the learners:

Explain to learners that they are now going to build a Sedimentary Layer Model (you may want to do this as a demonstration in the front of the classroom or get learners into groups for each group to do the investigation). Learners will need to do the following:

- a. Collect all materials:
 - small plastic bottle with lid
 - funnel made from paper
 - sandy soil
 - fine soil
 - top soil
 - water
 - dead plant materials like roots, leaves, stems
- b. Put a layer of fine soil into the bottle using the funnel made from paper.
- c. Add a layer of topsoil.
- d. Add dead plant material.
- e. Add sandy soil.
- f. Fill the bottle with water until it is three-quarters full.
- g. Screw on the cap and shake.
- h. Place the bottle on a window sill and leave it.

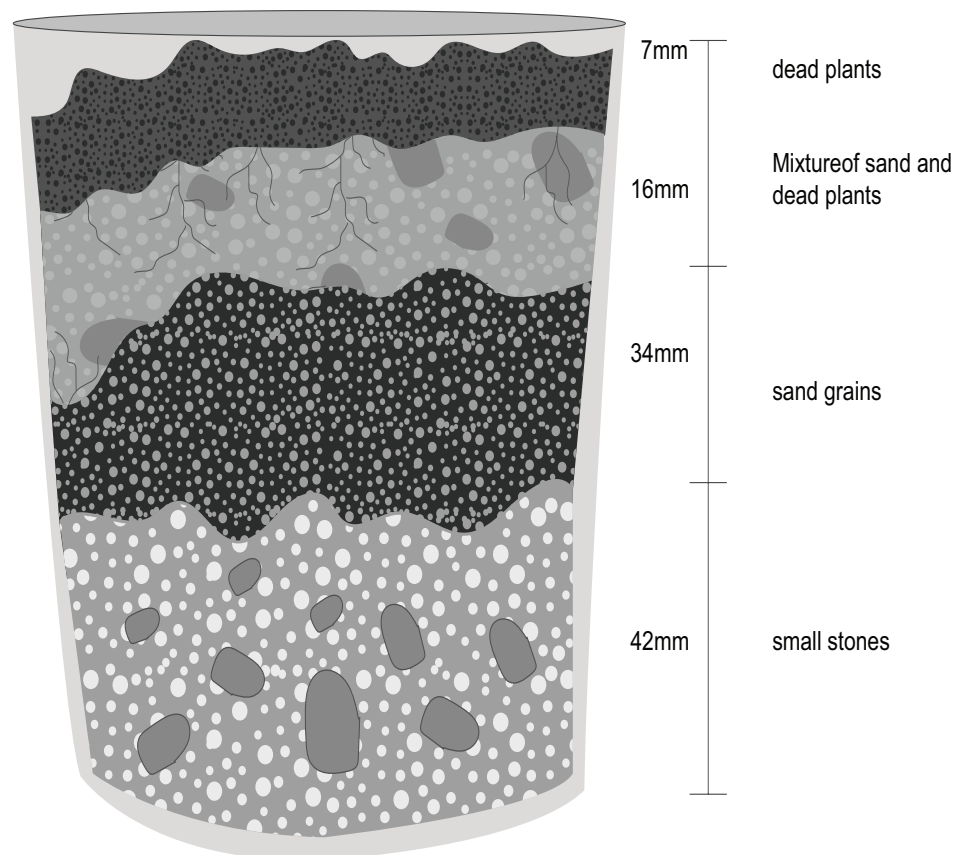
Task

- a. Draw a picture of the layers in the bottle.
 - b. Label each layer.
 - c. Measure the thickness of each layer.
 - d. Fill in these measurements on your drawing.
 - e. Give your drawing a heading.
4. Explain the following to the learners:
- a. The learners are now going to learn an important science skill – observation.
 - b. To observe something means to look at it very carefully
 - c. Observe what happens to the contents of the bottle according to the times on the table on the chalkboard, starting with an immediate observation.

TOPIC: Sedimentary Rocks

- d. Write down what you have observed each time by answering the questions on the chalkboard.
- e. After 15 minutes answer the 'Final Observation' questions on the chalkboard.
5. Explain the following to the learners:
 - a. The learners are now going to practice another important science skills – drawing.
 - b. Learners must do the task of drawing the layers in the bottle after 15 minutes.
 - c. Learners must follow the instructions on the chalkboard.
 - d. Next to each layer, write what it is made of – sand, mud, small stones, big stones, dead plants?
 - e. If the teacher is demonstrating the investigation, then ask two learners to use a ruler to measure the thickness of the layers in millimetres.
 - f. If the learners are in groups, then two learners from each group must do the measuring.
 - g. Learners will fill in these measurements next to each layer.
6. Give learners some time to complete this task in their workbooks.
7. Here is a model answer for the drawing. Drawings will vary according to the amount of small stones, sand grains, top soil and dead plants are put into the bottle.

Example of drawing of sedimentary layers



TOPIC: Sedimentary Rocks

Checkpoint 2

Ask the learners the following questions to check their understanding at this point:

- a. What does the word 'compacted' mean?
- b. How long does it take for sediment to be made into sedimentary rock?

Answers to the checkpoint questions are as follows:

- a. Squashed.
- b. Many hundreds of years.

8. Ask the learners if they have any questions and provide answers and explanations.

F REFERENCE POINTS FOR FURTHER DEVELOPMENT

If you need additional information or activities on this topic, you can find these in your textbook on the following pages:

NAME OF TEXTBOOK	TOPIC	PAGE NUMBER
Study & Master	Formation of sedimentary rocks	-
Viva	Formation of sedimentary rocks	-
Platinum	Formation of sedimentary rocks	188
Solutions for All	Formation of sedimentary rocks	219
Day-by-Day	Formation of sedimentary rocks	157
Oxford	Formation of sedimentary rocks	
Spot On	Formation of sedimentary rocks	-
Top Class	Formation of sedimentary rocks	126
Sasol Inzalo Bk B	Formation of sedimentary rocks	136-141

G ADDITIONAL ACTIVITIES / READING

In addition, further reading, listening or viewing activities related to this sub-topic are available through the following web links:

1. <https://goo.gl/IZsKM0> (2 1/2 mins) [Sedimentary Rocks video for kids]
2. <https://weirdsciencekids.com/Makesedimentarylayer.html> [Sedimentary layers]
3. <https://goo.gl/ebm2d4> (3 mins) [How to make a paper cone]

TOPIC: Sedimentary Rocks

4 C

Term 4, Week 4, Lesson C

Lesson Title: Sedimentary formation of rocks

Time for lesson: 1 hour

A POLICY AND OUTCOMES

Sub-Topic	How sedimentary rock is formed.
CAPS Page Number	44

Lesson Objectives

By the end of the lesson, learners will be able to:

- draw a flowchart of the four main stages of sedimentary rock formation
- draw a sketch of how the layers are formed for sedimentary rocks
- explain the meaning of specific words used to describe the four stages

Specific Aims	1. DOING SCIENCE & TECHNOLOGY	
	2. KNOWING THE SUBJECT CONTENT & MAKING CONNECTIONS	✓
	3. UNDERSTANDING THE USES OF SCIENCES & INDIGENOUS KNOWLEDGE	

SCIENCE PROCESS SKILLS

1. Accessing & recalling Information	✓	7. Raising Questions		13. Interpreting Information	✓
2. Observing	✓	8. Predicting		14. Designing	
3. Comparing		9. Hypothesizing		15. Making/ constructing	
4. Measuring		10. Planning Investigations		16. Evaluating and improving products	
5. Sorting & Classifying		11. Doing Investigations		17. Communicating	✓
6. Identifying problems & issues		12. Recording Information	✓		

TOPIC: Sedimentary Rocks

B POSSIBLE RESOURCES

For this lesson, you will need:

IDEAL RESOURCES	IMPROVISED RESOURCES
Resource 16: 'The stages of sedimentary rock formation'	
Resource 17: 'Formation of sedimentary rock'	

C CLASSROOM MANAGEMENT

1. Make sure that you are ready and prepared.
2. Write the following question onto the chalkboard before the lesson starts:

How long does it take for sediment to turn into rock?

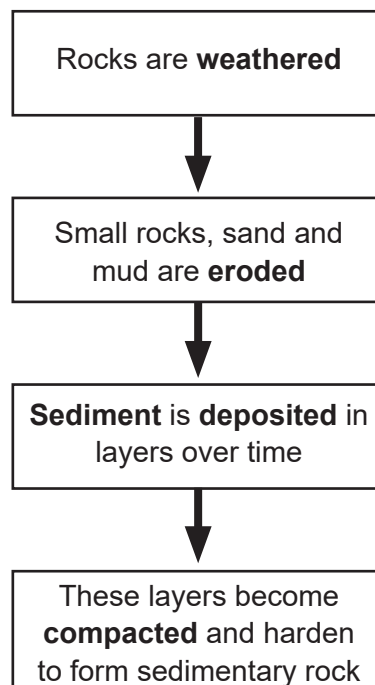
3. Learners should enter the classroom and answer the question in their workbooks.
4. Discuss the answer with the learners.
5. Write the model answer onto the chalkboard.

Many thousands of years.

D ACCESSING INFORMATION

1. Draw the following onto the chalkboard (always try to do this before the lesson starts):

Flow chart of the formation of sedimentary rock



TOPIC: Sedimentary Rocks

2. Write the following onto the chalkboard (always try to do this before the lesson starts):

Vocabulary

weathered – broken down into small pieces by wind and rain

eroded – to wear away

deposited – to add something and then leave it behind

compacted – pressed or squashed together

3. Explain this to the learners as follows:

- a. The making (formation) of sedimentary rock goes through four main stages: weathering, erosion, depositing and compacting.

4. Discuss the meaning of these words with the learners.

5. Read through the flow chart with the learners, pointing out the vocabulary as you go.

6. Give learners some time to copy the flowchart and the vocabulary off the chalkboard into their workbooks.

Checkpoint 1

Ask the learners the following questions to check their understanding at this point:

- a. What are the four main stages in the formation of sedimentary rock?
- b. What does 'compacting' mean?

Answers to the checkpoint questions are as follows:

- a. Weathering, erosion, depositing and compacting.
- b. To press or squash together.

E

CONCEPTUAL DEVELOPMENT

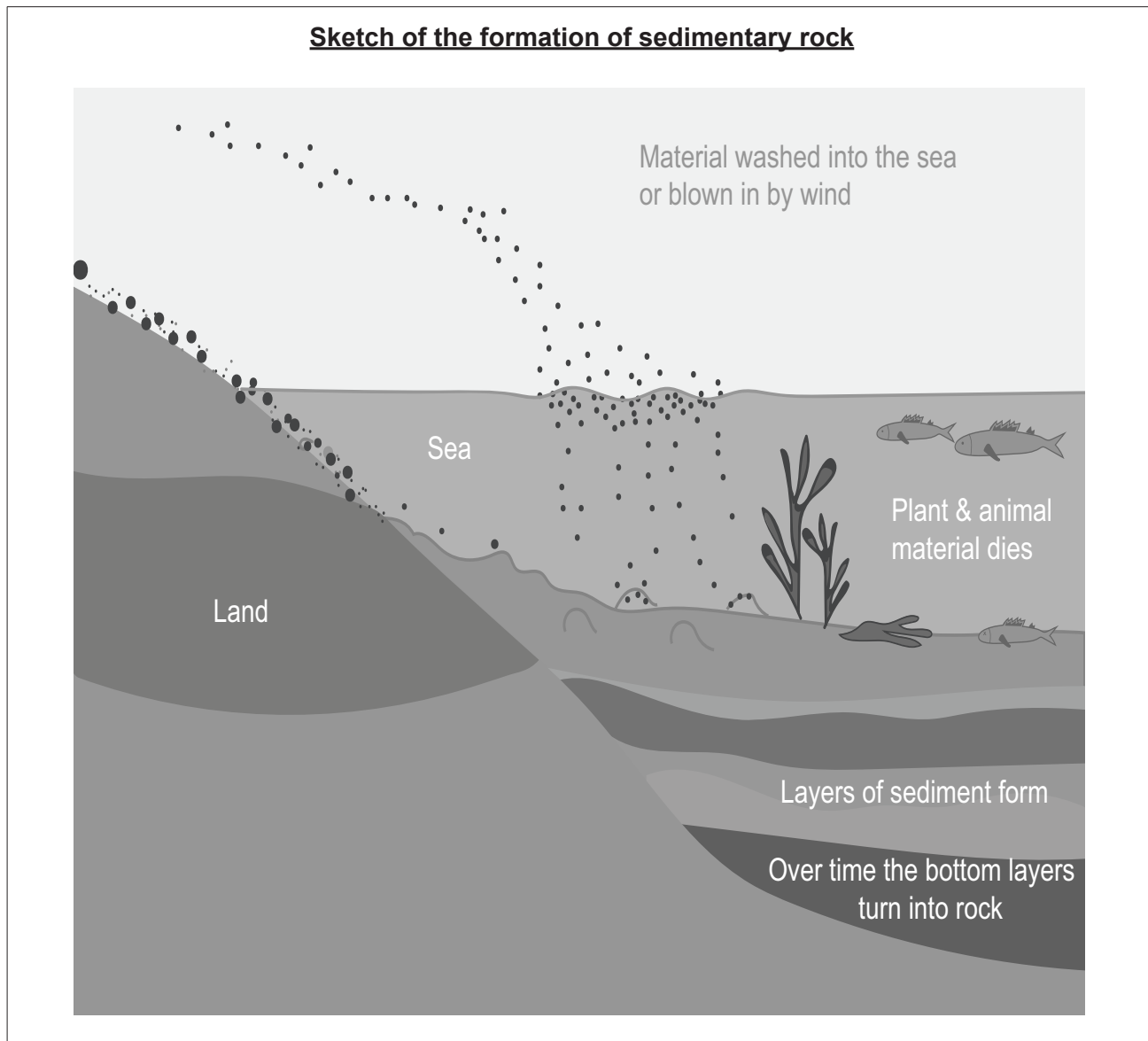
1. Show learners Resource 16: 'The Stages of Sedimentary Rock Formation'.

2. Explain the following to the learners:

- a. The first stage of the formation of sedimentary rock is when rocks are broken in smaller pieces.
- b. This is done by wind and rain.
- c. This is called 'weathering'.
- d. Show learners the picture and explanation of weathering in Resource 16.
- e. The second stage is when rock, sand and mud are moved from where they are to another place.
- f. This 'erodes' the place where the rock, sand and mud have come from.
- g. This sediment will be taken to a low-lying area (somewhere lower down than where it was) by wind or water.
- h. Show learners the picture and explanation in Resource 16.
- i. New layers of sediment will be deposited (taken and then left behind at that place).
- j. Show learners the picture and explanation in Resource 16.

TOPIC: Sedimentary Rocks

- k. These layers then get heavy and get compacted (squashed together).
 - l. Show learners the picture and explanation in Resource 16.
 - m. Over thousands of years, this becomes sedimentary rock.
3. Show learners Resource 17: 'The Formation of Sedimentary Rock'.
 4. Draw and label the following sketch on the always try to do this before the lesson starts):
Use the poster / resource (chart)



5. Explain the following to learners:
 - a. Material, such as small rocks, sand, mud and dead plants and animals, gets blown or washed into the sea.
 - b. Layers of sediment form.
 - c. Over thousands of years, the sediment turns into rock.

TOPIC: Sedimentary Rocks

Checkpoint 2

Ask the learners the following questions to check their understanding at this point:

- a. What does the word 'weathering' mean?
- b. How do layers of sediment become rock?

Answers to the checkpoint questions are as follows:

- a. Broken down into small pieces by wind or rain.
- b. The layers become heavy and compacted and this makes rock over thousands of years.

