Interesting Science fact #1

'Sphenopalatine ganglioneuralgia' is the scientific term for brain freeze.

NATURAL SCIENCES & TECHNOLOGY

LESSON PLAN
GRADE 4 TERM 2

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.

The NECT has successfully brought together groups of people interested in education to work together 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 scale-up process. NECT has already begun this scale-up process in its Universalisation Programme and in its Provincialisation Programme.

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

CONTENTS

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 1 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':

- 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.

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

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***

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

Grade 4							
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**	**Structures**	**Energy and Change**	**Systems and Control**	**Planet Earth and Beyond**	**Systems and Control**
Living and non-living things Structures of plants and animals What plants need to grow Habitats of animals	Structures for animal shelters	Materials around us Solid materials	Strengthening materials Strong frame structures	Energy and Energy transfer Energy around us Energy and sound	Movement energy in a system	Planet Earth The Sun The Earth & the Sun The Moon	Rocket Systems
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

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).

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.

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

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

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 checkpoint 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)		
22.	Were the checkpoint questions used effectively?		
23.	At the end of the lesson, were the learners asked if they had questions or if they needed any explanations?		
24.	Overall reflection on this part of the lesson: What was done well? What could have been done better?		

TOPIC OVERVIEW:
Materials around us
Term 2, Weeks 1A – 3B

A. TOPIC OVERVIEW

Term 2, Weeks 1a – 3b

- This topic runs for 2½ weeks.
- It is presented over 8 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	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 1 & 3	GRADE 4	GRADE 5
LOOKING BACK	**CURRENT**	**LOOKING FORWARD**
• Products and processes • The Earth • What we get from the Earth	• Solids, liquids and gases make up all the materials around us • Some properties of solids, liquids and gases • Solids keep their shape • Liquids flow and take the shape of their container • Gases, such as air, tend to spread out, have no definite shape but can be contained • Heating and cooling (removing heat) causes solids, liquids and gases to change state. • The water cycle • Water evaporates, condenses, freezes and melts in the water cycle	• Properties of metals • Metals are used to make things because they have certain properties • Properties of non-metals • Non-metals are used to make things because they have certain properties • Combining materials • Materials can be processed to make new materials/ products

C. SCIENTIFIC AND TECHNOLOGICAL VOCABULARY

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

	TERM	EXPLANATION
1.	matter	What everything around us is made up of
2.	solid	Hard or firm with a fixed shape; not hollow
3.	liquid	A substance that flows and takes the shape of the container it is in
4.	gas	Found in the air around us and cannot be seen
5.	molecule	A very small part of matter
6.	microscope	An instrument with lenses to let us see something that is too small to see normally
7.	flow	To move along in a stream
8.	properties	Characteristics of something
9.	poisonous	Something that is harmful and destructive
10.	invisible	Something that cannot be seen
11.	compress	To squeeze together, or press into less space
12.	resist	To pushes back against pressure
13.	force	The push or pull on something
14.	melt	Changing from a solid to a liquid through heating
15.	evaporate	To change from a liquid to a gas through heating
16.	condensation	Changing from a gas to a liquid state through cooling
17.	freeze	To change from a liquid to a solid state through cooling
18.	water cycle	A water process on Earth that keeps repeating itself
19.	hail	Raindrops that have frozen as they fall to Earth

D. UNDERSTANDING THE USES / VALUE OF SCIENCE

The value of knowing that everything on earth exists in one of the three states of matter. There is a value to knowing what form each item can be categorised into, from solids to liquids and gases. There is a value knowing how valuable water is to life on Earth, and what form water can take on the Earth.

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 2, Week 1, Lesson A
Lesson Title: Solids, liquids and gases
Time for lesson: 1 hour

A POLICY AND OUTCOMES

Sub-Topic	Materials around us
CAPS Page Number	20

Lesson Objectives

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

- explain what the three states of matter are
- explain how the distance between molecules helps to identify what state a material is in.

Specific Aims	1. DOING SCIENCE + TECHNOLOGY	✓
	2. UNDERSTANDING + CONNECTING IDEAS	✓
	3. SCIENCE, TECHNOLOGY + SOCIETY	✓

SCIENCE PROCESS + DESIGN 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: Solids, liquids and gases	

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 shelter is a dog kennel?

3. Learners should enter the classroom, then discuss the seven life processes with the teacher and then answer the question in their workbooks.
4. Discuss their answers with the learners.
5. Write the model answer onto the chalkboard.

A dog kennel is a shell structure.

D ACCESSING INFORMATION

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

SOLIDS, LIQUIDS AND GASES:

1. Everything on earth is made up of something called matter.
2. Solids, liquids or gases are called the three states of matter.
3. All matter is made up of very little parts called molecules.
4. These molecules are so small, you cannot see them without a microscope.
5. When there are lots of molecules close together, they form a shape.

2. Explain this to the learners as follows:
   a. We need to know that there everything on earth falls into one of three states of matter; a **solid**, a **liquid**, or a **gas**. Using Resource 1, show the learners the examples of solids, liquids and gases.
   b. Ask the learners if they can name two things in the classroom that are solids.
   c. Explain that all things are made up of tiny things called **molecules**. These molecules are so small people must use a **microscope** to see them.
3. Give learners some time to copy the above information from the chalkboard into their workbooks.

Checkpoint 1

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

a. Name the three states of matter.
b. What is all matter made of?

Answers to the checkpoint questions are as follows:

a. Solids, liquids and gases
b. All matter is made of molecules

E CONCEPTUAL DEVELOPMENT

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

MOLECULES:

1. The molecules that make up matter are always moving.
2. When the molecules are very close together they form a solid.
3. When the molecules have slightly more room to move, they form a liquid.
4. When the molecules have lots of space to move around, they are a gas.