7. Ask the learners if they have any questions and provide answers and explanations.

F REFERENCE POINTS FOR FURTHER DEVELOPMENT

If you need additional information or activities on this topic, you can find these in your textbook on the following pages:

NAME OF TEXTBOOK	TOPIC	PAGE NUMBER
Study & Master	Sedimentary rocks	156
Viva	Sedimentary rocks	187
Platinum	Sedimentary rocks	189-191
Solutions for All	Sedimentary rocks	219-224
Day-by-Day	Sedimentary rocks	158-159
Oxford	Sedimentary rocks	
Spot On	Sedimentary rocks	83-84
Top Class	Sedimentary rocks	127-129
Sasol Inzalo Bk B	Sedimentary rocks	136-141

G ADDITIONAL ACTIVITIES / READING

In addition, further reading, listening or viewing activities related to this sub-topic are available through the following web links:

1. <https://goo.gl/IZsKM0> (2 1/2 mins) [Sedimentary Rocks video for kids]

TOPIC: Sedimentary Rocks

5 A

Term 4, Week 5, Lesson A

Lesson Title: Formation of Sedimentary rocks

Time for lesson: 1 hour

A POLICY AND OUTCOMES

Sub-Topic	Sedimentary rocks have layers
CAPS Page Number	44

Lesson Objectives

By the end of the lesson, learners will be able to:

- identify sedimentary rock by looking for layers
- make their own sedimentary rock model

Specific Aims	1. DOING SCIENCE & TECHNOLOGY	✓
	2. KNOWING THE SUBJECT CONTENT & MAKING CONNECTIONS	✓
	3. UNDERSTANDING THE USES OF SCIENCES & INDIGENOUS KNOWLEDGE	

SCIENCE PROCESS SKILLS

1. Accessing & recalling Information	✓	7. Raising Questions	✓	13. Interpreting Information	✓
2. Observing	✓	8. Predicting	✓	14. Designing	
3. Comparing		9. Hypothesizing	✓	15. Making/ constructing	
4. Measuring		10. Planning Investigations	✓	16. Evaluating and improving products	
5. Sorting & Classifying		11. Doing Investigations	✓	17. Communicating	
6. Identifying problems & issues		12. Recording Information	✓		

TOPIC: Sedimentary Rocks

B POSSIBLE RESOURCES

For this lesson, you will need:

IDEAL RESOURCES	IMPROVISED RESOURCES
A half cup of sand, table salt, a half cup of water	
Plastic container or tin lid	
Container for mixing, spoon or stick	
Resource 18: Layers of sedimentary rock	

C CLASSROOM MANAGEMENT

1. Make sure that you are ready and prepared.
2. Write the following question onto the chalkboard before the lesson starts:

What does the word 'depositing' mean?

3. Learners should enter the classroom and answer the question in their workbooks.
4. Discuss the answer with the learners.
5. Write the model answer onto the chalkboard.

To add something and then leave it behind.

D ACCESSING INFORMATION

1. Write the following onto the chalkboard (always try to do this before the lesson starts):

VISIBLE LAYERS OF SEDIMENTARY ROCK

1. It is easy to identify sedimentary rock.
 2. Sedimentary rock is made up of layers.
 3. These layers are visible.
 4. Visible means you can see it.
 5. You can identify sedimentary rock by its layers.
2. Explain this to the learners as follows:
 - a. To identify something means to recognize, or you can name something when you see it.
 - b. It is easy to identify sedimentary rock as it has layers.
 - c. If you see rock that has layers, then it is sedimentary rock.
 3. Give learners some time to copy the information from the chalkboard into their workbooks.

TOPIC: Sedimentary Rocks

Checkpoint 1

Ask the learners the following questions to check their understanding at this point:

- a. How can you identify sedimentary rock?
- b. What does 'visible' mean?

Answers to the checkpoint questions are as follows:

- a. Look for layers.
- b. If something is visible, it means that you can see it.

E

CONCEPTUAL DEVELOPMENT

1. Depending on time and resources, do the following task as a teacher demonstration or get groups of learners to do their own. If you do this as a teacher demonstration, then three containers of the sand and salt mixture will need to be made.
2. Write the following onto the chalkboard (always try to do this before the lesson starts):

MAKE YOUR OWN SEDIMENTARY ROCK

You will need:

½ cup of sand, a big handful of salt, a small container for the sand and salt mixture, a container for mixing, a spoon or stick to stir, ½ cup of water

Method:

- a. Put the sand in the plastic container or tin lid.
 - b. Put ½ cup of water into the container for mixing.
 - c. Add salt to the water.
 - d. Stir until it dissolves.
 - e. Add more salt and stir until no more salt can be added.
 - f. Pour the salt and water mixture slowly over the sand.
 - g. Place the container with the mixture in the sun for a day.
 - h. When the sand has dried out completely, turn the container over to get the sand out.
 - i. Notice how hard the sand has become.
 - j. Place three lots of hardened sand mixture on each other.
 - k. Observe the different layers.
3. Explain this task to the learners as follows:
 - a. Get all the materials that you will need before you start.
 - b. Follow the instructions. In Science, we call this the Method.
 - c. When the sand mixture has dried out and become hard, explain that this is like the way rocks are made over thousands of years.

TOPIC: Sedimentary Rocks

- d. Let learners put three layers of sand on top of each other. Get the learners to look at the layers.
4. Show learners Resource 18: 'Layers of sedimentary rock'.
5. Point out the different layers in the photographs of sedimentary rock.

Checkpoint 2

Ask the learners the following questions to check their understanding at this point:

- a. Name the type of rock that can be identified as it has layers.
- b. What does 'identify' mean?

Answers to the checkpoint questions are as follows:

- a. Sedimentary rock.
- b. To recognise or to be able to name something when you see it.

6. Ask the learners if they have any questions and provide answers and explanations.

F REFERENCE POINTS FOR FURTHER DEVELOPMENT

If you need additional information or activities on this topic, you can find these in your textbook on the following pages:

NAME OF TEXTBOOK	TOPIC	PAGE NUMBER
Study & Master	Formation of sedimentary rocks	157
Viva	Formation of sedimentary rocks	188-189
Platinum	Formation of sedimentary rocks	191
Solutions for All	Formation of sedimentary rocks	218
Day-by-Day	Formation of sedimentary rocks	159
Oxford	Formation of sedimentary rocks	
Spot On	Formation of sedimentary rocks	-
Top Class	Formation of sedimentary rocks	127-129
Sasol Inzalo BkB	Formation of sedimentary rocks	141

G ADDITIONAL ACTIVITIES / READING

In addition, further reading, listening or viewing activities related to this sub-topic are available through the following web links:

1. <https://goo.gl/H2EqQj> (5.30 mins) [Forming clastic sedimentary rocks]

TOPIC: Sedimentary Rocks

5 B

Term 4, Week 5, Lesson B

Lesson Title: Formation of sedimentary rock

Time for lesson: 1 hour

A POLICY AND OUTCOMES

Sub-Topic	Types of sedimentary rock Formation of sedimentary rock
CAPS Page Number	44

Lesson Objectives

By the end of the lesson, learners will be able to:

- name the different sedimentary rocks
- explain the origins of different sedimentary rocks

Specific Aims	1. DOING SCIENCE & TECHNOLOGY	
	2. KNOWING THE SUBJECT CONTENT & MAKING CONNECTIONS	✓
	3. UNDERSTANDING THE USES OF SCIENCES & INDIGENOUS KNOWLEDGE	

SCIENCE PROCESS SKILLS

1. Accessing & recalling Information	✓	7. Raising Questions	✓	13. Interpreting Information	✓
2. Observing	✓	8. Predicting		14. Designing	
3. Comparing		9. Hypothesizing		15. Making/ constructing	
4. Measuring		10. Planning Investigations		16. Evaluating and improving products	
5. Sorting & Classifying		11. Doing Investigations		17. Communicating	✓
6. Identifying problems & issues		12. Recording Information			

TOPIC: Sedimentary Rocks

B POSSIBLE RESOURCES

For this lesson, you will need:

IDEAL RESOURCES	IMPROVISED RESOURCES
Resource 18: 'Layers of sedimentary rock'	
Resource 19: 'Sandstone, shale and limestone'	

C CLASSROOM MANAGEMENT

1. Make sure that you are ready and prepared.
2. Write the following question onto the chalkboard before the lesson starts:

How would you identify (know that) a rock was sedimentary?

3. Learners should enter the classroom and answer the question in their workbooks.
4. Discuss the answer with the learners.
5. Write the model answer onto the chalkboard.

It would have different layers that are visible.

D ACCESSING INFORMATION

1. Write the following table onto the chalkboard (always try to do this before the lesson starts):

TYPES OF SEDIMENTARY ROCK

1. There are many different types of sedimentary rock.
 2. Coal is sedimentary rock formed from dead plant material.
 3. Oil is sedimentary rock formed from dead animals.
 4. Shale is sedimentary rock made from clay.
 5. Sandstone is sedimentary rock made from sand.
 6. Limestone is made from dead sea animals.
 7. Sedimentary rock takes thousands of years to form.
2. Explain this to the learners as follows:
 - a. There are many types of sedimentary rock.
 - b. The different types are made from different materials.
 - c. In shale, the clay particles are too small to see.
 - d. You can see the sand particles in sandstone.
 - e. Coal and oil take many thousands of years to form.
 3. Give learners some time to copy the information from the chalkboard into their workbooks.

TOPIC: Sedimentary Rocks

Checkpoint 1

Ask the learners the following questions to check their understanding at this point:

- a. What is coal made from?
- b. What is limestone made from?

Answers to the checkpoint questions are as follows:

- a. Dead plant material.
- b. Dead sea animals.

E

CONCEPTUAL DEVELOPMENT

1. Write the following onto the chalkboard.

Fill in the correct word from the list of words given below. Underline the word you have filled in.

oil, compact, clay, plant, sandstone, limestone

1. ____ is a sedimentary rock made from layers of sand.
2. Shale is a sedimentary rock made from layers of ____.
3. ____ is made from thousands of sea animals, which died and sank to the bottom of the sea.
4. The layers on top push down on the layers underneath them and ____ the lower layers.
5. Coal is dead ____ matter.
6. ____ is sedimentary rock made form dead animals.

2. Explain this task to the learners as follows:
 - a. Ask learners to complete the task.
 - b. Ask learners if they understand all the words. If they do not, then explain the words to the learners.
3. Give learners some time to complete the above task from the chalkboard into their workbooks.
4. Write the models on the chalkboard:

1. Sandstone is a sedimentary rock made from layers of sand.
2. Shale is a sedimentary rock made from layers of clay.
3. Limestone is made from thousands of sea animals, which died and sank to the bottom of the sea.
4. The layers on top push down on layers underneath them and compact the lower layers.
5. Coal is dead plant matter.
6. Oil is sedimentary rock made form dead animals.

TOPIC: Sedimentary Rocks

5. Show the learners Resource 18: 'Layers of sedimentary rock'. Point out the different layers that can be seen.
6. Show the learners Resource 19: 'Sandstone, shale and limestone: layers'. Point out the different layers of each type of sedimentary rock.

Checkpoint 2

Ask the learners the following questions to check their understanding at this point:

- a. What is shale?
- b. What makes oil?

Answers to the checkpoint questions are as follows:

- a. Shale is sedimentary rock made from clay.
- b. Oil is made from dead animals.

7. Ask the learners if they have any questions and provide answers and explanations.

F REFERENCE POINTS FOR FURTHER DEVELOPMENT

If you need additional information or activities on this topic, you can find these in your textbook on the following pages:

NAME OF TEXTBOOK	TOPIC	PAGE NUMBER
Study & Master	Sedimentary rocks	-
Viva	Sedimentary rocks	189-191
Platinum	Sedimentary rocks	192-193
Solutions for All	Sedimentary rocks	225-226
Day-by-Day	Sedimentary rocks	160
Oxford	Sedimentary rocks	
Spot On	Sedimentary rocks	86
Top Class	Sedimentary rocks	129-131
Sasol Inzalo Bk B	Sedimentary rocks	144

G ADDITIONAL ACTIVITIES / READING

In addition, further reading, listening or viewing activities related to this sub-topic are available through the following web links:

1. <http://e-classroom.co.za/wp-content/uploads/2014/10/EngGr5T4-NS-Planet-Earth-Beyond-Sedimentary-Rocks-Formation-of-Sedimentary-Rock.pdf> [Formation of sedimentary rock]

TOPIC: Sedimentary Rocks

5 C

Term 4, Week 5, Lesson C

Lesson Title: Uses of Sedimentary rock

Time for lesson: 1½ hours

A POLICY AND OUTCOMES

Sub-Topic	Uses of Limestone
CAPS Page Number	44

Lesson Objectives

By the end of the lesson, learners will be able to:

- describe the uses of limestone
- explain how cement is made

Specific Aims	1. DOING SCIENCE & TECHNOLOGY	
	2. KNOWING THE SUBJECT CONTENT & MAKING CONNECTIONS	✓
	3. UNDERSTANDING THE USES OF SCIENCES & INDIGENOUS KNOWLEDGE	✓

SCIENCE PROCESS SKILLS

1. Accessing & recalling Information	✓	7. Raising Questions	✓	13. Interpreting Information	✓
2. Observing	✓	8. Predicting		14. Designing	✓
3. Comparing		9. Hypothesizing		15. Making/ constructing	
4. Measuring		10. Planning Investigations		16. Evaluating and improving products	
5. Sorting & Classifying		11. Doing Investigations		17. Communicating	
6. Identifying problems & issues		12. Recording Information			

TOPIC: Sedimentary Rocks

B POSSIBLE RESOURCES

For this lesson, you will need:

IDEAL RESOURCES	IMPROVISED RESOURCES
Resource 20: 'Nelson Mandela chipping away at limestone'	
Resource 21: 'The limestone quarry on Robben Island'	
Resource 22: 'A bridge in France built over 2000 years ago'	
Resource 23: 'Storms River Bridge: Eastern Cape'	

C CLASSROOM MANAGEMENT

1. Make sure that you are ready and prepared.
2. Write the following question onto the chalkboard before the lesson starts:

What is limestone?

3. Learners should enter the classroom and answer the question in their workbooks.
4. Discuss the answer with the learners.
5. Write the model answer onto the chalkboard.

Limestone is sedimentary rock made from dead sea animals.

D ACCESSING INFORMATION

1. Write the following onto the chalkboard (always try to do this before the lesson starts):

USES OF LIMESTONE

1. Limestone is rock made up of many fossils.
2. The Sterkfontein Caves in the Cradle of Humankind are formed from limestone.
3. Limestone is mined in a quarry.
4. A quarry is a large pit from which large pieces of rock are taken.
5. Limestone has many uses.
6. Limestone is used to make cement.
7. Limestone is heated to a very high temperature and ground to a fine powder.
8. This powder is mixed with stone and sand to make cement.

TOPIC: Sedimentary Rocks

2. Explain this to the learners as follows:
 - a. Limestone dissolves in water.
 - b. It becomes like a glue when it is dissolved.
 - c. This is useful for making cement.
 - d. Limestone is used in the making of many things.
 - e. It is used to make insecticides, chalk, coating on chewing gum, and many other products.
3. Give learners some time to copy the information written on the chalkboard into their workbooks.

Checkpoint 1

Ask the learners the following questions to check their understanding at this point:

- a. What is a quarry?
- b. What building material uses limestone?

Answers to the checkpoint questions are as follows:

- a. A place on the surface of the Earth for cutting out big pieces of rock.
- b. Cement.