2. Read the information on the board to the learners.
   a. Explain that the tiny molecules that matter is made of are continually moving. We cannot see these molecules, and we cannot see their movement.
   b. Tell the learners that in a solid, the molecules are very tightly packed together. There is very little movement. In a liquid, the molecules are slightly further apart and can move over each other. In a gas, the molecules are spaced very far apart, so they can move freely and away from each other.
3. Ask the learners if they have any questions. Provide answers where necessary.
4. After looking at the pictures on Resource 1, tell the learners to copy these questions down into their books and answer them:
   1. Can you identify two solids and two liquids from Resource 1?
   2. Can you describe the closeness of molecules in a gas?
5. Give learners some time to complete this task in their exercise books.

MODEL ANSWER

1. *Any two of each from the Resource.*
2. *The molecules in a gas are spread out.*

Checkpoint 2

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

a. Do molecules move continually?
b. How many states of matter are there?

Answers to the checkpoint questions are as follows:

c. Yes, molecules move continually.
d. There are three states of matter.

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
Solutions for All	States of materials	73
Study & Master	Materials around us	54
Day by Day	The materials around us	51
Platinum	Solids, liquids and gases	56
Viva	Materials around us	50
Spot On	Solids, liquids and gases	32
Oxford Successful	Materials around us	46
Shuter & Shooter	Materials around us	41
Sasol Inzalo Bk A	Materials around us	114-115

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://www.youtube.com/watch?v=wclY8F-UoTE (4min 34sec) [3 States of Matter for Kids]

1 B

Term 2, Week 1, Lesson B
Lesson Title: Solids
Time for lesson: 1 hour

A POLICY AND OUTCOMES

Sub-Topic	Materials around us
CAPS Page Number	20

Lesson Objectives

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

- describe the properties of a solid
- explain the movement and arrangement of molecules in a solid.

Specific Aims	1. DOING SCIENCE + TECHNOLOGY	✓
	2. UNDERSTANDING + CONNECTING IDEAS	✓
	3. SCIENCE, TECHNOLOGY + SOCIETY	✓

SCIENCE PROCESS + DESIGN 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 2: Solids	
Stone, ruler, chair, 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 are molecules arranged in a solid?

3. Learners should enter the classroom, then discuss the seven life processes with the teacher and then answer the question in their workbooks.
4. Discuss their answers with the learners.
5. Write the model answer onto the chalkboard.

The molecules in a solid are packed tightly together.

D ACCESSING INFORMATION

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

SOLIDS:

1. Solids are things that keep their shape.
2. The molecules in solids are so close together they can barely move.
3. The molecules move so little, you cannot see any movement.
4. The solid object can be seen clearly.
5. Solids are normally very firm shapes.

2. Explain this to the learners as follows:
   a. We need to know that solids are able to keep their shape, unless they are subjected to a great force. Using Resource 2, show the learners the examples of everyday things that are solids.
   b. Ask the learners if they can identify two things outside the classroom that are solids.
3. Ask learners to draw a picture of one of the solids from outside the classroom in their books.
4. Give learners some time to copy the above information from the chalkboard into their workbooks.

Checkpoint 1

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

a. If the molecules in a solid are always moving, why can you not see the movement?
b. Can you always see a solid?

Answers to the checkpoint questions are as follows:

a. You cannot see the movement of molecules in a solid because they are packed very tightly.
b. Yes, you can always see a solid.

E CONCEPTUAL DEVELOPMENT

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

SOLIDS

1. When a substance is in a solid state, it can be hard, like a spoon or soft like a balloon.
2. The shape of a solid does not change unless force is used.

2. Read the information on the board to the learners.
   a. Explain that if something is a solid, it can be hard or soft, but it will always keep its shape.
   b. Tell the learners that a solid will only change with the addition of great **force**.
3. Ask the learners if they have any questions. Provide answers where necessary.

   After looking at the pictures on Resource 2, tell the learners to copy this table into their book:

EXERCISE:

Draw the following table into your books and fill in the blank spaces:

	stone	**ruler**	**chair**	**pencil**
Does it feel hard or soft?				
Does it make a sound when you knock on it?				
Does it break easily? Can it break?				
Can you put your finger through it?				
Is your hand dry or wet after handling the object?				
Does it change its shape when you put it in something else?				

Is it a fixed shape or does it remain the same?				

2. Which properties were the same for all the solids?

4. Show the following to the learners: a stone, a ruler, a chair and a pencil. Now tell the learners to complete the exercise.
5. Give learners some time to complete this task in their exercise books.

MODEL ANSWER:

1.

	stone	**ruler**	**chair**	**pencil**
Does it feel hard or soft?	hard	hard	hard	hard
Does it make a sound when you knock on it?	no	yes	yes	no
Does it break easily? Can it break?	no	no	no	no
Can you put your finger through it?	no	no	no	no
Is your hand dry or wet after handling the object?	dry	dry	dry	dry
Does it change its shape when you put it in something else?	no	no	no	no
Is it a fixed shape or does it remain the same?	fixed	fixed	fixed	fixed

2. Which properties were the same for all the solids? (*Answer: Fixed shape, keeps its shape, dry)*

Checkpoint 2

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

a. Is a stone a solid?
b. Can the shape of a solid be changed?

Answers to the checkpoint questions are as follows:

a. Yes, a stone is a solid.
b. Yes, it can be changed, but it takes a great force.

4. 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
Solutions for All	Solids	74
Study & Master	Solids	57
Day by Day	Solids	52
Platinum	Solids	56
Viva	Solids	50
Spot On	Solids	32
Oxford Successful	Solids	46
Shuter & Shooter	Solids	41-42
Sasol Inzalo Bk A	Solids	115-117

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://simple.wikipedia.org/wiki/Solid [Website - Solid]

1 C

Term 2, Week 1, Lesson C
Lesson Title: Liquids
Time for lesson: 1½ hours

A POLICY AND OUTCOMES

Sub-Topic	Materials around us
CAPS Page Number	20

Lesson Objectives

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

- describe the **properties** of a liquid
- explain the arrangement and movement of molecules in a liquid.

Specific Aims	1. DOING SCIENCE + TECHNOLOGY	✓
	2. UNDERSTANDING + CONNECTING IDEAS	✓
	3. SCIENCE, TECHNOLOGY + SOCIETY	

SCIENCE PROCESS + DESIGN 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 3: Liquids	
Water, paraffin, baby oil, fruit juice, Coca Cola, methylated spirits, one litre of milk, five small pieces of cloth, 10 containers for the liquids, five saucers	

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 solid?