E CONCEPTUAL DEVELOPMENT

1. Write the following flow onto the chalkboard.

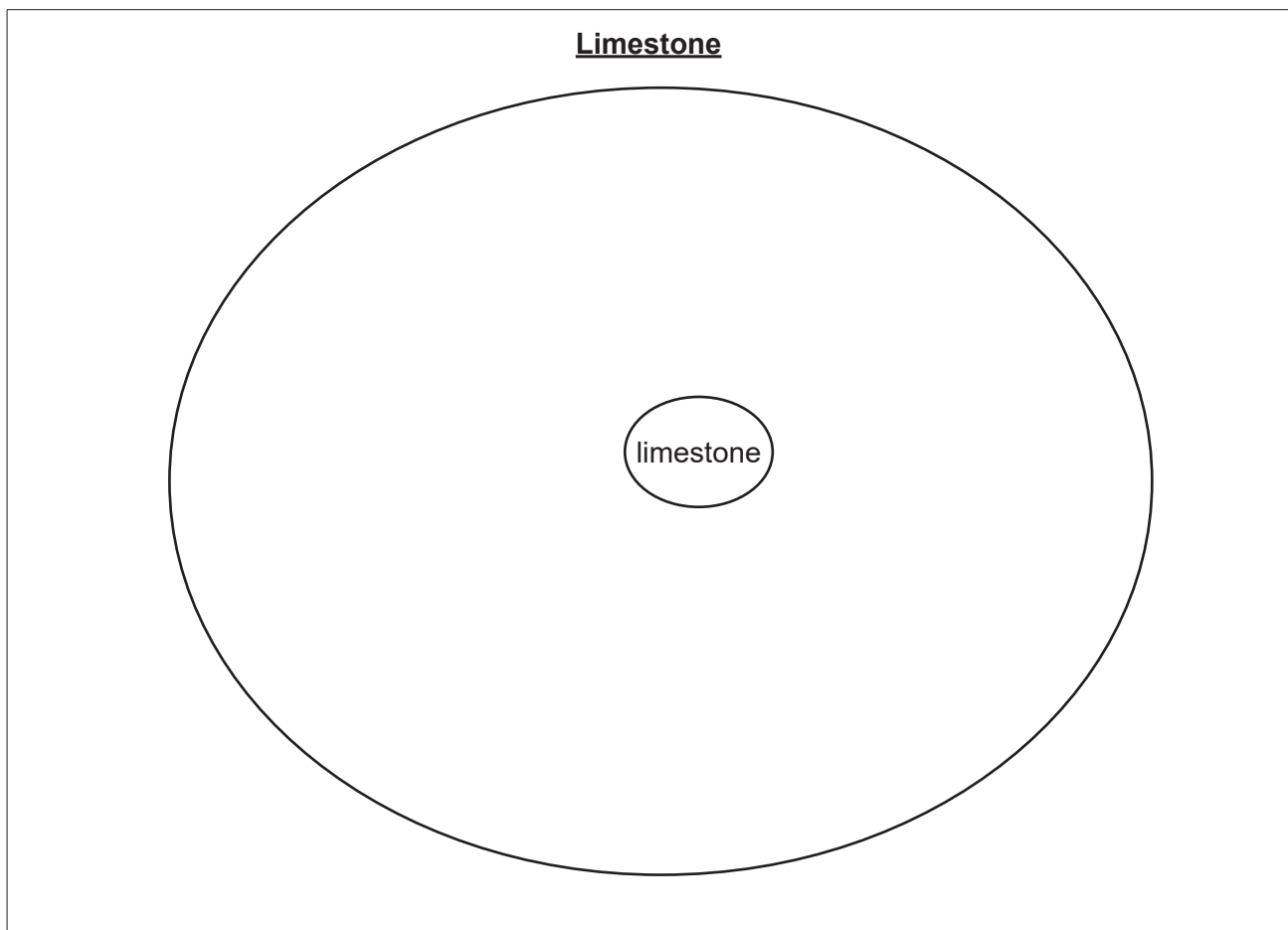
USES OF LIMESTONE

1. Limestone is very useful to us.
2. Big buildings use limestone blocks.
3. The Egyptians used big pieces of limestone to build the pyramids.
4. The Romans used limestone blocks to build bridges.
5. These structures still stand today.
6. It is used to make some medicines, cosmetics, toothpaste and paint.
7. It is used to make sculptures.

2. Explain this to the learners as follows:
 - a. Limestone is very useful to us.
 - b. It is used to make many, many things that we use every day.
 - c. Show the learners Resource 20: 'Nelson Mandela chipping away at a limestone block on Robben Island'.
 - d. Explain that this is what the prisoners on Robben Island did for many years.
 - e. A quarry is a place on the surface of the Earth for cutting big pieces of rock.
 - f. Show learners Resource 21: 'A limestone quarry on Robben Island'.

TOPIC: Sedimentary Rocks

- g. Discuss all the things we use that are made from limestone: cosmetics, chalk, cement, cosmetics, medicines, toothpaste, paint.
 - h. Show the learners Resource 22: 'A bridge in France built over 2000 years ago'.
 - i. This bridge was built by the Romans from limestone.
 - j. It is still standing over 2000 years later.
 - k. Show the learners Resource 23: 'Storms River Bridge: Eastern Cape'.
 - l. This bridge was made from cement which is made from limestone in a powdered form and mixed with stone, sand and water.
3. Ask the learners to complete the following task. They will draw a circle in the centre with the word 'limestone' in it. They will draw a big circle around this. In the big circle, they will write down or draw anything that they remember, research or read about on limestone.
4. Ask the learners to copy the following in their workbooks:



5. Explain the following task to the learners:
- a. Write or draw down anything about limestone that you remember, read about in your workbook or find out about through reading other books or looking on the internet.
 - b. Put this information in the big circle.

TOPIC: Sedimentary Rocks

6. Draw the diagram and fill in the model answers on the chalkboard:

The diagram is a large circle with 'limestone' in the center, enclosed in a smaller circle. Surrounding it are several rectangular boxes containing the following text:

- cement
- chalk
- Sterkfontein Caves
- cosmetics
- mined
- buildings
- Robben Island quarry
- dissolves in water
- Powder is mixed with sand, stone water
- sea shells
- fertilizer
- bridges
- sedimentary rock
- insecticides
- paper

Internet: <https://wiki.kidzsearch.com/wiki/Limestone>

7. Ask learners to write down three sentences from the words that they have written down in their circle. They must do this in their workbooks.

8. A model answer would be any three sentences like these:

1. Limestone is sedimentary rock made from dead sea animals and sea shells.
2. Limestone is mined in a quarry like the one on Robben Island.
3. Limestone is used to make cement, paper, insecticides, cosmetics, chalk and fertilizer.
4. Limestone is made into a powder, mixed with sand, stone and water to make cement.
5. Limestone blocks are used for building structures like bridges and houses.

Checkpoint 2

Ask the learners the following questions to check their understanding at this point:

- a. What makes limestone?
- b. Limestone is used to make many products. Name three of these.

Answers to the checkpoint questions are as follows:

- a. Fossils.
- b. Any three of: cement, insecticides, fertiliser, cosmetics, chalk, paper

9. Ask the learners if they have any questions and provide answers and explanations.

TOPIC: Sedimentary Rocks

F REFERENCE POINTS FOR FURTHER DEVELOPMENT

If you need additional information or activities on this topic, you can find these in your textbook on the following pages:

NAME OF TEXTBOOK	TOPIC	PAGE NUMBER
Study & Master	Uses of sedimentary rock	158
Viva	Uses of sedimentary rock	193
Platinum	Uses of sedimentary rock	194
Solutions for All	Uses of sedimentary rock	226-227
Day-by-Day	Uses of sedimentary rock	160-161
Oxford	Uses of sedimentary rock	
Spot On	Uses of sedimentary rock	88
Top Class	Uses of sedimentary rock	131
Sasol Inzalo Bk B	Uses of sedimentary rock	144-145

G ADDITIONAL ACTIVITIES / READING

In addition, further reading, listening or viewing activities related to this sub-topic are available through the following web links:

1. <https://wiki.kidzsearch.com/wiki/Limestone> [Limestone]

TOPIC: Sedimentary Rocks

6 A

Term 4, Week 6, Lesson A

Lesson Title: Uses of sedimentary rock

Time for lesson: 1 hour

A POLICY AND OUTCOMES

Sub-Topic	Uses of shale and sandstone
CAPS Page Number	44

Lesson Objectives

By the end of the lesson, learners will be able to:

- name some products that made from shale and sandstone
- describe why sandstone is chosen for some products
- describe why shale is chosen for some products

Specific Aims	1. DOING SCIENCE & TECHNOLOGY	
	2. KNOWING THE SUBJECT CONTENT & MAKING CONNECTIONS	✓
	3. UNDERSTANDING THE USES OF SCIENCES & INDIGENOUS KNOWLEDGE	

SCIENCE PROCESS SKILLS

1. Accessing & recalling Information	✓	7. Raising Questions	✓	13. Interpreting Information	✓
2. Observing	✓	8. Predicting		14. Designing	
3. Comparing		9. Hypothesizing		15. Making/ constructing	
4. Measuring		10. Planning Investigations		16. Evaluating and improving products	
5. Sorting & Classifying		11. Doing Investigations		17. Communicating	✓
6. Identifying problems & issues		12. Recording Information			

TOPIC: Sedimentary Rocks

B POSSIBLE RESOURCES

For this lesson, you will need:

IDEAL RESOURCES	IMPROVISED RESOURCES
Resource 24: 'From a pyramid chapel: Egypt'	
Resource 25: 'The Union Buildings: Pretoria'	
Resource 26: 'The City Hall: Cape Town'	

C CLASSROOM MANAGEMENT

1. Make sure that you are ready and prepared.
2. Write the following question onto the chalkboard before the lesson starts:

Name three products made from limestone.

3. Learners should enter the classroom and answer the question in their workbooks.
4. Discuss the answer with the learners.
5. Write the model answer onto the chalkboard.

Any three of: some medicines, cement, chalk, cosmetics, fertiliser, paper, coating on chewing gum.

D ACCESSING INFORMATION

1. Write the following table onto the chalkboard (always try to do this before the lesson starts):

USES OF SHALE

1. Shale is sedimentary rock made from clay.
2. Shale is ground up and mixed with water to make clay.
3. Bricks and paving stones are made from this clay.
4. Slate is made from shale.
5. Slate is used to make tiles for floors.
6. Some shale contains gas.
7. The gas can be used to make petrol.

USES OF SANDSTONE

1. Sandstone is sedimentary rock made from sand.
2. Sandstone is easy to carve but does not weather.
3. Blocks of sandstone are used in building.
4. It is often used to make statues, fountains and tiles.

TOPIC: Sedimentary Rocks

2. Explain this to the learners as follows:
 - a. Sandstone is used in many buildings as it weathers well and is easy to cut up.
 - b. It is used to make tiles, paving stones, statues and fountains.
 - c. Some people are against the mining of shale for petrol as it damages the environment.
3. Give learners some time to copy the information written on the chalkboard into their workbooks.

Checkpoint 1

Ask the learners the following questions to check their understanding at this point:

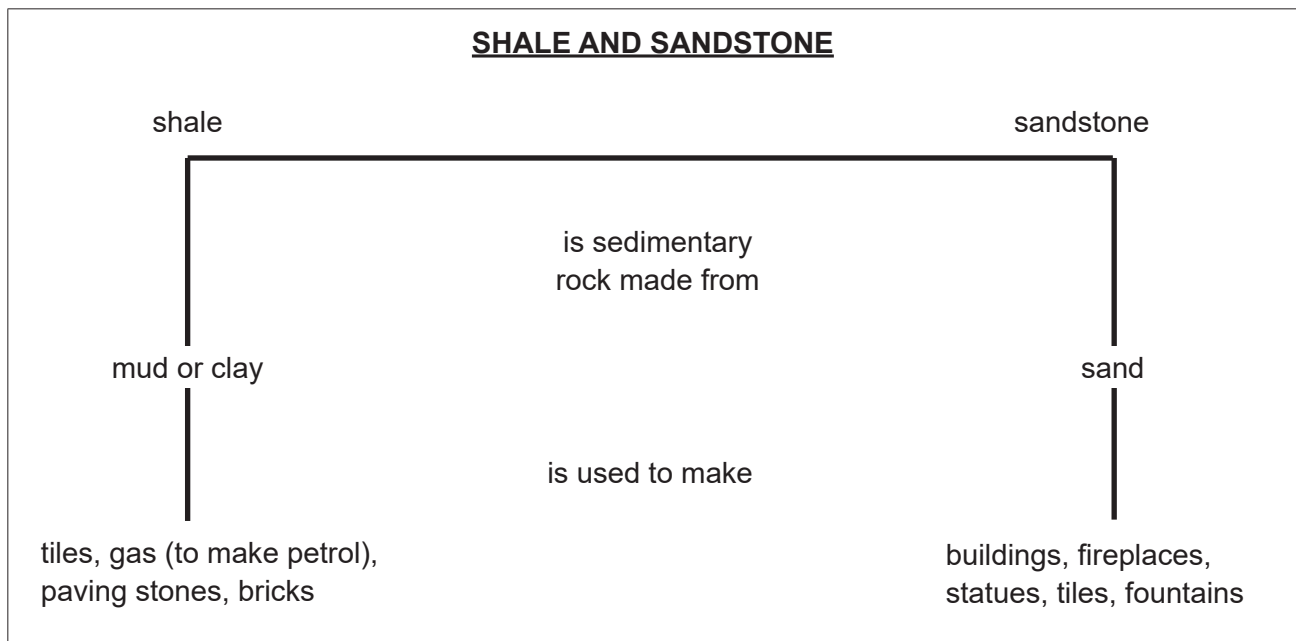
- a. What is sandstone made from?
- b. What does some shale contain?

Answers to the checkpoint questions are as follows:

- a. Sand.
- b. Gas.

E CONCEPTUAL DEVELOPMENT

1. Draw the following diagram onto the chalkboard.



2. Explain this task to the learners as follows:
 - a. Learners will write two sentences from this diagram.
 - b. The diagram should assist learners to make good sentences.
 - c. For example, read from the top left-hand side: Shale is sedimentary rock made from mud or clay and it is used to make tiles, gas, paving stones and bricks.
 - d. Ask learners to write two complete sentences in their workbooks. They must first write the heading 'Shale and Sandstone'. One sentence must be about shale and the other about sandstone.

TOPIC: Sedimentary Rocks

3. Give learners some time to complete this task in their workbooks.
4. Write the model answer on the chalkboard:

SHALE AND SANDSTONE

Shale is sedimentary rock made from mud or clay and it is used to make tiles, gas, paving stones and bricks.

Sandstone is sedimentary rock made from sand and it is used to make buildings, fireplaces, statues, tiles and fountains.

5. Show the learners Resource 24: 'From a pyramid chapel: Egypt'. Explain that sandstone was used for carvings and statues as it is easy to carve and it does not wear away easily.
6. Show the learners Resource 25: 'The Union Buildings, Pretoria'. Explain that this building is made from a light sandstone.
7. Show the learners Resource 26: 'The City Hall: Cape Town.' Explain that this building is also made from sandstone.

Checkpoint 2

Ask the learners the following questions to check their understanding at this point:

- a. What is shale made from?
- b. Name a product made from sandstone.

Answers to the checkpoint questions are as follows:

- a. Shale is made from mud or clay.
- b. One of: buildings, fireplaces, statues, tiles, fountains.