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 solid is a firm shape which does not change easily. The molecules which make it are tightly packed together.

D ACCESSING INFORMATION

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

LIQUIDS

1. Liquids are things that can flow.
2. When a liquid is poured into a container, it takes the shape of the container.
3. The molecules in liquids have enough space for them to flow over one another.
4. There are still enough molecules for the liquid to be clearly seen.
5. If you spill a liquid on the floor, it will spread, taking the shape of the floor.

2. Explain this to the learners as follows:
   a. We need to know that liquids **flow** when they are poured. They also take the shape of the container they are in. Using Resource 3, show the learners the examples of everyday liquids.
   b. Show learners the examples of liquids that you have brought to class (water, paraffin, baby oil, fruit juice, Coca Cola, methylated spirits, milk).

c. Ask the learners if they can think of other things that are liquid.

d. Tell the learners that some liquids, like methylated spirits and paraffin, are very dangerous and **poisonous**.

3. Give learners some time to copy the above information from the chalkboard into their workbooks.

Checkpoint 1

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

a. Does water roll, flow or crawl?

b. What does water do in a container?

Answers to the checkpoint questions are as follows:

a. Water flows.

b. Water takes the shape of the container.

E CONCEPTUAL DEVELOPMENT

1. To do this activity, each group will need the following:
   - a container of water
   - a few teaspoons of cooking oil
   - two glasses/cups/tins/jars
   - a flat plate/polystyrene tray
   - a spoon or stick to stir
   - a sheet of newspaper
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 an investigation where they will be exploring the properties of liquids.
4. They will be looking at two liquids in this investigation, water and oil.
5. Divide the learners into groups of six.
6. Write the following onto the chalkboard (always try to do this before the lesson starts):

PRACTICAL TASK

1. This practical task will be done in groups of 6.
2. Each group will be doing tasks to explore the properties of water.
3. Each person in the group must participate in the investigation and complete the answers to the written activities in their workbooks.
4. Each group will need the following materials and equipment to do the investigation:
   - a container of water
   - a few teaspoons of oil
   - two glasses/cups/tins/jars
   - a flat plate/polystyrene tray
   - a spoon/stick to stir
   - a sheet of newspaper

7. Read through the practical task with the learners.
8. Remind the learners that in previous lessons they have investigated the properties of solids.
9. Tell the learners that today they are going to be investigating the properties of liquids and recording their findings for assessment.
10. Have each group collect the equipment they will need for the task.
11. Write the following onto the chalkboard (always try to do this before the lesson starts):

Task 1: Investigating water [7 marks]

Pour a small amount of water into one of the cups/tins/jars.

1.1 Does the water have a colour?

1.2 Smell the water. What does the water smell like?

1.3 Can you put your finger through the surface of the water?

1.4 How does your finger feel after touching the water?

1.5 Can you pour the water easily from one cup to another?

1.6 Does the amount stay the same once you have poured it into the other cup?

1.7 Pour the water from the cup onto the plate. What do you notice the water does?

Now take a strip of newspaper and dip it in the water. Place this strip in a sunny place. We will come back to this at the end of the lesson.

12. Read through task 1 with the learners.
13. Ask them if they have any questions.
14. Tell the learners they have 10 minutes to complete task 1.
15. Supervise the learners whilst they complete the task and answer any questions they may have.
16. After 10 minutes call the learners back to attention.
17. Tell the learners that they are now going to be doing the same investigation with the oil.
18. Tell the learners to pour the from the plate into the garden before starting task 2.
19. They should try and dry the plate with a bit of the newspaper before starting Task 2

20. The following will need to be written on the chalkboard (always try to do this before the lesson starts):

Task 2: Investigating oil [7 marks]

Pour the oil into one of the cups/tins/jars.(It must be empty)

2.1 Does the oil have a colour?

2.2 Smell the oil. What does the oil smell like?

2.3 Can you put your finger through the surface of the oil?

2.4 How does your finger feel after touching the oil?

2.5 Can you pour the oil easily from one cup to another?

2.6 Does the amount stay the same once you have poured it into the other cup?

2.7 Pour the oil from the cup onto the plate. What do you notice the oil does?

Now take a strip of newspaper and dip it in the oil. Place this strip in a sunny place. We will come back to this at the end of the lesson.

21. Read through task 2 with the learners.
22. Ask them if they have any questions.
23. Tell the learners they have 10 minutes to complete task 1.
24. Supervise the learners whilst they complete the task and answer any questions they may have.
25. After 10 minutes call the learners back to attention.
26. Tell the learners that they are now going to complete a third task.
27. The following will need to be written on the chalkboard:

Task 3: Comparing oil and water [6 marks]

Pour the oil into the cup and half fill the cup with water. Give this mixture a stir.

1. What do you notice about the mixture of oil and water?
2. After 1 minute, what do you notice has happened to the mixture now?

Collect your strips of paper from task 1 and 2 from their sunny spot.

3. Which strip of paper is drier; the oil dipped paper or the water dipped paper?
4. What do we call this process of “drying”?
5. Name1 property that you observed where oil and water are the same.
6. Name 1 property that you observed where oil and water differ.

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
Solutions for All	Liquids	74
Study & Master	Liquids	57
Day by Day	Liquids	52
Platinum	Liquids	56
Viva	Liquids	51
Spot On	Liquids	32
Oxford Successful	Liquids	46
Shuter & Shooter	Liquids	42
Sasol Inzalo Bk A	Liquids	117-120

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://simple.wikipedia.org/wiki/Liquid [Website - Liquid]

2 A

Term 2, Week 2, Lesson A
Lesson Title: Gases
Time for lesson: 1 hour

A POLICY AND OUTCOMES

Sub-Topic	Materials around us
CAPS Page Number	20

Lesson Objectives

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

- describe the properties of a gas
- explain the movement and arrangement of molecules in a gas.

Specific Aims	1. DOING SCIENCE + TECHNOLOGY	✓
	2. UNDERSTANDING + CONNECTING IDEAS	✓
	3. SCIENCE, TECHNOLOGY + SOCIETY	

SCIENCE PROCESS + DESIGN 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 4: Gases	

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 happens when water is poured into a container?

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.

> *When water is poured into a container, it takes the shape of the container.*

D ACCESSING INFORMATION

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

> GASES
>
> 1. There are so few molecules in gas that they are invisible to us.
> 2. Even though they are **invisible**, we know they are there.
> 3. A gas will not stay in an open container, but will spread outwards.
> 4. Gases or air can be **compressed** to take up less space.
> 5. Gas **resists** being compressed, so it needs great force to keep it there.

2. Explain this to the learners as follows:
   a. We need to know that gases are invisible to people. Their molecules are so far apart that we cannot see them. Using Resource 4, show the learners the examples of everyday gases.
   b. Ask the learners if they can identify one gas that they use daily.
   c. Explain to the learners that the air around them is made up of many gases.
   d. Gas will not stay in an open container, but will spread outwards. Give learners some time to copy the above information from the chalkboard into their workbooks.
3. Give learners some time to copy the above information from the chalkboard into their workbooks.

Checkpoint 1

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

a. Can you store gas in an open container?
b. Why can't you see a gas?

Answers to the checkpoint questions are as follows:

a. No, you cannot store gas in an open container as it will move out of it naturally.
b. You can't see a gas because the molecules are very far apart.

E CONCEPTUAL DEVELOPMENT

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

GASES

1. We can contain gases, like in a balloon or in a bubble.
2. You cannot see, feel or smell some gases.
3. We can only see the containers that hold the gases.
4. Air is made out of different gases.
5. To live people need oxygen and plants use carbon dioxide.

2. Read the instructions on the board to the learners.
   a. Explain that a gas needs be stored in a sealed container, so instead of us seeing gas, we see the containers that store the gas.
   b. Gases cannot be seen, felt or seen. We only know they are there when they take up, or fill a container.
   c. Gas can be compressed, but without force keeping it in a container, it will expand again. Ask the learners if they have any questions. Provide answers where necessary.
3. After looking at the pictures on Resource 4, tell the learners to copy this table into their book:

EXERCISE:

1. Can you name one gas that humans need to survive?
2. Can you name one gas that plants take in and use?
3. Can gases be stored in open containers?

4. Give learners some time to complete this task in their exercise books.

MODEL ANSWER:

1. *Humans need oxygen to survive.*
2. *Plants take in carbon dioxide.*
3. *No, gases cannot be stored in open containers.*

Checkpoint 2

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

a. How are the molecules in a gas arranged?
b. What happens to a gas when you compress it into a container?

Answers to the checkpoint questions are as follows:

a. The molecules in a gas are very spread out.
b. Compressed gas in a container will always try to expand.

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
Solutions for All	Gases	74
Study & Master	Gases	57
Day by Day	Gases	52
Platinum	Gases	56
Viva	Gases	51
Spot On	Gases	32
Oxford Successful	Gases	47
Shuter & Shooter	Gases	42
Sasol Inzalo Bk A	Gases	120-122

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://simple.wikipedia.org/wiki/Gas [Website - Gas]

2 A

Term 2, Week 2, Lesson B
Lesson Title: Changing the state of materials
Time for lesson: 1 hour

A POLICY AND OUTCOMES

Sub-Topic	Materials around us
CAPS Page Number	20

Lesson Objectives

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

- describe the change of state of matter
- explain what is required to make matter change states.

Specific Aims	1. DOING SCIENCE + TECHNOLOGY	✓
	2. UNDERSTANDING + CONNECTING IDEAS	✓
	3. SCIENCE, TECHNOLOGY + SOCIETY	

SCIENCE PROCESS + DESIGN 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 5: Changing the state of materials	

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 the three states of matter?

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.

Solids, liquids and gases

D ACCESSING INFORMATION

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

CHANGING THE STATE OF MATERIALS:

1. Matter or materials exist in different states: solid, liquid or gas.
2. A substance can change from one state to another.
3. A solid can change to a liquid.
4. A liquid can change to a gas.
5. A gas can change to a liquid.
6. And a liquid can change to a solid.

2. Explain this to the learners as follows:
   a. We need to know that matter makes up all things on Earth. It has the ability to change state. Changing state means to change from a solid to a liquid, or a liquid to a gas. Using Resource 5, show the learners the examples of everyday items changing their state.
   b. Explain to the learners that matter can change to and from the different states. A solid can change to a liquid and back to a solid.
3. Give learners some time to copy the above information from the chalkboard into their workbooks.

Checkpoint 1

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

a. What does a solid change to?
b. What does a gas change to?

Answers to the checkpoint questions are as follows:

a. A solid will change to a liquid.
b. A gas will change to a liquid.

E CONCEPTUAL DEVELOPMENT

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

WATER

1. In nature, water can be a liquid, a solid and a gas.
2. As water, it is a liquid.
3. When water is a solid, it is called ice.
4. When water is a gas, it is called water vapour.
5. When water is boiled, the steam we see is the gas turning back to water.

2. Read the instructions on the board to the learners.
   a. Explain to the learners that water is a substance that we need to know more about.
   b. Water is the only natural substance that exists in all three states of matter and so is easily studied.
3. Ask the learners if they have any questions. Provide answers where necessary.

EXERCISE

1. Can you name the three forms water as they exists in as a solid, a liquid and a gas?
2. Can you see water vapour?
3. When steam comes out of a kettle, what state of matter is that?

4. Give learners some time to complete this task in their exercise books.

MODEL ANSWER:

1. *Water is ice as a solid; as a liquid it is water; and a gas as water vapour.*
2. *No, you cannot see water vapour.*
3. *Steam can be seen, so it is a liquid.*

Checkpoint 2

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

a. How does ice change to water?
b. What is water as a gas called?

Answers to the checkpoint questions are as follows:

a. Ice melts to change to water.
b. Water as a gas is called water vapour.