8. Ask the learners if they have any questions and provide answers and explanations.

TOPIC: Sedimentary Rocks

F REFERENCE POINTS FOR FURTHER DEVELOPMENT

If you need additional information or activities on this topic, you can find these in your textbook on the following pages:

NAME OF TEXTBOOK	TOPIC	PAGE NUMBER
Study & Master	Uses of sedimentary rock	158
Viva	Uses of sedimentary rock	193-194
Platinum	Uses of sedimentary rock	194-195
Solutions for All	Uses of sedimentary rock	225-227
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Oxford	Uses of sedimentary rock	
Spot On	Uses of sedimentary rock	88
Top Class	Uses of sedimentary rock	132
Sasol Inzalo Bk B	Uses of sedimentary rock	145-146

G ADDITIONAL ACTIVITIES / READING

In addition, further reading, listening or viewing activities related to this sub-topic are available through the following web links:

1. <https://goo.gl/6CKw52> (6.30 mins) [How oil and gas is extracted from shale]
2. <https://goo.gl/cNrK1g> (3 mins) [Sandstone]

TOPIC OVERVIEW:

Fossils

Term 4, Weeks 6B – 8C

A. TOPIC OVERVIEW

Term 4, Weeks 6b – 8c

- This topic runs for 2½ weeks.
- It is presented over 8 lessons.
- This topic counts for 32% in the end of year final exam.
- This topic's position in the term is as follows:

LESSON	WEEK 1			WEEK 2			WEEK 3			WEEK 4			WEEK 5		
	A	B	C	A	B	C	A	B	C	A	B	C	A	B	C

LESSON	WEEK 6			WEEK 7			WEEK 8			WEEK 9			WEEK 10		
	A	B	C	A	B	C	A	B	C	A	B	C	A	B	C

B. SEQUENTIAL TABLE

GRADE 4	GRADE 5	GRADE 6 & 7
LOOKING BACK	CURRENT	LOOKING FORWARD
<ul style="list-style-type: none"> • n/a 	<ul style="list-style-type: none"> • Understand how fossils are made of the remains of ancient plants and animals • Categorise fossils into trace and body fossils • Make a model to demonstrate how fossils are embedded in sedimentary rock • Understand the importance of South African fossils 	<ul style="list-style-type: none"> • n/a

C. SCIENTIFIC AND TECHNOLOGICAL VOCABULARY

Ensure that you teach the following vocabulary at the appropriate place in the topic:

	TERM	EXPLANATION
1.	preserved	To keep something the way it was; in its original state.
2.	ancient	Belonging to a time from very long ago; no longer in existence.
3.	decompose	To become rotten; to break into smaller pieces.
4.	palaeontologist	A scientist who studies fossils so that we can learn about the plants and animals that lived on Earth before humans.
5.	exposed	To become visible by uncovering it.
6.	cast	An object made by shaping a material to be in the same form as the original object.
7.	skeleton	An inside or outside framework of bones.
8.	extinct	It is no longer alive today.
9.	herbivore	An animal that eats plants only.
10.	carnivore	An animal that feeds on other animals.
11.	droppings	The faeces of birds and animals.
12.	surrounded	Be all round; to enclose.
13.	assume	To accept without proof or evidence.
14.	embryo	An animal that is developing either in its mother's womb or in an egg.
15.	interpret	To give the meaning of; to decide what the intended meaning is.
16.	resin	A sticky substance that does not dissolve in water.
17.	hatch	To cause an egg to break to allow a young animal to come out.
18.	smothered	To kill someone by covering their nose and mouth so they suffocate.
19.	hominid	Primate family which includes humans and their fossil ancestors.
20.	site	A specific area of ground.
21.	clutch	A group of eggs together.
22.	swamp	An area of low-lying ground where water collects.

D. UNDERSTANDING THE USES / VALUE OF SCIENCE

Fossils are important for us to study as they help us in working out the history of the Earth. They provide physical evidence of animals and plants that lived in the past. Through discovering fossils, **paleontologists** can work out how life on Earth used to be many thousands and even millions of years ago. A paleontologist is a scientist who studies fossils. South Africa has some of the best paleontologists in the world.

E. PERSONAL REFLECTION

Reflect on your teaching at the end of each topic:

Date completed:

Lesson successes:

Lesson challenges:

Notes for future improvement:

6 B

Term 4, Week 6, Lesson B

Lesson Title: Fossils in rock

Time for lesson: 1½ hours

A POLICY AND OUTCOMES

Sub-Topic	Fossils in rock
CAPS Page Number	45

Lesson Objectives

By the end of the lesson, learners will be able to:

- describe how fossils are formed
- explain how fossils provide evidence of plants and animals that lived a long time ago
- understand how fossils provide evidence of the environmental conditions at that time
- make a cast of a leaf

Specific Aims	1. DOING SCIENCE & TECHNOLOGY	✓
	2. KNOWING THE SUBJECT CONTENT & MAKING CONNECTIONS	✓
	3. UNDERSTANDING THE USES OF SCIENCES & INDIGENOUS KNOWLEDGE	✓

SCIENCE PROCESS SKILLS

1. Accessing & recalling Information	✓	7. Raising Questions	✓	13. Interpreting Information	✓
2. Observing	✓	8. Predicting		14. Designing	✓
3. Comparing		9. Hypothesizing		15. Making/ constructing	✓
4. Measuring		10. Planning Investigations	✓	16. Evaluating and improving products	
5. Sorting & Classifying		11. Doing Investigations	✓	17. Communicating	
6. Identifying problems & issues		12. Recording Information	✓		

TOPIC: Fossils

B POSSIBLE RESOURCES

For this lesson, you will need:

IDEAL RESOURCES	IMPROVISED RESOURCES
Resource 27: 'A fish fossil'	
Resource 28: 'A plant fossil'	
Resource 29: 'A salt water crocodile – 185 million years old'	
Resource 30: 'Massospondylus – a fossil from 200 million years ago'	
Resource 31: 'How palaeontologists think that the Massospondylus looked'	
Per group: Teaspoon for measuring; 2 disposable cups (paper or plastic); clay; petroleum jelly (Vaseline); plaster of paris; a big leaf, clay or play dough or plasticine	

C CLASSROOM MANAGEMENT

1. Make sure that you are ready and prepared.
2. Write the following question onto the chalkboard before the lesson starts:

What is sedimentary rock?

3. Learners should enter the classroom and answer the question in their workbooks.
4. Discuss the answer with the learners.
5. Write the model answer onto the chalkboard.

Sedimentary rock is made by compacted sand, mud and small rocks that were eroded and deposited in layers, in low-lying areas, millions of years ago.

D ACCESSING INFORMATION

1. Write the following table onto the chalkboard (always try to do this before the lesson starts):

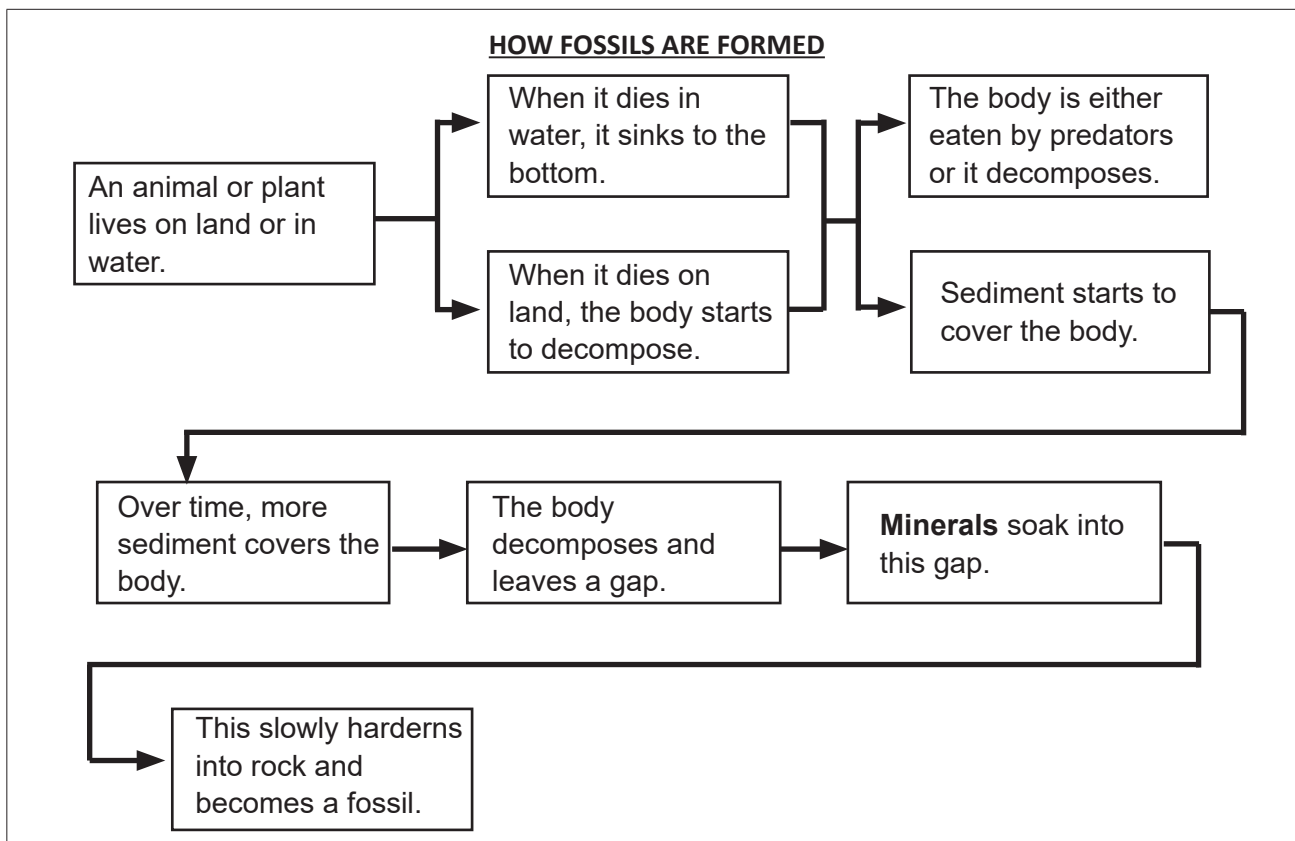
FOSSILS IN ROCK

1. Fossils are the **preserved** remains or signs of **ancient** animals or plants that lived a long time ago.
2. These remains have turned into rock.
3. When a living thing dies, it **decomposes** and becomes part of the soil.
4. Sometimes special conditions stop decomposition from happening.
5. This is when fossils form.

TOPIC: Fossils

6. Fossils can be millions of years old.
7. Fossils are found where sedimentary rocks have been **exposed**.

2. Explain this to the learners as follows:
 - a. A fossil is not the real leaf or animal you see.
 - b. The rock has kept the shape of the leaf or animal.
 - c. Skeletons of animals turn into rock over millions of years.
 - d. Fossils are mostly found in sedimentary rock.
 - e. This rock has become exposed for some reason. This means the fossils are now visible.
3. Give learners some time to copy this information written on the chalkboard into their workbooks.
4. Draw the following flow chart onto the chalkboard and fill in the details (try to do this before the lesson starts):



5. Explain the following to the learners:
 - a. Follow the flow chart process by following the arrows.
 - b. Most fossils are formed from things that once lived in water.
 - c. Fossils were only formed when sediment covered the animal or plant before they decomposed.
 - d. The process of becoming a fossil took a very long time.
6. Give learners some time to copy the information written on the chalkboard into their workbooks.

TOPIC: Fossils

Checkpoint 1

Ask the learners the following questions to check their understanding at this point:

- a. What is a fossil?
- b. What type of rock contains fossils?

Answers to the checkpoint questions are as follows:

- a. An ancient animal or plant that has been preserved.
- b. Sedimentary rock

10. Ask the learners if they have any questions and provide answers and explanations.

E

CONCEPTUAL DEVELOPMENT

1. Write the following on the chalkboard (try to do this before the lesson starts):

MAKING A FOSSIL CAST

MATERIALS AND TOOLS

Clay or plasticine
Plaster of paris (6 teaspoons)
water (3 teaspoons)
vaseline
2 disposable cups – plastic or paper
a leaf that will fit sideways in the cup
scissors

METHOD

- a. Cut one of the cups in half.
- b. Write your names on the cup.
- c. Press a small ball of clay into the bottom of the cup.
- d. Spread a very small amount of vaseline over the leaf.
- e. Put your leaf onto the top of the clay and gently press the leaf evenly down (it must leave its shape and ribs on the clay).
- f. Slowly peel the leaf away (there should be a print of the leaf left on the clay).
- g. Mix 6 teaspoons of plaster of paris with 3 teaspoons of water (you might need to add a bit more water).
- h. Pour this mixture into the cup.
- i. Put your cup on the windowsill and leave this to harden until your next lesson.

NEXT LESSON

- a. Peel away the disposable cup from the clay and plaster of Paris.
- b. Very carefully separate the clay from the plaster of Paris.
- c. You should now have a cast of the leaf.
- d. Put the casts on display for the rest of the class to view.

TOPIC: Fossils

2. Explain to the learners that before they start making their fossils, they must:
 - a. Gather all the materials and tools.
 - b. Follow the instructions for the method carefully (read through each step before they start, to make sure that they understand what they must do).
 - c. The cast will take a day to dry.
3. Read the following to the learners:

A famous South African fossil expert, Phillip Tobias, once said “You must make the bones tell you a story”. This is because fossils give scientists clues on what the Earth was like thousands and millions of years ago. Scientists can find out what ancient plants and animals looked like, what size they were, how the animal moved, when the fossil lived, how it might have died and what the climate of the Earth was like at the time the fossil lived. Animals that lived in South Africa millions of years ago look like some animals living nowadays. These animals are now **extinct**.
4. Show learners Resource 27: “A fish fossil” and Resource 28: “A plant fossil”. Explain that this is what a fossil looks like.
5. “Read through the passage again and then ask learners to write down three things that we can learn from fossils”.

WHAT WE CAN LEARN FROM FOSSILS

6. Give the learners time to complete this task in their workbooks.
7. Ask a few learners to share their answers with the class. Discuss these answers with the class. Possible answers are:
 - a. what ancient animals and plants looked like
 - b. what size these animals and plants were
 - c. how the animals moved
 - d. when the ancient animals and plants lived
 - e. how they might have died
 - f. what the climate of the Earth was like at this time
8. Show the learners Resource 29: “A salt water crocodile”. This crocodile lived over 185 million years ago. It is perfectly preserved.
9. Show the learners Resource 30: “Massospondylus: a fossil from 200 million years ago”. This is the fossilized skull of a dinosaur.
10. Show the learners Resource 31: “Massospondylus: How paleontologists think the Massospondylus looked”. **Paleontologists** can develop a good image of ancient animals and plants from the fossils that are collected.

TOPIC: Fossils

Checkpoint 2

Ask the learners the following questions to check their understanding at this point:

- a. Name two things that we can learn about from fossils.
- b. What does the word 'extinct' mean?