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
Solutions for All	Changes of state	78
Study & Master	Change of state	58-59
Day by Day	Change of state	54
Platinum	Change of state	58
Viva	Change of state	53
Spot On	Change of state	34
Oxford Successful	Change of state	48
Shuter & Shooter	Change of state	44-45
Sasol Inzalo Bk A	Change of state	125-127

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://www.youtube.com/watch?v=tuE1LePDZ4Y (5min 8sec) [Changing water: states of matter]

2 C

Term 2, Week 2, Lesson C
Lesson Title: Heating materials
Time for lesson: 1½ hours

A POLICY AND OUTCOMES

Sub-Topic	Materials around us
CAPS Page Number	20

Lesson Objectives

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

- describe how heating contributes to changing the state of matter
- explain what happens to water in its various forms when exposed to heat.

Specific Aims	1. DOING SCIENCE + TECHNOLOGY	✓
	2. UNDERSTANDING + CONNECTING IDEAS	✓
	3. SCIENCE, TECHNOLOGY + SOCIETY	

SCIENCE PROCESS + DESIGN 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 5: Changing the state of materials	
Ice in a cooler bag, saucers	

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 happens to water when it is heated?

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.

When water is heated, it turns to water vapour.

D ACCESSING INFORMATION

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

HEATING MATERIALS:

1. When materials are heated, they change their state.
2. A solid first changes to a liquid when heated.
3. This process is called **melting**.
4. When heated further the liquid changes to a gas.
5. This process is called **evaporation**.

2. Explain this to the learners as follows:
   a. We need to know that matter makes up all things on Earth. It has the ability to change state. Matter changes state when heat is added. Using Resource 5, show the learners the examples of everyday items changing their state because heat has been added.
   b. Explain to the learners that when a solid is heated it melts.
   c. Explain to the learners that when a liquid is heated is evaporates.
   d. Evaporation happens when water is heated. The water changes to water vapour and moves into the air.

3. Give learners some time to copy the above 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 melting?
b. What is evaporating?

Answers to the checkpoint questions are as follows:

a. When heat is added to a solid, it changes to a liquid.
b. When heat is added to a liquid, it changes to water vapour.

E CONCEPTUAL DEVELOPMENT

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

WATER

1. Ice is the solid form of water.
2. If it is heated, it melts and becomes water again.
3. If water is heated it will evaporate.
4. Water becomes a gas called water vapour.
5. We cannot see water vapour – it is invisible.

2. Read the instructions on the board to the learners.
   a. Explain to the learners that water is a substance that we need to know more about.
   b. Water occurs in a solid form as ice. When heat is added, the ice melts and become water. When the water is heated, some of it evaporates into the air.
   c. Water becomes water vapour when heated.
3. Ask the learners if they have any questions. Provide answers where necessary.

INVESTIGATION

1. Take one block of ice out of the cooler bag.
2. Put it on a saucer.
3. Put the saucer in the sun.
4. Note what happens to the block of ice.
5. Once the block of ice has melted completely, leave the saucer in the sun for 30 minutes.
6. Note what has happened to the water in the saucer.

4. Read the information on the board to the learners.
    a. Explain to the learners that they will need to draw three pictures in their workbooks.
    b. The first is the block of ice in the saucer.
    c. The second picture is when the ice has melted – what do the learners see?
    d. The third picture is what the learners see on the saucer after 30 minutes.
5. Give learners some time to complete this task in their exercise books.

MODEL ANSWER:

The three pictures should be:

1. *A block of ice in the saucer*
2. *Water in the saucer*
3. *There should be less water in the saucer*

Checkpoint 2

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

a. What will happen when a solid is heated?
b. Why do we keep ice in a cooler bag?

Answers to the checkpoint questions are as follows:

a. A solid when heated starts to melt.
b. The air outside is warm. It will melt the ice, but the cooler bag keeps the ice cold.

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
Solutions for All	Changes of state	78-83
Study & Master	Change of state	58-61
Day by Day	Change of state	54-55
Platinum	Change of state	58-59
Viva	Change of state	53-56
Spot On	Change of state	34-35
Oxford Successful	Change of state	48-49
Shuter & Shooter	Change of state	44-47
Sasol Inzalo Bk A	Change of state	128-138

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://www.youtube.com/watch?v=IPKH7Q3nXno (4min 3sec) [Melting 200 aluminum cans]

3 A

Term 2, Week 3, Lesson A
Lesson Title: Cooling materials
Time for lesson: 1 hour

A POLICY AND OUTCOMES

Sub-Topic	Materials around us
CAPS Page Number	20

Lesson Objectives

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

- describe how cooling contributes to changing the state of matter
- explain what happens to water in its various forms when cooled.

Specific Aims	1. DOING SCIENCE + TECHNOLOGY	✓
	2. UNDERSTANDING + CONNECTING IDEAS	✓
	3. SCIENCE, TECHNOLOGY + SOCIETY	

SCIENCE PROCESS + DESIGN 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 5: Changing the state of materials	
Water, ice trays, kettle, mirror	

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 happens to ice when it is heated?

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.

> *Ice melts and becomes water when it is heated.*

D ACCESSING INFORMATION

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

> HEATING MATERIALS:
>
> 1. When materials are cooled, they change their state.
> 2. A gas first changes to a liquid.
> 3. This is called **condensation**.
> 4. When the liquid is cooled further, it changes to a solid.
> 5. This process is called **freezing**.

2. Explain this to the learners as follows:
   a. We need to know that matter makes up all things on Earth. It has the ability to change state. Matter changes state when it is cooled. Using Resource 5, show the learners the examples of everyday items changing their state because they are cooled.
   b. Explain to the learners that when a gas it cooled it condenses and becomes a liquid.
   c. Explain to the learners that when a liquid is cooled it freezes and becomes a solid.
   d. Condensation happens when water vapour is cooled and becomes water.
   e. Freezing happens when water is exposed to extreme cold.

3. Give learners some time to copy the above 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 condensation?
b. What is freezing?

Answers to the checkpoint questions are as follows:

a. Condensation occurs when water vapour is cooled and becomes water.
b. When water is exposed to extreme cold, freezing occurs and the water becomes ice.