Answers to the checkpoint questions are as follows:

- a. One of the following answers: what ancient animals and plants looked like, what size these animals and plants were, how the animals moved, when the ancient animals and plants lived, how they might have died, what the climate of the Earth was like at this time
- b. The animal or plant is no longer alive today

7. Ask the learners if they have any questions and provide answers and explanations.

F REFERENCE POINTS FOR FURTHER DEVELOPMENT

If you need additional information or activities on this topic, you can find these in your textbook on the following pages:

NAME OF TEXTBOOK	TOPIC	PAGE NUMBER
Study & Master	Fossils	159-160
Viva	Fossils	195-197
Platinum	Fossils	197-199
Solutions for All	Fossils	231-237
Day-by-Day	Fossils	165-167
Oxford	Fossils	
Spot On	Fossils	89-90
Top Class	Fossils	133-136
Sasol Inzalo Bk B	Fossils	152-163

G ADDITIONAL ACTIVITIES / READING

In addition, further reading, listening or viewing activities related to this sub-topic are available through the following web links:

1. <https://goo.gl/kz2nhC> (2 mins) [What's a fossil?]
2. <https://goo.gl/cmjN9v> (3 mins) [How to make fossils! DIY]
3. <https://goo.gl/2qZzRw> (2.30 mins) [How to make a fossil]

6 C

Term 4, Week 6, Lesson C

Lesson Title: Body and trace fossils

Time for lesson: 1 hour

A POLICY AND OUTCOMES

Sub-Topic	Body fossils
CAPS Page Number	45

Lesson Objectives

By the end of the lesson, learners will be able to:

- define a body fossil
- explain the assumptions that can be made from body fossils

Specific Aims	1. DOING SCIENCE & TECHNOLOGY	
	2. KNOWING THE SUBJECT CONTENT & MAKING CONNECTIONS	✓
	3. UNDERSTANDING THE USES OF SCIENCES & INDIGENOUS KNOWLEDGE	✓

SCIENCE PROCESS SKILLS

1. Accessing & recalling Information	✓	7. Raising Questions	✓	13. Interpreting Information	✓
2. Observing	✓	8. Predicting		14. Designing	
3. Comparing		9. Hypothesizing		15. Making/ constructing	
4. Measuring		10. Planning Investigations		16. Evaluating and improving products	
5. Sorting & Classifying		11. Doing Investigations		17. Communicating	✓
6. Identifying problems & issues		12. Recording Information			

TOPIC: Fossils

B POSSIBLE RESOURCES

For this lesson, you will need:

IDEAL RESOURCES	IMPROVISED RESOURCES
Resource 32: 'Woolly mammoths'	
Resource 33: 'An insect in amber: 50 million years old'	

C CLASSROOM MANAGEMENT

1. Make sure that you are ready and prepared.
2. Write the following question onto the chalkboard before the lesson starts:

In what type of rock do you normally find fossils?

3. Learners should enter the classroom and answer the question in their workbooks.
4. Discuss the answer with the learners.
5. Write the model answer onto the chalkboard.

Sedimentary rock

D ACCESSING INFORMATION

1. Write the following table onto the chalkboard (always try to do this before the lesson starts):

BODY FOSSILS

1. Body fossils are formed from the hard parts of plants and animals.
 2. These include teeth, bones, shells, stems, leaves and seeds.
 3. Teeth can help us know whether the animal was a **carnivore** or **herbivore**.
 4. Bones (**skeletons**) can help us know the size of the animal and how it moved.
 5. Sometimes the whole body of an animal is preserved.
 6. Woolly mammoths were discovered in the ice in Russia.
 7. Insects are sometimes preserved in amber which is a **resin** from a tree.
2. Explain the following to the learners:
 - a. There are two main types of fossils: body fossils and trace fossils.
 - b. This information is about body fossils.
 - c. Body fossils are from the hard parts of the animal (teeth, bones) or plant (seeds, leaves).

TOPIC: Fossils

- d. Woolly mammoths are like very big elephants with huge tusks.
 - e. Woolly mammoths are the extinct relatives of today's elephants.
 - f. They became extinct about 4000 years ago.
 - g. Amber is a resin that is an orange-yellow colour.
3. Give learners some time to copy the information written on the chalkboard into their work-books.

Checkpoint 1

Ask the learners the following questions to check their understanding at this point:

- a. True or false: Body fossils include teeth.
- b. True or false: Teeth can help us know whether the animal was a carnivore or a herbivore.

Answers to the checkpoint questions are as follows:

- a. True
- b. True

E

CONCEPTUAL DEVELOPMENT

1. Show learners Resource 32: 'Woolly mammoths'.
2. Explain the following to the learners:
 - a. Woolly Mammoths were **preserved** in ice for thousands of years.
 - b. Whole fossilized skeletons have been discovered.
 - c. They look like elephants but are much bigger. Point out the big tusks.
 - d. They lived in a very cold climate.
3. Show learners Resource 33: 'An insect in amber: 50 million years ago'.
4. Explain the following to the learners:
 - a. Amber is a resin from a tree.
 - b. Resin is a sticky substance like glue.
 - c. The insects would get caught in the sticky resin.
 - d. This insect has been preserved for 50 million years.

TOPIC: Fossils

Checkpoint 2

Ask the learners the following questions to check their understanding at this point:

- a. What is the name of the resin that insects get stuck in?
- b. What is the fossil relative of today's elephant known as?

Answers to the checkpoint questions are as follows:

- a. Amber
- b. Woolly mammoth

5. Ask the learners if they have any questions and provide answers and explanations.

F REFERENCE POINTS FOR FURTHER DEVELOPMENT

If you need additional information or activities on this topic, you can find these in your textbook on the following pages:

NAME OF TEXTBOOK	TOPIC	PAGE NUMBER
Study & Master	Fossils	161
Viva	Fossils	198-199
Platinum	Fossils	199-200
Solutions for All	Fossils	238-239
Day-by-Day	Fossils	168
Oxford	Fossils	
Spot On	Fossils	91
Top Class	Fossils	136-137
Sasol Inzalo Bk B	Fossils	163

G ADDITIONAL ACTIVITIES / READING

In addition, further reading, listening or viewing activities related to this sub-topic are available through the following web links:

1. <https://goo.gl/ChwNkS> (2.30 mins) [How fossils are formed]
2. <https://goo.gl/DbNvL2> (2 mins) [What is a fossil?]

7 A

Term 4, Week 7, Lesson A

Lesson Title: Body and trace fossils

Time for lesson: 1 hour

A POLICY AND OUTCOMES

Sub-Topic	Trace fossils
CAPS Page Number	45

Lesson Objectives

By the end of the lesson, learners will be able to:

- define a trace fossil
- explain the assumptions that can be made from trace fossils

Specific Aims	1. DOING SCIENCE & TECHNOLOGY	
	2. KNOWING THE SUBJECT CONTENT & MAKING CONNECTIONS	✓
	3. UNDERSTANDING THE USES OF SCIENCES & INDIGENOUS KNOWLEDGE	✓

SCIENCE PROCESS SKILLS

1. Accessing & recalling Information	✓	7. Raising Questions	✓	13. Interpreting Information	✓
2. Observing	✓	8. Predicting		14. Designing	
3. Comparing		9. Hypothesizing		15. Making/ constructing	
4. Measuring		10. Planning Investigations		16. Evaluating and improving products	
5. Sorting & Classifying		11. Doing Investigations		17. Communicating	
6. Identifying problems & issues		12. Recording Information			

TOPIC: Fossils

B POSSIBLE RESOURCES

For this lesson, you will need:

IDEAL RESOURCES	IMPROVISED RESOURCES
Resource 34: 'Massospondylus eggs and embryos'	

C CLASSROOM MANAGEMENT

1. Make sure that you are ready and prepared.
2. Write the following question onto the chalkboard before the lesson starts:

What are body fossils?

3. Learners should enter the classroom and answer the question in their workbooks.
4. Discuss the answer with the learners.
5. Write the model answer onto the chalkboard.

Fossils formed from hard parts of plants and animals.

D ACCESSING INFORMATION

1. Write the following table onto the chalkboard (always try to do this before the lesson starts):

TRACE FOSSILS

1. Trace fossils are formed from the evidence left behind by animals.
2. Examples of trace fossils are eggs, nests, tracks and **droppings**.
3. These trace fossils tell us a lot about the behaviour of the animals.

2. Explain this to the learners as follows:
 - a. Trace fossils are not the fossilized remains of animals and plants.
 - b. Trace fossils are things that have been left behind by animals.
 - c. Eggs, nests, tracks and droppings are examples of trace fossils.
3. Give learners some time to copy the information from the chalkboard into their workbooks.

Checkpoint 1

Ask the learners the following questions to check their understanding at this point:

- a. What is a trace fossil?
- b. Give two examples of trace fossils.

Answers to the checkpoint questions are as follows:

- a. A fossil that is formed from evidence left behind by animals.
- b. Any two of: eggs, nest, tracks, droppings.

E

CONCEPTUAL DEVELOPMENT

1. Write the following flow chart onto the chalkboard.

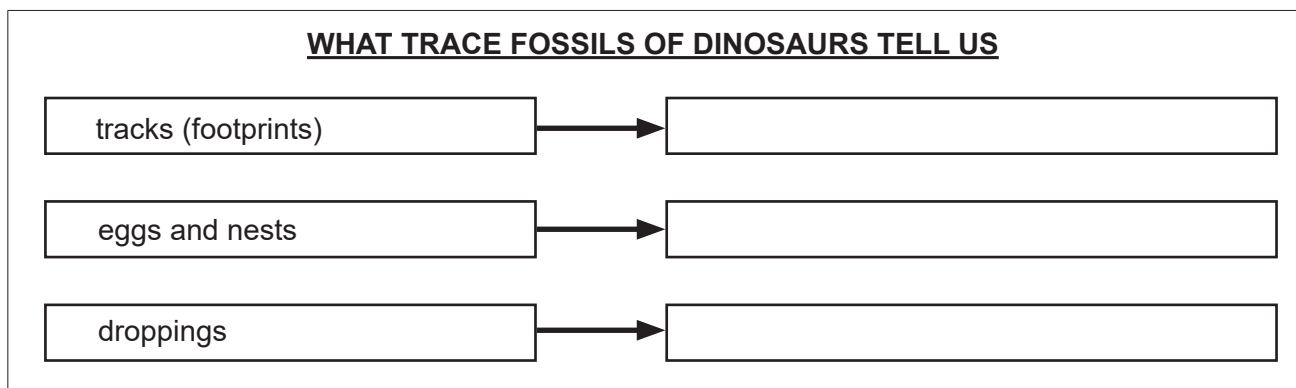
- Dinosaur eggs and nests are trace fossils.
- These fossils tell us that dinosaurs looked after their eggs and babies much the same way as birds do today.
- Some dinosaur eggs were found near Golden Gate in the Free State.
- These were the eggs of a Massospondylus.
- The fossil of an adult was found nearby.
- Droppings of animals can tell us what they ate.
- Tracks can tell us about the size and speed of a dinosaur.
- Scientists consults expert trackers like the !Xam hunters to learn how to **interpret** tracks.
- If small tracks are **surrounded** by larger tracks then we **assume** that the young dinosaurs were being protected by the adults.

2. Read through the information on the chalkboard with the learners.

3. Explain the following to the learners:

- a. Dinosaur nests and eggs tell us a lot about the family behavior of dinosaurs.
- b. The eggs found near Golden Gate tell us that dinosaurs looked after their eggs much like birds do.
- c. Show the learners Resource 34: 'Massospondylus eggs and embryos'.
- d. Point out the eggs.
- e. Explain what an embryo is. The embryos can be clearly seen in this picture.
- f. Tracks tell us about the behaviour of dinosaurs.

4. Write the following onto the chalkboard.

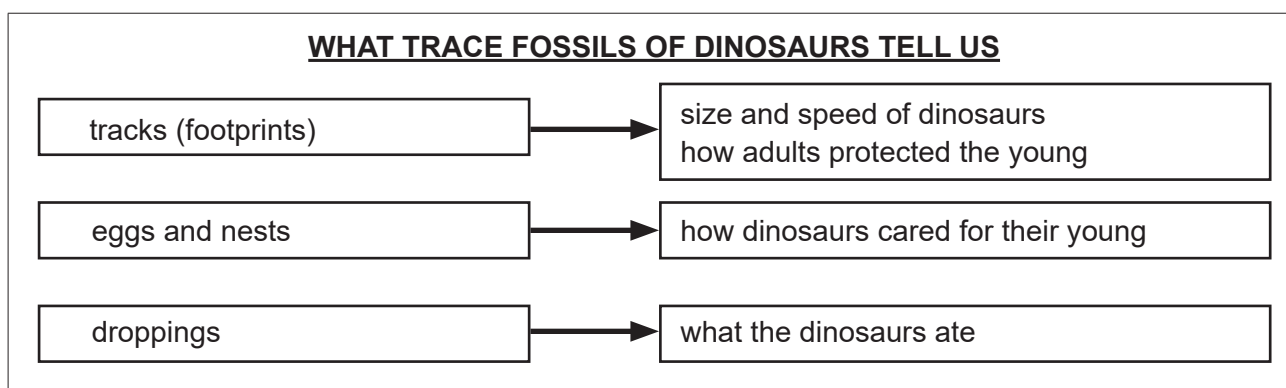


5. Ask learners to complete the task. Learners must:

- a. Write the heading "WHAT TRACE FOSSILS OF DINOSAURS TELL US" into their workbooks.
- b. Copy the blocks from the chalkboard.
- c. Look at the information on the chalkboard to find the answers.
- d. Fill the information they can find on the board into the blocks.

TOPIC: Fossils

6. Give learners some time to complete this task in their workbooks.
7. Write the model answer on the chalkboard:



Checkpoint 2

Ask the learners the following questions to check their understanding at this point:

- a. What do fossilised droppings tell us?
- b. What do fossilised tracks tell us?

Answers to the checkpoint questions are as follows:

- a. What the dinosaurs ate.
- b. The size and speed of the dinosaurs and how they protected their young.

8. Ask the learners if they have any questions and provide answers and explanations.

F REFERENCE POINTS FOR FURTHER DEVELOPMENT

If you need additional information or activities on this topic, you can find these in your textbook on the following pages:

NAME OF TEXTBOOK	TOPIC	PAGE NUMBER
Study & Master	Fossils	162
Viva	Fossils	198-199
Platinum	Fossils	200-201
Solutions for All	Fossils	238-239
Day-by-Day	Fossils	169-170
Oxford	Fossils	
Spot On	Fossils	91
Top Class	Fossils	136-137
Sasol Inzalo Bk B	Fossils	163-165

G

ADDITIONAL ACTIVITIES / READING

In addition, further reading, listening or viewing activities related to this sub-topic are available through the following web links:

1. <http://www.virtualmuseum.ca/sgc-cms/expositions-exhibitions/fossiles-fossils/english/sections/types.html> [Types of trace fossils]
2. <http://mentalfloss.com/article/71309/6-types-fascinating-trace-fossils-you-can-visit> [Six types of fascinating trace fossils you can visit]

7 B

Term 4, Week 7, Lesson B

Lesson Title: Body and trace fossils

Time for lesson: 1 hour

A POLICY AND OUTCOMES

Sub-Topic	Relatives of modern plants and animals
CAPS Page Number	45

Lesson Objectives

By the end of the lesson, learners will be able to:

- compare fossils to plants and animals living today
- explain the importance of knowing about these fossils

Specific Aims	1. DOING SCIENCE & TECHNOLOGY	✓
	2. KNOWING THE SUBJECT CONTENT & MAKING CONNECTIONS	✓
	3. UNDERSTANDING THE USES OF SCIENCES & INDIGENOUS KNOWLEDGE	

SCIENCE PROCESS SKILLS

1. Accessing & recalling Information	✓	7. Raising Questions	✓	13. Interpreting Information	✓
2. Observing		8. Predicting		14. Designing	
3. Comparing	✓	9. Hypothesizing		15. Making/ constructing	
4. Measuring		10. Planning Investigations		16. Evaluating and improving products	
5. Sorting & Classifying	✓	11. Doing Investigations		17. Communicating	✓
6. Identifying problems & issues		12. Recording Information			

TOPIC: Fossils

B POSSIBLE RESOURCES

For this lesson, you will need:

IDEAL RESOURCES	IMPROVISED RESOURCES
Resource 32: 'Woolly mammoths'	
Resource 35: 'A cycad fossil and a living cycad'	
Resource 36: 'A dragonfly fossil and a living dragonfly'	

C CLASSROOM MANAGEMENT

1. Make sure that you are ready and prepared.
2. Write the following question onto the chalkboard before the lesson starts:

What are trace fossils?