E CONCEPTUAL DEVELOPMENT

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

WATER

1. When water vapour cools it condenses into a liquid - water.
2. Rain is formed when water vapour condenses high up in the air.
3. Small drops form and then combine to form large drops.
4. When liquid is frozen, it becomes ice which is a solid.
5. Hail is formed when raindrops freeze.

2. Read the instructions on the board to the learners.
   a. Explain to the learners that water is a substance that we need to know more about.
   b. Water occurs in a gas form as water vapour. When it is cooled, the water vapour condenses and becomes water. When the water is exposed to extreme cold, it freezes into ice – a solid.
3. Ask the learners if they have any questions. Provide answers where necessary.

INVESTIGATION

1. Boil the kettle.
2. Once it has boiled be VERY careful because the air above the kettle is VERY hot.
3. Watch the teacher hold the mirror over the spout of the kettle.
4. Notice the droplets of water forming on the mirror.
5. Pour water from the bottle into the ice tray, to a depth of 5mm.
6. Put the ice tray in the school freezer.
7. Note what happens to the water.
8. Leave the ice tray in the freezer for 30 minutes.
9. Note what has happened to the water in the ice tray.

* if electricity is not available, the teacher should boil water on a fire.

4. Read the information on the board to the learners.
    a. Explain to the learners that they will need to draw three pictures in their workbooks.
    b. The first is the mirror with droplets on it.
    c. The second picture is when the water has been poured into the ice tray – what do the learners see?
    d. The third picture is what the learners see in the ice tray after 30 minutes.
5. Give learners some time to complete this task in their exercise books.

MODEL ANSWER:

The three pictures should be:

1. *A flat surface with water droplets on it*
2. *An ice tray with a low level of water in it*
3. *An ice tray with ice.*

Checkpoint 2

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

a. What will happen when water vapour is cooled?
b. Why do we put water in the freezer?

Answers to the checkpoint questions are as follows:

a. Water vapour turns to liquid when cooled.
b. We put water in the freezer to make ice.

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
Solutions for All	Changes of state	78-83
Study & Master	Change of state	58-61
Day by Day	Change of state	56-57
Platinum	Change of state	60-61
Viva	Change of state	57-58
Spot On	Change of state	34-35
Oxford Successful	Change of state	49-51
Shuter & Shooter	Change of state	44-47
Sasol Inzalo Bk A	Change of state	128-138

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://www.youtube.com/watch?v=r8M7mah_QaY (6min 46sec) [Phases of matter]

3 B

Term 2, Week 3, Lesson B
Lesson Title: The Water Cycle
Time for lesson: 1½ hours

A POLICY AND OUTCOMES

Sub-Topic	Materials around us
CAPS Page Number	20

Lesson Objectives

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

- describe the water cycle
- explain what happens to water on the Earth.

Specific Aims	1. DOING SCIENCE + TECHNOLOGY	✓
	2. UNDERSTANDING + CONNECTING IDEAS	✓
	3. SCIENCE, TECHNOLOGY + SOCIETY	

SCIENCE PROCESS + DESIGN 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 6: The Water Cycle	
Term Poster: The Water Cycle	

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 happens to water when it is frozen?

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.

> *Water becomes ice when it is frozen.*

D ACCESSING INFORMATION

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

> THE WATER CYCLE
>
> 1. Water is very important for life.
> 2. We need water to cook, clean, drink and grow food.
> 3. All the water in the world follows a water cycle.
> 4. In this cycle the water moves from a liquid, to a gas, and back to a liquid.
> 5. Sometimes the water freezes and is stored as ice or rain freezes and forms hail.
> 6. We need to take care of our water as it is a vital resource.

2. Explain this to the learners as follows:
   a. We need to know that there can be no new water added to earth. The water on the Earth is all we have. The same water was present when dinosaurs used to roam the planet.
   b. Using Resource 6, show the learners the pictures of the various states and places water occurs on Earth.
   c. Explain to the learners that we have learnt that water occurs in all three states of matter, and that this cycle shows how one state becomes another in the form of a cycle.

3. Give learners some time to copy the above 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 water cycle?
b. Why do people need water?

Answers to the checkpoint questions are as follows:

a. The water cycle is the path of water on and around Earth.
b. People need water to cook, clean, drink and grow food.

E CONCEPTUAL DEVELOPMENT

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

PROCESS

1. Starting in a lake or sea, the water is in a liquid state.
2. The sun heats the water and some of it evaporates and turns into water vapour – a gas.
3. Water vapour condenses to form rain – a liquid.
4. Rain or hail (frozen rain) falls to earth.
5. The water on the earth flows over the ground in rivers into lakes, rivers or seas.
6. The water cycle starts again.

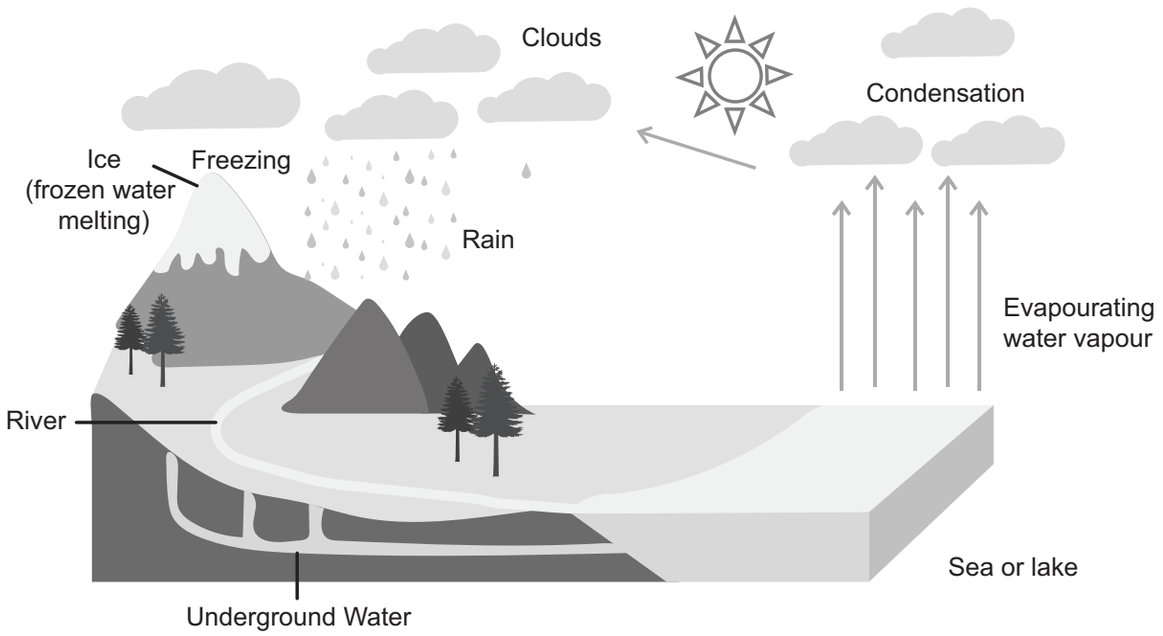
2. Read the instructions on the board to the learners.
   a. Explain to the learners that the process that water undergoes on Earth forms a cycle. This means that it happens over and over and over again.
   b. Using the Term Poster: 'The Water Cycle', show the learners the cycle water follows on and around the earth.
3. Write the following onto the chalkboard (always try to do this before the lesson starts):

TASK:

1. Using the Term Poster: 'The Water Cycle' as a guide, draw the water cycle into your book.
2. Label the four processes you have learnt: evaporation, condensation, freezing, and melting.
3. Use directional arrows to show the cycle.
4. Give your drawing a title.

4. Read the information on the board to the learners.
    a. Explain to the learners that they will need to draw the water cycle in their workbooks.
    b. The learners need to identify and label where in the water cycle the four processes of evaporation, condensation, freezing, and melting occur. They must be labelled correctly.
    c. The learners should add directional arrows to show the direction of the water in the water cycle.
    d. The learners should add a title to their drawing.

MODEL ANSWER:



5. Give learners some time to complete this task in their exercise books.

Checkpoint 2

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

a. When water vapour cools high in the air it forms clouds. What happens next?
b. Where does water flow to on Earth?

Answers to the checkpoint questions are as follows:

a. It rains.
b. Water flows to lakes, rivers and seas on Earth.

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
Solutions for All	The water cycle	84-86
Study & Master	The water cycle	62-63
Day by Day	The water cycle	59-60
Platinum	The water cycle	66-67
Viva	The water cycle	61-62
Spot On	The water cycle	36-37
Oxford Successful	The water cycle	52-53
Shuter & Shooter	The water cycle	48-49
Sasol Inzalo Bk A	The water cycle	140-143

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://www.youtube.com/watch?v=al-do-HGuIk (6min 46sec) [The water cycle]

TOPIC OVERVIEW:
Solid Materials
Term 2, Weeks 3C – 5B

A. TOPIC OVERVIEW

Term 2, Weeks 3c – 5b

- This topic runs for 2 weeks.
- It is presented over 6 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	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 1 & 3	GRADE 4	GRADE 5
LOOKING BACK	**CURRENT**	**LOOKING FORWARD**
• Products and processes • The earth • What we get from the earth • Process from clay to brick • Animals that give us food and or clothes	• Raw and manufactured materials • Examples of some raw materials we use to make other useful materials • Sand is used to make glass • Clay is used to make ceramics • Coal and oil are used to make plastics, paints and fabrics • Wood and fibre from plants are used to make paper • Animal wool and hide are used to make fabrics and leather	• Properties of metals • Metals are used to make things because they have certain properties • Properties of non-metals • Non-metals are used to make things because they have certain properties • Combining materials • Materials can be processed to make new materials/ products

	• Properties of materials • Raw and manufactured materials have specific properties. These properties can include being hard or soft, stiff or flexible, strong or weak, light or heavy, waterproof or absorbent	

C. SCIENTIFIC AND TECHNOLOGICAL VOCABULARY

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

	TERM	EXPLANATION
1.	raw materials	Materials found in nature
2.	manufactured	Something made by humans
3.	processed	To change or treat a raw material so that its properties are changed
4.	properties	The special features of a material that make it suitable to do a certain job
5.	flexible	Able to bend without breaking
6.	mixture	Two or more things mixed together
7.	ceramic	Something that is made from clay
8.	pottery	Pots and bowls that are made from clay
9.	furnace	A type of oven in which materials can be heated to a high temperature
10.	refinery	A place where oil and coal are processed
11.	synthetic	Something that is made in a chemical process
12.	fibres	A small thread-like piece of something
13.	plantation	A large area where trees are grown to be used for their wood
14.	pulp	A soft soggy substance made from whatever is being mixed at the time
15.	hides	The skins of animals
16.	shear	To cut wool off a sheep
17.	fleece	The whole coat of a sheep
18.	slaughtered	(Animals) Killed to provide food

19.	textile mill	A place where wool is processed, and fabrics are made
20.	tannery	A place where animal hides are processed
21.	waterproof	When liquid cannot pass through something
22.	absorbent	Able to soak up liquids
23.	spun	Twisted to make wool into a long thread

D. UNDERSTANDING THE USES / VALUE OF SCIENCE

The value of knowing the difference between raw and manufactured materials and how and why humans use them for specific tasks. It is important to know what properties each material has. This helps us to identify the correct material for each job.

E. PERSONAL REFLECTION

Reflect on your teaching at the end of each topic:

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

3 C

Term 2, Week 3, Lesson C
Lesson Title: Raw and manufactured materials
Time for lesson: 1 hour

A POLICY AND OUTCOMES

Sub-Topic	Solid Materials
CAPS Page Number	21

Lesson Objectives

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

- explain the difference between raw and manufactured materials
- explain why we need to process raw materials.

Specific Aims	1. DOING SCIENCE + TECHNOLOGY	✓
	2. UNDERSTANDING + CONNECTING IDEAS	✓
	3. SCIENCE, TECHNOLOGY + SOCIETY	

SCIENCE PROCESS + DESIGN 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 7: Raw and manufactured materials	

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 water cycle?

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 water cycle describes the continuous flow of water around the Earth.