3. Learners should enter the classroom and answer the question in their workbooks.
4. Discuss the answer with the learners.
5. Write the model answer onto the chalkboard.

Trace fossils are formed from the evidence left behind by animals, like eggs, nests, tracks and droppings.

D ACCESSING INFORMATION

1. Write the following table onto the chalkboard (always try to do this before the lesson starts):

COMPARING EXTINCT ANIMALS AND PLANTS WITH ANIMALS AND PLANTS LIVING TODAY

1. Fossils tell us about the plants and animals that lived a very long time ago.
2. Some fossils look like the plants and animals living now.
3. The woolly mammoth is an ancestor of the elephant.
4. The woolly mammoth was much bigger than the modern elephant but looked similar.
5. Insects from millions of years ago were also much bigger than they are today.
6. The skeletons of some dinosaurs show us they were like birds.

2. Explain this to the learners as follows:
 - a. Fossils show us how things have changed over time.
 - b. Many fossils look like their modern relatives but were bigger.
 - c. Cycads are plants with hard spiky leaves and cones.
 - d. A fossil cycad looked very much the same today as it did millions of years ago.
 - e. Show the learners Resource 35: 'A cycad fossil and a living fossil'.

TOPIC: Fossils

- f. You can see from the cycad fossil that the leaves **resemble** those of the living cycad.
 - g. Show the learners Resource 32: 'Woolly mammoths'.
 - h. Point out that the mammoth resembles the modern elephant.
3. Give learners some time to copy the information written on the chalkboard into their workbooks.

Checkpoint 1

Ask the learners the following questions to check their understanding at this point:

- a. What do fossils show us?
- b. What extinct animal is the ancestor to the modern elephant?

Answers to the checkpoint questions are as follows:

- a. How things have changed over time.
- b. The woolly mammoth.

E CONCEPTUAL DEVELOPMENT

1. Write the following flow chart onto the chalkboard.

A COMPARISON OF FOSSILS WITH LIVING PLANTS AND ANIMALS

SIMILARITIES:

DIFFERENCES:

CONCLUSION:

2. Explain the following to the learners:
- a. Show the learners Resource 36: 'A dragonfly fossil and a living dragonfly'.
 - b. Learners must identify similarities and differences for the dragonfly fossil and the living dragonfly.
 - c. Learners must write down everything that is similar to the two dragonflies.
 - d. Learners must write down what is different to the two dragonflies.
 - e. The last step is to write down a conclusion. (What can they say about dragonflies and the way they have changed or have not changed?)
3. Write the model answer on the chalkboard:

TOPIC: Fossils

A COMPARISON OF FOSSILS WITH LIVING PLANTS AND ANIMALS

SIMILARITIES

Both dragonflies have:

four wings

wings that are the same shape

a long pointy tail

two antennae

DIFFERENCES

The living dragonfly seems to have more legs

CONCLUSION

Dragonflies have hardly changed in millions of years.

Checkpoint 2

Ask the learners the following questions to check their understanding at this point:

- a. Give an example of a fossil that looks similar to a plant, animal or insect today.
- b. What is a difference between a mammoth and an elephant?

Answers to the checkpoint questions are as follows:

- a. One of the following answers: a dragonfly, a mammoth, a cycad.
- b. One of the following answers: a mammoth is much bigger; the tusks are much bigger on a mammoth than on an elephant.

4. Ask the learners if they have any questions and provide answers and explanations.

TOPIC: Fossils

F REFERENCE POINTS FOR FURTHER DEVELOPMENT

If you need additional information or activities on this topic, you can find these in your textbook on the following pages:

NAME OF TEXTBOOK	TOPIC	PAGE NUMBER
Study & Master	Fossils	n/a
Viva	Fossils	n/a
Platinum	Fossils	201-202
Solutions for All	Fossils	239
Day-by-Day	Fossils	170
Oxford	Fossils	
Spot On	Fossils	91
Top Class	Fossils	137
Sasol Inzalo Bk B	Fossils	165

G ADDITIONAL ACTIVITIES / READING

In addition, further reading, listening or viewing activities related to this sub-topic are available through the following web links:

7 C

Term 4, Week 7, Lesson C

Lesson Title: Importance of South African fossils

Time for lesson: 1 hour

A POLICY AND OUTCOMES

Sub-Topic	Fossils in South Africa
CAPS Page Number	45

Lesson Objectives

By the end of the lesson, learners will be able to:

- write a basic design brief, specifications and constraints
- sketch design ideas
- apply existing knowledge to solve problems

Specific Aims	1. DOING SCIENCE & TECHNOLOGY	
	2. KNOWING THE SUBJECT CONTENT & MAKING CONNECTIONS	✓
	3. UNDERSTANDING THE USES OF SCIENCES & INDIGENOUS KNOWLEDGE	✓

SCIENCE PROCESS SKILLS

1. Accessing & recalling Information	✓	7. Raising Questions		13. Interpreting Information	✓
2. Observing		8. Predicting		14. Designing	
3. Comparing		9. Hypothesizing		15. Making/ constructing	
4. Measuring		10. Planning Investigations		16. Evaluating and improving products	
5. Sorting & Classifying		11. Doing Investigations		17. Communicating	✓
6. Identifying problems & issues	✓	12. Recording Information	✓		

TOPIC: Fossils

B POSSIBLE RESOURCES

For this lesson, you will need:

IDEAL RESOURCES	IMPROVISED RESOURCES
Map of South Africa	

C CLASSROOM MANAGEMENT

1. Make sure that you are ready and prepared.
2. Write the following question onto the chalkboard before the lesson starts:

What living animal had the Woolly Mammoth as its ancestor?

3. Learners should enter the classroom and answer the question in their workbooks.
4. Discuss the answer with the learners.
5. Write the model answer onto the chalkboard.

The elephant

D ACCESSING INFORMATION

1. Write the following table onto the chalkboard (always try to do this before the lesson starts):

FOSSILS IN SOUTH AFRICA

1. South Africa has many **sites** where fossils were found.
 2. We have one of the largest collections of fossils in the world.
 3. The mammal and plant fossils found in the Karoo cover 120-million years of evolution.
 4. The plant fossils show that the Karoo was much wetter than it is today.
 5. The Sterkfontein Caves are in a valley called the Cradle of Humankind near Johannesburg.
 6. Fossils found here show that **hominids** lived here 300 million years ago.
2. Explain this to the learners as follows:
 - a. South Africa is known for its collection of fossils.
 - b. Fossils have been found in the Karoo, the Sterkfontein caves, the Swartberg mountains, and the West Coast Fossil Park, the Cradle of Humankind, as well as many other sites.
 - c. If possible, point these places out on a map of South Africa.
 3. Give learners some time to copy the information written on the chalkboard into their workbooks.

TOPIC: Fossils

Checkpoint 1

Ask the learners the following questions to check their understanding at this point:

- a. What are the caves called where many hominid fossils were found?
- b. How do we know that the Karoo was once wetter than it is now?

Answers to the checkpoint questions are as follows:

- a. The Sterkfontein Caves.
- b. It has plant fossils that show us.

E

CONCEPTUAL DEVELOPMENT

1. Write the following onto the chalkboard.

STERKFORTEIN CAVES

The Sterkfontein Caves, situated in the Cradle of Humankind near Krugersdorp, is one of the world's richest fossil sites. The discoveries there still surprise archaeologists.

In the late 1890s, gold miners dynamited the Sterkfontein caves in search of limestone which they converted into the quick lime which they used to process gold. Their explosions opened entrances to many caves.

Fossils discovered at the caves date back more than 4-million years and it is thought that it is in this area that human life began.

2. Discuss the fossils and the importance of fossils sites, like the Sterkfontein Caves with your learners. Explain that:
 - a. Fossils tell us a lot about life long ago.
 - b. They help us understand how plants and animals have changed over time.
 - c. They give clues about what the environment and climate was like many years ago.
 - d. They help us understand rock layers.
3. Ask learners if they have any questions.
4. Write the model answer on the chalkboard:

WHY ARE FOSSILS IMPORTANT?

5. Give learners some time to complete this task in their workbooks. Discuss answers with the learners. Their answers should include the points in your explanation.

TOPIC: Fossils

Checkpoint 2

Ask the learners the following questions to check their understanding at this point:

- a. What do we call people who study fossils?
- b. Why did miners, in the 1800s, blast at the Sterkfontein caves?

Answers to the checkpoint questions are as follows:

- a. Palaeontologist.
- b. They needed the limestone to process gold.

6. Ask the learners if they have any questions and provide answers and explanations.

F REFERENCE POINTS FOR FURTHER DEVELOPMENT

If you need additional information or activities on this topic, you can find these in your textbook on the following pages:

NAME OF TEXTBOOK	TOPIC	PAGE NUMBER
Study & Master	Fossils	n/a
Viva	Fossils	n/a
Platinum	Fossils	201-202
Solutions for All	Fossils	239
Day-by-Day	Fossils	170
Oxford	Fossils	
Spot On	Fossils	91
Top Class	Fossils	137
Sasol Inzalo Bk B	Fossils	165

G ADDITIONAL ACTIVITIES / READING

In addition, further reading, listening or viewing activities related to this sub-topic are available through the following web links:

1. <http://peter-mulroy.squarespace.com/why-are-fossils-important/> [The importance of fossils]

8 A

Term 4, Week 8, Lesson A

Lesson Title: Importance of South African fossils

Time for lesson: 1 hour

A POLICY AND OUTCOMES

Sub-Topic	South African fossils
CAPS Page Number	45

Lesson Objectives

By the end of the lesson, learners will be able to:

- locate important fossil areas in South Africa
- describe the types of fossils found in these areas

Specific Aims	1. DOING SCIENCE & TECHNOLOGY	
	2. KNOWING THE SUBJECT CONTENT & MAKING CONNECTIONS	✓
	3. UNDERSTANDING THE USES OF SCIENCES & INDIGENOUS KNOWLEDGE	✓

SCIENCE PROCESS SKILLS

1. Accessing & recalling Information	✓	7. Raising Questions	✓	13. Interpreting Information	✓
2. Observing	✓	8. Predicting		14. Designing	
3. Comparing		9. Hypothesizing		15. Making/ constructing	
4. Measuring		10. Planning Investigations		16. Evaluating and improving products	
5. Sorting & Classifying		11. Doing Investigations		17. Communicating	✓
6. Identifying problems & issues		12. Recording Information			

TOPIC: Fossils

B POSSIBLE RESOURCES

For this lesson, you will need:

IDEAL RESOURCES	IMPROVISED RESOURCES
Resource 38: 'A Coelacanth'	
Resource 39: 'A skeleton of a Brontosaurus'	
Resource 34: 'Massospondylus eggs and embryos'	

C CLASSROOM MANAGEMENT

1. Make sure that you are ready and prepared.
2. Write the following question onto the chalkboard before the lesson starts:

In what valley are the Sterkfontein Caves?

3. Learners should enter the classroom and answer the question in their workbooks.
4. Discuss the answer with the learners.
5. Write the model answer onto the chalkboard.

The Cradle of Humankind Valley.

D ACCESSING INFORMATION

1. Write the following table onto the chalkboard (always try to do this before the lesson starts):

THE COELACANTH

1. A coelacanth is a prehistoric fish.
2. It was thought to be extinct but a living fish was discovered in 1938.
3. It is known as a living fossil as it has not changed much over millions of years.
4. Living coelacanths are very rare.

SOUTH AFRICAN DINOSAURS

1. Dinosaurs first appeared on Earth about 225 million years ago.
2. They became extinct about 65 million years ago.
3. Dinosaur fossils have been found in the Eastern Cape and the Karoo.
4. The biggest dinosaur in South Africa was the Brontosaurus.
5. It ate plants.
6. The Brontosaurus was about 12 metres long, had a small head and a long neck.

TOPIC: Fossils

2. Explain this to the learners as follows:
 - a. You pronounce the word 'Coelacanth' like 'see-la-canth'.
 - b. The Coelacanth is known as a living fossil as it was thought to be extinct.
 - c. Fossils of this fish had been found.
 - d. A live Coelacanth was discovered in 1938 in the sea near East London.
 - e. Show the learners Resource 38: 'A Coelacanth'.
 - f. South Africa has many dinosaur fossils, especially in the Karoo.
 - g. Some dinosaurs were herbivores – they only ate plants.
 - h. Show the learners Resource 39: 'A skeleton of a Brontosaurus'.
 - i. This dinosaur was about 12 metres. Stride 12 big steps to show the learners how long 12 metres is.
3. Give learners some time to copy the information from the chalkboard into their workbooks.

Checkpoint 1

Ask the learners the following questions to check their understanding at this point:

- a. Why is the coelacanth known as a 'living fossil'?
- b. Name the biggest dinosaur that lived in South Africa.

Answers to the checkpoint questions are as follows:

- a. The coelacanth was thought to be extinct but they have found rare living specimens.
- b. The brontosaurus was the biggest dinosaur to have lived in South Africa.

E

CONCEPTUAL DEVELOPMENT

1. Remind the learners that they learnt about fossilized dinosaur eggs when they learnt about trace fossils.
2. Read the following to the learners:

Dinosaur Eggs

In 1976, Professor Kitching discovered a clutch of dinosaur eggs and embryos in the Golden Gate Highland National Park in the Free State. The eggs and embryos were sent to Canada where they were 'prepared'. This took four years of careful work.

One day, over 195 million years ago, a mother dinosaur laid a clutch of six eggs. The tiny embryos were starting to **hatch** when a huge sandstorm **smothered** the eggs. Over millions of years, the mountains **eroded** away and the rivers dried up. Eventually the *Massospondylus* became extinct.

The site at the Golden Gate National Park has shown **palaeontologists** how the *Massospondylus* lived.

TOPIC: Fossils

3. Write the following on the chalkboard (try to do this before the lesson starts):

DINOSAUR EGGS

Use the following words to write three sentences about the dinosaur eggs found in the Golden Gate National Park.

dinosaur eggs; embryos; hatch; clutch; sandstorm; Massospondylus; palaeontologist; Canada; Golden Gate National Park; discovered

4. Explain this task to the learners as follows:
- The Massospondylus eggs and embryos can be seen on display at Maropeng, the visitor centre at the Cradle of Humankind.
 - Show the learners Resource 34: 'Massospondylus eggs and embryos'.
 - The fossils had to be taken to Canada where they took four years to prepare the fossils.
 - They had to treat the eggs and embryos very carefully as the bones could break easily.
 - Tell the learners to write three sentences about the dinosaur eggs found in the Golden Gate National Park.
5. Give learners some time to complete this task in their workbooks.
6. Write the model answer on the chalkboard: (This is a POSSIBLE answer)

DINOSAUR EGGS

- Massospondylus egg and embryo fossils were discovered at the Golden Gate National Park.*
- These eggs were found in a clutch.*
- The fossilized eggs were sent to a paleontologist in Canada to be prepared.*

Checkpoint 2

Ask the learners the following questions to check their understanding at this point:

- How do we know that dinosaurs lived in South Africa?
- What is South Africa's most famous living fossil?

Answers to the checkpoint questions are as follows:

- There are many fossils of dinosaur skeletons and footprints found in South Africa.
- The Coelacanth is South Africa's most famous living fossil.

7. Ask the learners if they have any questions and provide answers and explanations.

TOPIC: Fossils

F REFERENCE POINTS FOR FURTHER DEVELOPMENT

If you need additional information or activities on this topic, you can find these in your textbook on the following pages:

NAME OF TEXTBOOK	TOPIC	PAGE NUMBER
Study & Master	Fossils	163-167
Viva	Fossils	199-203
Platinum	Fossils	204-207
Solutions for All	Fossils	241-242
Day-by-Day	Fossils	172-173
Oxford	Fossils	
Spot On	Fossils	96-97
Top Class	Fossils	138-139
Sasol Inzalo Bk B	Fossils	165-172

G ADDITIONAL ACTIVITIES / READING

In addition, further reading, listening or viewing activities related to this sub-topic are available through the following web links:

1. <https://goo.gl/MsdmTK> (1 min) [Oldest dinosaur nursery found in South Africa]
2. <https://goo.gl/zJiy7e> (1.30 mins) [Dinosaurs brought back to life in South Africa]
3. <https://goo.gl/d73pTp> (3 mins) [Finding the Coelacanth]

8 B

Term 4, Week 8, Lesson B

Lesson Title: Importance of South African fossils

Time for lesson: 1½ hours

A POLICY AND OUTCOMES

Sub-Topic	The Cradle of Humankind
CAPS Page Number	45

Lesson Objectives

By the end of the lesson, learners will be able to:

- understand the importance of the Cradle of Humankind
- describe the fossils that have been found there
- describe the different sites in this valley

Specific Aims	1. DOING SCIENCE & TECHNOLOGY	
	2. KNOWING THE SUBJECT CONTENT & MAKING CONNECTIONS	✓
	3. UNDERSTANDING THE USES OF SCIENCES & INDIGENOUS KNOWLEDGE	✓

SCIENCE PROCESS SKILLS

1. Accessing & recalling Information	✓	7. Raising Questions	✓	13. Interpreting Information	✓
2. Observing	✓	8. Predicting		14. Designing	
3. Comparing		9. Hypothesizing		15. Making/ constructing	
4. Measuring		10. Planning Investigations		16. Evaluating and improving products	
5. Sorting & Classifying		11. Doing Investigations		17. Communicating	✓
6. Identifying problems & issues	✓	12. Recording Information			

TOPIC: Fossils

B POSSIBLE RESOURCES

For this lesson, you will need:

IDEAL RESOURCES	IMPROVISED RESOURCES
Resource 37: 'Mrs Ples'	

C CLASSROOM MANAGEMENT

1. Make sure that you are ready and prepared.
2. Write the following question onto the chalkboard before the lesson starts:

What is a 'Coelacanth'?

3. Learners should enter the classroom and answer the question in their workbooks.
4. Discuss the answer with the learners.
5. Write the model answer onto the chalkboard.

It is a fish known as living fossil as it has not changed much over millions of years.

D ACCESSING INFORMATION

1. Write the following table onto the chalkboard (always try to do this before the lesson starts):

THE CRADLE OF HUMANKIND

1. The Cradle of Humankind is found north-west of Johannesburg.
 2. Scientists agree that humankind was born here in Africa 3 million years ago.
 3. Our ancestors are called hominids.
 4. Over 1 000 hominid fossils have been found here.
 5. There are 15 fossil sites at the Cradle.
 6. This is more than anywhere else in the world.
 7. Modern humans emerged about 200 000 years ago in Africa.
 8. The Cradle of Humankind is such an important site it was made a World Heritage Site in 1999.
2. Explain this to the learners as follows:
 - a. The Cradle of Humankind is known for its important finds on fossils, that explain the early forms of humans.
 - b. These hominids lived many millions of years ago.
 - c. More hominid fossils have been found at the Cradle than anywhere else in the world.
 - d. Scientists agree that humankind started here, in Africa.
 3. Give learners some time to copy the information written on the chalkboard into their workbooks.

TOPIC: Fossils

Checkpoint 1

Ask the learners the following questions to check their understanding at this point:

- a. What are our ancestors called?
- b. How many fossil sites are there at the Cradle of Humankind?

Answers to the checkpoint questions are as follows:

- a. They are called 'hominids'.
- b. There are fifteen fossil sites at the Cradle of Humankind.

E

CONCEPTUAL DEVELOPMENT

1. Read the following to the learners:

In 1924, Professor Raymond Dart presented the fossil skull of the 'Taung Child' to the world. The scientific name for this skull is *Australopithecus africanus*. This skull suggested that human origins were in Africa. This shocked the world.

In 1947, Dr Robert Broom found an adult skull belonging to the same species as the Taung Child. This skull carried the nickname 'Mrs Ples'. This 2,1 million-year old fossil gave evidence that there was a link between human and apes, and that humans roots are in Africa.

Most of the hominid fossils found in the caves at the Cradle of Humankind were the remains of hominids that were attacked by large predators.

2. Show the learners Resource 37: 'Mrs Ples'.
3. Write the following questions on the chalkboard:

THE CRADLE OF HUMANKIND

1. Name the two fossil skulls that were found in 1924 and 1947 at the Cradle of Humankind.
2. Are these two fossils body, or trace fossils?
3. What is the scientific name given to these skulls?
4. These skulls suggested that human origins were on which continent?

4. Explain the task to the learners as follows:
 - a. From the information of the chalkboard, answer the questions.
 - b. Write full sentences.
 - c. Read the questions carefully before you answer them.
5. Write the model answers on the chalkboard:

TOPIC: Fossils

THE CRADLE OF HUMANKIND

1. The two fossils skulls are named the Taung Child and Mrs Ples.
2. These two fossils are body fossils.
3. The scientific name of these skulls is *Australopithicus africanus*.
4. They suggested that human origins were in Africa.

6. Give learners some time to complete this task in their workbooks.

Checkpoint 2

Ask the learners the following questions to check their understanding at this point:

- a. What are our ancestors known as?
- b. Why did the Cradle of Humankind become a World Heritage Site?

Answers to the checkpoint questions are as follows:

- a. Hominids.
- b. Over 1000 hominid fossils have been found at the Cradle of Humankind which is important for the scientific world.

7. Ask the learners if they have any questions and provide answers and explanations.

F REFERENCE POINTS FOR FURTHER DEVELOPMENT

If you need additional information or activities on this topic, you can find these in your textbook on the following pages:

NAME OF TEXTBOOK	TOPIC	PAGE NUMBER
Study & Master	Fossils	168-169
Viva	Fossils	204-207
Platinum	Fossils	208-209
Solutions for All	Fossils	243-246
Day-by-Day	Fossils	174
Oxford	Fossils	
Spot On	Fossils	96
Top Class	Fossils	140
Sasol Inzalo Bk B	Fossils	169-173

G ADDITIONAL ACTIVITIES / READING

In addition, further reading, listening or viewing activities related to this sub-topic are available through the following web links:

1. <https://goo.gl/mQeQ7d> [How Africa became the Cradle of Humankind]

8 C

Term 4, Week 8, Lesson C

Lesson Title: Importance of South African fossils

Time for lesson: 1½ hours

A POLICY AND OUTCOMES

Sub-Topic	Fossils of humankind
CAPS Page Number	45

Lesson Objectives

By the end of the lesson, learners will be able to:

- name the more important fossil finds at the Cradle of Humankind
- explain that these hominid fossils are our ancestors

Specific Aims	1. DOING SCIENCE & TECHNOLOGY	
	2. KNOWING THE SUBJECT CONTENT & MAKING CONNECTIONS	✓
	3. UNDERSTANDING THE USES OF SCIENCES & INDIGENOUS KNOWLEDGE	✓

SCIENCE PROCESS SKILLS

1. Accessing & recalling Information	✓	7. Raising Questions	✓	13. Interpreting Information	✓
2. Observing	✓	8. Predicting		14. Designing	
3. Comparing		9. Hypothesizing		15. Making/ constructing	
4. Measuring		10. Planning Investigations		16. Evaluating and improving products	
5. Sorting & Classifying		11. Doing Investigations		17. Communicating	✓
6. Identifying problems & issues	✓	12. Recording Information			

TOPIC: Fossils

B POSSIBLE RESOURCES

For this lesson, you will need:

IDEAL RESOURCES	IMPROVISED RESOURCES
Resource 37: 'Mrs Ples'	
Resource 40: 'Homo naledi's skeleton of a hand'	

C CLASSROOM MANAGEMENT

1. Make sure that you are ready and prepared.
2. Write the following question onto the chalkboard before the lesson starts:

Why was the Cradle of Humankind made a World Heritage Site in 1999?

3. Learners should enter the classroom and answer the question in their workbooks.
4. Discuss the answer with the learners.
5. Write the model answer onto the chalkboard.

It is an important site as over 1000 hominid fossils have been found here, more than anywhere else in the world.

D ACCESSING INFORMATION

1. Write the following table onto the chalkboard (always try to do this before the lesson starts):

THE EARLIEST HUMANS

1. Fossil evidence shows that the earliest humans lived in Africa.
2. Australopithecus is one of our ancestors.
3. Mrs Ples, a 2,1 million-year old fossil, was discovered in 1947 by Robert Broom at Sterkfontein.
4. The skull shows both human and ape-like features.
5. Scientists believe that Mrs Ples could walk upright but could also jump from tree to tree.
6. A study of the teeth shows that they did not eat much meat.
7. Little Foot, which is more than 3 million-years old, is an early hominid skeleton found at Sterkfontein in the mid-1990s.
8. Nearby, in the Rising Star Cave, fifteen fossil skeletons were discovered.

TOPIC: Fossils

2. Explain this to the learners as follows:
 - a. Both Mrs Ples and Little Foot were discovered at Sterkfontein.
 - b. Little Foot is an almost complete skeleton more than 3 million years old.
 - c. Mrs Ples is 2,1 million years old.
 - d. They both belong to a species called Australopithecus.
 - e. They tell us much about the hominids that came before modern humans.
 - f. There are probably many more fossils waiting to be discovered.
3. Give learners some time to copy the information written on the chalkboard into their workbooks.

Checkpoint 1

Ask the learners the following questions to check their understanding at this point:

- a. Where were Mrs Ples and Little Foot discovered?
- b. How do scientists think Mrs Ples moved?

Answers to the checkpoint questions are as follows:

- a. Mrs Ples and Little Foot were discovered at Sterkfontein.
- b. Mrs Ples walked upright but she also jumped from tree to tree.

E

CONCEPTUAL DEVELOPMENT

1. Write the following onto the chalkboard.
 - a. Sediba is the name given to a well-preserved skull of a young boy.
 - b. He lived nearly 2 million years ago.
 - c. He was found with the skeleton of an adult female in her 20s or 30s.
 - d. They could have been mother and child.
 - e. Scientists think that they were looking for water and fell into a cave and died together.
 - f. The bones were found by Matthew Burger, son of Professor Burger, of Wits University.
 - g. They lived between 1,95 and 1,78 million years ago.
 - h. Sediba has long arms, and short, strong hands.
 - i. He also had long legs.
 - j. The size of his brain was about 1/3 the size of a human brain.
2. Read through the information on the chalkboard with the learners.
3. Ask them if there is anything they do not understand. Explain anything that needs explanation.
4. Without erasing the above information, write the following on the board too:

TOPIC: Fossils

SEDIBA

long; Sediba; hands; 1,95 million; water; 1,78 million; died; legs; brain

_____ is the name given to the fossil of a young boy. The fossil is between _____ and _____ years old. Scientists think that the mother and son were looking for _____, fell into a cave and _____ together.

Sediba has _____ arms and strong _____. He had long _____. The size of his _____ was about 1/3 the size of a human brain.

5. Explain this task to the learners as follows:
 - a. Write the heading in your workbook.
 - b. Complete the paragraph by filling in the correct words from the given list.
 - c. Underline the words you fill in.
6. Give learners some time to complete this task in their workbooks.
7. Write the model answer on the chalkboard:

SEDIBA

Sediba is the name given to the fossil of a young boy. The fossil is between 1,95 million and 1,78 million years old. Scientists think that the mother and son were looking for water, fell into a cave and died together.

Sediba has long arms and strong hands. He had long legs. The size of his brain was about 1/3 the size of a human brain.

Checkpoint 2

Ask the learners the following questions to check their understanding at this point:

- a. What is the name given to the fossil of a young boy who died with his mother?
- b. Were his arms long or short?

Answers to the checkpoint questions are as follows:

- a. Sediba.
- b. He had long arms.

8. Ask the learners if they have any questions and provide answers and explanations.

TOPIC: Fossils

F REFERENCE POINTS FOR FURTHER DEVELOPMENT

If you need additional information or activities on this topic, you can find these in your textbook on the following pages:

NAME OF TEXTBOOK	TOPIC	PAGE NUMBER
Study & Master	Fossils	168-169
Viva	Fossils	204-207
Platinum	Fossils	208-209
Solutions for All	Fossils	243-246
Day-by-Day	Fossils	174
Oxford	Fossils	
Spot On	Fossils	96
Top Class	Fossils	140
Sasol Inzalo Bk B	Fossils	169-173

G ADDITIONAL ACTIVITIES / READING

In addition, further reading, listening or viewing activities related to this sub-topic are available through the following web links:

1. <http://news.nationalgeographic.com/2015/09/150910-human-evolution-change/> [This Face Changes the Human Story. But How?]
2. <https://goo.gl/yCEfGA> (1 min) [Skull of Australopithecus Sediba: our new human ancestor?]

NATURAL SCIENCES & TECHNOLOGY

ASSESSMENT
GRADE 5 TERM 4



GRADE 5 ASSESSMENT

- This section presents the CAPS assessment requirements for this grade for this term.
- See your prescribed textbooks for examples of the required assessments.

CAPS Assessment

Assessment is a continuous planned process that involves identifying, gathering, interpreting and diagnosing information about the performance of learners.

Assessment involves generating and collecting evidence of learner achievement and progress, and using this information to understand and provide assistance to the learner during the process of teaching and learning.

Assessment should be both *formal* and *informal*:

- Informal Assessment** involves regular checking of learners' class work and practical tasks; asking questions; discussions; informal classroom interactions; and giving constructive feedback. Informal assessment marks do not need to be recorded, but the teacher can make notes for future reference.
- Formal Assessment** provides teachers with a systematic way of evaluating how well learners are progressing. Formal Assessment consists of selected assessment tasks. These tasks are stipulated by CAPS and the marks need to be recorded. These tasks are done throughout the year, and include practical tasks, tests and examinations.

- Tests and Examinations**

Examinations must include questions on both Natural Sciences and Technology. The weighting of the marks should reflect the time allocated to each section in the curriculum content. Tests and exams should consist of a range of questions that cover different cognitive levels: recall; understanding; application; evaluation; analysis; and synthesis. CAPS aligned tests and examinations, with accompanying memoranda, are provided with these lesson plans.

- Practical Tasks**

Practical tasks give learners the opportunity to demonstrate knowledge, skills and understanding. Practical tasks form part of the activities included in these lesson plans. Each term, one practical task has been selected for assessment. A rubric is provided to conduct the assessment.

A minimum mark allocation is prescribed in CAPS for tests, practical tasks and examinations for each grade. For this grade, these are summarised in the table below:

GRADE 5 ASSESSMENT

Grade 5						
Programme of Formal Assessment						
Formal Assessments	TERM 1	TERM 2	TERM 3	TERM 4	TOTAL MARKS FOR THE YEAR	TOTAL
School-based assessments	1 test [15 marks] 1 selected practical task [15 marks]	1 exam or test on work from terms 1 & 2 [45 marks] 1 selected practical task [15 marks]	1 test [15 marks] 1 selected practical task [15 marks]	1 selected practical task [15 marks]	135 marks	Together make up 75% of the total marks of the year
Exams [60 minutes]				Exam on work from terms 3 & 4 [45 marks]	45 marks	Makes up 25% of the total marks of the year
Number of formal assessments	2	2	2	2	Total 8 assessments [180 marks]	Total: 100%

Refer to CAPS on the processes for converting marks to percentages and to the 7-point scale.

In this section of the booklet, you will find your science assessments for this term.

There are two assessments included:

A Practical Activity

The activity completed is drawn from one of the lessons in the lesson plans. The rubric or memorandum attached in this pack will assist you with assessing the task completed by the learners.

An Exam

The exam included will need to be copied onto the chalkboard for learners to complete. There is also an exam memorandum included to assist you with marking the learners completed test scripts.

All of the assessments are aligned to CAPS requirements and the marks allocated for each assessment are as stipulated in CAPS.

Natural Sciences & Technology

Grade 5

Practical Task

Term 4

15 marks

Time allocation: 40 minutes (15 minutes preparation, 25 minutes task time)

NOTE TO THE TEACHER:

1. This practical activity will be completed after lesson 3A section E.
2. This practical will take place during the lesson after the teaching component in Section E, "Conceptual development".
3. The first 15 minutes will be used to teach section E and prepare learners for the practical task.
4. The next 25 minutes will be used to complete the practical activity as outlined.
5. The instructions and content of the practical task should be written on the chalkboard for the learners.
6. The memo for assessing the practical task is provided.
7. The learners will be working in groups and will need the following items for each group to complete the task:
 - three samples of different types of soil (different colours and textures)
 - water
 - three glasses/ jars
 - a funnel
 - cotton wool
8. Ensure that all the materials have been collected before the practical lesson. This may take a few days. Allow enough time for this.
9. The learners should complete the drawings with a sharp pencil and the written answers should be completed in pen.

GRADE 5 ASSESSMENT – PRACTICAL TASK TERM 4 MEMO

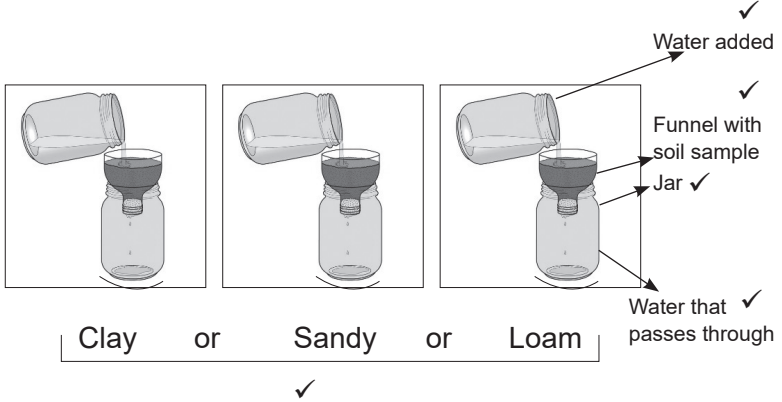
GRADE 5 NATURAL SCIENCES & TECHNOLOGY TERM 4

PRACTICAL TASK MEMORANDUM

(see Section E of Lesson 3A for instructions and questions)

CAPS Topic	Question number	Expected answer/outcome	Marks																												
Soil types	1	<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th></th> <th>Sample A</th> <th>Sample B</th> <th>Sample C</th> <th></th> </tr> </thead> <tbody> <tr> <td>Size of soil grains</td> <td></td> <td></td> <td></td> <td style="text-align: center;">✓</td> </tr> <tr> <td>Colour/ texture of soil</td> <td></td> <td></td> <td></td> <td style="text-align: center;">✓</td> </tr> <tr> <td>How much water can the soil hold?</td> <td></td> <td></td> <td></td> <td style="text-align: center;">✓</td> </tr> </tbody> </table> <p>This table will depend on the samples found. Each row must be filled in for the mark.</p> <p>For example:</p> <table border="1" style="width: 50%; border-collapse: collapse;"> <thead> <tr> <th></th> <th>Sample A</th> </tr> </thead> <tbody> <tr> <td>Size of soil grains</td> <td>large</td> </tr> <tr> <td>Colour/ texture of soil</td> <td>Grey, grainy, rough</td> </tr> <tr> <td>How much water can the soil hold?</td> <td>Very little</td> </tr> </tbody> </table>		Sample A	Sample B	Sample C		Size of soil grains				✓	Colour/ texture of soil				✓	How much water can the soil hold?				✓		Sample A	Size of soil grains	large	Colour/ texture of soil	Grey, grainy, rough	How much water can the soil hold?	Very little	3
	Sample A	Sample B	Sample C																												
Size of soil grains				✓																											
Colour/ texture of soil				✓																											
How much water can the soil hold?				✓																											
	Sample A																														
Size of soil grains	large																														
Colour/ texture of soil	Grey, grainy, rough																														
How much water can the soil hold?	Very little																														
Soil types	2.	Sand ✓ loam ✓ clay ✓	3																												
Soil types	3.1	If any of the samples have moderate water retention then the learner must answer yes. ✓	1																												
	3.2	Specify which sample (if none then learner must say none) ✓	1																												

GRADE 5 ASSESSMENT – PRACTICAL TASK TERM 4 MEMO

CAPS Topic	Question number	Expected answer/outcome	Marks
	4.	<p>Diagram showing soil investigation completed</p>  <p style="text-align: center;">Clay or Sandy or Loam</p> <p>Depending on the samples the learners have the amounts of “water that passes through” will be different.</p> <p>4 marks- labels 1 mark- heading</p>	5
	5.	<p>Particles, the spaces between and texture all influence water retention. ✓</p> <p>Sandy soil:</p> <ul style="list-style-type: none"> • large sand grains • loosely packed <p>Clay:</p> <ul style="list-style-type: none"> • small sand grains • not loose • wet <p>Loam:</p> <ul style="list-style-type: none"> • medium sized grains • very loose <p style="text-align: right;">} Comparison ✓ using these facts</p>	2
			TOTAL 15

**GRADE 5
NATURAL SCIENCES & TECHNOLOGY
TERM 4
EXAM**

**45 marks
60 minutes**

NOTE TO THE TEACHER:

If possible, photocopy this exam for each learner. If this is not possible, write the exam on the chalkboard.

INSTRUCTIONS TO THE LEARNERS

1. Answer all questions in blue or black ink.
2. Read each question carefully before answering it.
3. Pay attention to the mark allocations.
4. Plan your time carefully.
5. Write your answers in the spaces provided.
6. Write neatly.

PRACTICE QUESTION

Read the question and circle the letter that shows the correct answer.

- 1.1. Which of the following is not an example of a fuel?
- a. gas
 - b. a match
 - c. wood
 - d. coal

You have answered correctly if you have circled (B)

GRADE 5 ASSESSMENT – EXAM TERM 4

SECTION A:

QUESTION 1: MULTIPLE CHOICE

[5]

Read each question and circle the letter that shows the correct answer.

1.1. For fuels to keep burning it needs _____ and _____.

- a. Heat and oxygen
- b. Fuel and fire
- c. Carbon dioxide and oxygen
- d. Oxygen and fuel

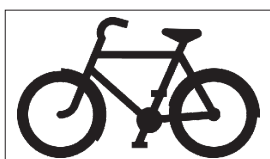
1.2. Stored energy in cells and batteries ...

- a. are always the same
- b. can be changed into potential energy
- c. can be changed into electrical energy
- d. cannot be changed

1.3. To load energy into a compressed spring you must ...

- a. Stretch it
- b. Leave it as is
- c. Compress it
- d. Pull it

1.4. Which of the following does not have wheels and an axle?



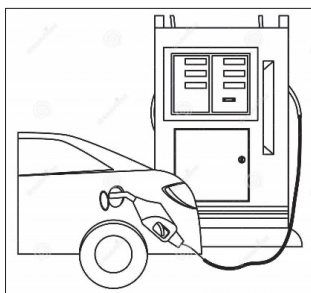
GRADE 5 ASSESSMENT – EXAM TERM 4

QUESTION 2

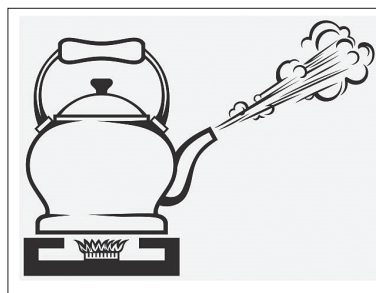
[2]

Refer to the pictures below.

2. What are the fuels below being used for?



2.1 _____



2.2 _____

QUESTION 3

[6]

3.1. Where does an animal, like a dog for example, get energy from?

(1)

3.2. What is a fuel?

(1)

3.3. "I burned my page by mistake" said Sarah.

What two forms of energy can Sarah see when this happens?

(2)

3.4. Explain the difference between input and output energy.

(2)

GRADE 5 ASSESSMENT – EXAM TERM 4

QUESTION 4

[10]

Study the picture below and answer the questions that follow.



4.1.1. Why is this situation considered a possible fire hazard? (1)

4.1.2. How can we prevent a fire from breaking out? (1)

4.2. List parts of a main electricity system from source to where it is needed. (4)

4.3. Name TWO disadvantages of fuel-burning power stations. (2)

4.4. Give TWO examples of how stored energy in an elastic band or spring can be used. (2)

SECTION A: 22

GRADE 5 ASSESSMENT – EXAM TERM 4

SECTION B:

QUESTION 1: MULTIPLE CHOICE

[5]

Read each question and circle the letter that shows the correct answer.

1.1. Which of the following term is used to describe Earth's journey around the Sun?

- a. Eclipse
- b. Rotate
- c. Revolve
- d. Orbit

1.2. What occurrence takes place when the Earth spins on its own axis?

- a. Lunar eclipse
- b. Solar eclipse
- c. Different seasons
- d. Day and night

1.3. Which one of the following is not an example of a sedimentary rock.

- a. Limestone
- b. Sandstone
- c. Granite
- d. Shale

1.4. One of the most famous fossils found at the Cradle of Humankind is ...

- a. Little foot
- b. Mrs. Ples
- c. Sediba
- d. Naledi

1.5. What is so special about the Coelacanth?

- a. It had 4 leg-like fins.
- b. It was thought to have been extinct.
- c. It is thought to have been closely related to the first land animals.
- d. All of the above.

GRADE 5 ASSESSMENT – EXAM TERM 4

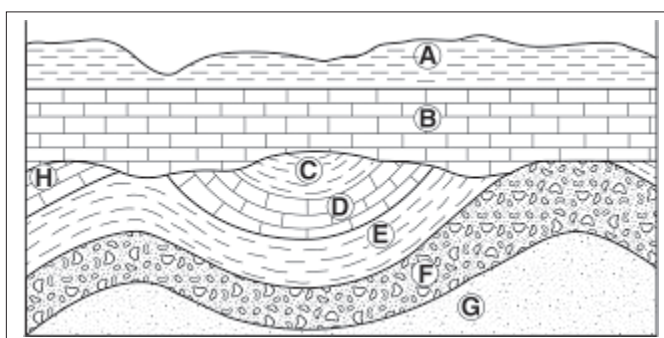
QUESTION 2

[2]

Refer to the picture below.

2.1. Which layer of rock/soil (A – E) is the oldest?

2.2. Which layer of rock/soil (A – E) is the newest?

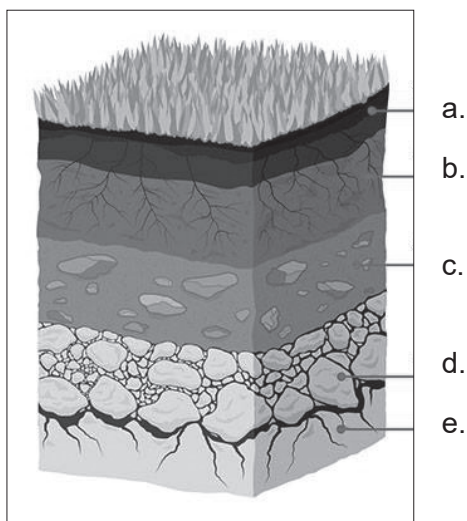


QUESTION 3

[6]

3.1. Provide labels for the soil profile below.

(5)



3.2. What is important about topsoil?

(1)

GRADE 5 ASSESSMENT – EXAM TERM 4

QUESTION 4

[10]

4.1. Explain how fossils are formed (3)

4.2. Describe the difference between body fossils and trace fossils. (2)

4.3. What type of fossil would dinosaur droppings be? (1)

4.4. What sedimentary rock is used to make cement? (1)

4.5. What natural force moves mud and sand? (1)

4.6. Name TWO uses of sandstone in your home. (2)

SECTION B: 23

TOTAL: 45 MARKS

GRADE 5 ASSESSMENT – EXAM TERM 4 MEMO

Grade 5 Natural Sciences & Technology Term 4

Exam Memorandum

CAPS Topic	Questions	Expected answer(s)	Marks
SECTION A (22 Marks)			
Stored energy in fuels	1.1.	A ✓	1
Cells and batteries	1.2.	C ✓	1
Stored energy	1.3.	C ✓	1
Wheels and axles	1.4.	C ✓	1
	2		
Fuels	2.1.	petrol (fuel) used to make a car move ✓	1
	2.2.	gas (fuel) in stove used to boil water ✓	1
	3		
Stored energy in fuels	3.1.	The food it eats. ✓	1
Stored energy in fuels	3.2.	A substance that can be eaten or burned to produce ✓ energy.	1
Burning fuels	3.3.	Light energy ✓ and heat energy can be witnessed. ✓	2
Fuels	3.4.	Input energy is the energy we need to 'put in' to start a fuel burning. ✓ Output energy is the energy (like heat and light) that is produced when a fuel burns. ✓	2
	4		
Safety with electricity	4.1.1.	Metal conducts electricity so the fork will conduct electricity from the toaster to the man who will get electrocuted. ✓	1
Safety with electricity	4.1.2.	Unplug the toaster before the fork conducts electricity. Use an insulator instead of a conductor. ✓	1
Mains electricity	4.2.	National grid → ✓ power station → ✓ substation/ transmission lines → ✓ your home/ where electricity is needed ✓	4
Mains electricity	4.3.	Burning coal- releases gases → affects peoples' health ✓ Nuclear- no gas or smoke → although it does produce dangerous nuclear waste (must be kept away from people and environment) ✓	2
Stored energy	4.4.	Springs → mattress/ bike/ pogo stick/ rat trap/ jack in the box (any one for one mark) ✓ Elastic → hand-held catapult/ elastic powered aeroplane (one for one mark) ✓	2

GRADE 5 ASSESSMENT – EXAM TERM 4 MEMO

CAPS Topic	Questions	Expected answer(s)	Marks
SECTION B (23 Marks)			
The earth moves	1.1.	D ✓	1
The earth moves	1.2.	D ✓	1
Formation of sedimentary rock	1.3.	C ✓	1
Importance of South African fossils	1.4.	B ✓	1
Importance of South African fossils	1.5.	D ✓	1
	2		
Formation of sedimentary rock	2.1.	G ✓	1
	2.2.	A ✓	1
	3		
Soil comes from rocks	3.1.	A - topsoil ✓ B - subsoil ✓ C - smaller pieces of rock ✓ D - larger pieces of rock ✓ E - solid rock/ bedrock ✓	5
Soil comes from rocks	3.2.	It contains rich, nutrient, organic (decaying) matter which is good for plants to grow healthily. ✓	1
	4		
Fossils in rock	4.1.	Fossils form when an animal dies and sediments settle on it in layers. ✓ When living things get trapped ✓ in these layers and become compressed they become preserved in the rock as fossils. ✓	3
Body and trace fossils	4.2.	Body fossils- actual preserved part of the body ✓ Trace fossils- preserved signs of animals ✓	2
Body and trace fossils	4.3.	Trace fossils ✓	1
Uses of sedimentary rock	4.4.	Limestone ✓	1
Formation of sedimentary rock	4.5.	wind ✓	1
Uses of sedimentary rock	4.6.	Sandstone blocks for building; ✓ and sandstone tiles ✓	2
TOTAL: 45 MARKS			