D ACCESSING INFORMATION

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

RAW AND MANUFACTURED MATERIALS

1. **Raw materials** are materials that come from nature and are in their natural state.
2. An example is: wool from a sheep
3. Often, raw materials are not useful in their raw form.
4. Raw materials are used to create other useful materials.
5. These materials are now called **manufactured** – which means 'made by man'
6. Wool from sheep is made into jerseys and socks.

2. Explain this to the learners as follows:
   a. We need to know that all materials are either raw materials or manufactured materials.
   b. All manufactured materials have been made using raw materials.
   c. Using Resource 7, show the learners the examples of raw materials and manufactured materials.
   d. Ask the learners if they can name two things in the classroom that are manufactured materials. *(Examples: chalkboard, desks, windows, among many others)*
3. Give learners some time to copy the above information from the chalkboard into their workbooks.

Checkpoint 1

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

a. What are raw materials?
b. What is a manufactured material?

Answers to the checkpoint questions are as follows:

a. Raw materials are materials that come from nature and are in their natural state.
b. It is a material that has been made by a person.

E CONCEPTUAL DEVELOPMENT

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

PROCESSING AND PROPERTIES

1. Raw materials need to be **processed** in some way before they can be used.
2. Manufactured materials are not found naturally.
3. People make materials with **properties** that are suitable for a specific job.
4. Plastics are **flexible** and can be moulded into different shapes and sizes.
5. Wood can be shaped into products that can be used.

2. Read the instructions on the board to the learners.
   a. Explain that in order to use raw materials, we need to process them.
   b. All materials have different properties that make them suitable for certain jobs.
3. Ask the learners if they have any questions. Provide answers where necessary.
4. After looking at the pictures on Resource 7, tell the learners to copy these questions down into their book and answer them:

EXERCISE:

1. Which objects are raw materials?
2. Which objects are manufactured materials?
3. What is the difference between a raw material and a manufactured material?

5. Give learners some time to complete this task in their exercise books.

MODEL ANSWER:

1. *Wood, sand coal, oil, wool, hide*
2. *Metal pipes, petrol, window, wool, leather shoes*
3. *A raw material occurs naturally and often needs to be processed for it to be used. A manufactured material is made by humans.*

Checkpoint 2

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

a. What do we need to do to a raw material before we can use it?
b. Do manufactured materials occur in nature?

Answers to the checkpoint questions are as follows:

a. We need to process a raw material before we can use it.
b. No, manufactured materials do not occur in nature.

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
Solutions for All	Raw and manufactured materials	91
Study & Master	Raw and manufactured materials	65
Day by Day	Raw and manufactured materials	63
Platinum	Raw and manufactured materials	70
Viva	Raw and manufactured materials	65
Spot On	Raw and manufactured materials	38
Oxford Successful	Raw and manufactured materials	54
Shuter & Shooter	Raw and manufactured materials	50
Sasol Inzalo Bk A	Raw and manufactured materials	148-153

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://www.youtube.com/watch?v=tGfLhPslEjQ (4min 36sec) [Material World]

4 A

Term 2, Week 4, Lesson A
Lesson Title: Sand and clay
Time for lesson: 1 hour

A POLICY AND OUTCOMES

Sub-Topic	Solid Materials
CAPS Page Number	21

Lesson Objectives

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

- explain how glass and clay are made
- identify the raw materials needed to make glass and ceramics.

Specific Aims	1. DOING SCIENCE + TECHNOLOGY	✓
	2. UNDERSTANDING + CONNECTING IDEAS	✓
	3. SCIENCE, TECHNOLOGY + SOCIETY	

SCIENCE PROCESS + DESIGN 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 8: Sand and Clay	

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 manufactured materials?

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.

> *Manufactured materials are made by humans.*

D ACCESSING INFORMATION

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

> SAND AND CLAY
>
> 1. Some materials are made from different types of soil.
> 2. Sand is a type of soil.
> 3. A **mixture** of sand, limestone and soda ash is used to make glass.
> 4. Clay is another type of soil.
> 5. It is a raw material used to make **ceramic** and **pottery** products.

2. Explain this to the learners as follows:
   a. We need to know that glass is made from a mixture of raw materials. Sand is the main part of the mixture.
   b. Clay is another type of soil. Clay is a raw material, that is used to make things.
   c. Ask the learners if they can name something in the classroom that is glass. *(Answers: windows, beaker, drinking glass)*
3. Give learners some time to copy the above information from the chalkboard into their workbooks.

Checkpoint 1

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

a. Can you list the three materials used to make glass?
b. What raw material is used to make pottery and ceramics?

Answers to the checkpoint questions are as follows:

a. Sand, limestone and soda ash are used to make glass.
b. Clay is used to make pottery and ceramics.

E CONCEPTUAL DEVELOPMENT

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

MAKING GLASS AND CERAMICS

1. The sand, limestone and soda ash mixture is heated until it melts in a large oven, called a **furnace**.
2. The mixture needs to be very hot before it will melt.
3. The mixture melts to form liquid glass.
4. While the mixture is still hot, it can be shaped to form different products.
5. When clay is wet, it can be shaped into specific objects.
6. The clay is then baked in a furnace. It becomes hard and keeps its shape.
7. Clay pots have been used for hundreds of years for cooking and storage in South Africa.

2. Read the instructions on the board to the learners.
   a. Explain that in order to use raw materials, we need to process them.
   b. The process to make glass involves mixing the three ingredients together and then heating them until they melt. Liquid glass is the result.
   c. When it is in this very hot liquid form, it can be shaped to form different products.
   d. When clay is wet, it can be shaped into different objects.
   e. It is then baked in a furnace where it becomes hard.
   f. Clay pots have been used for a long time in South Africa.
3. Ask the learners if they have any questions. Provide answers where necessary.
4. Using Resource 8, show the learners the picture of a furnace. Explain that these ovens reach temperatures far above the ovens in houses.
5. After looking at the first two pictures on Resource 8, tell the learners to copy these questions down into their book and answer them:

EXERCISE:

Look at the pictures on Resource 8.

1. What is the object in the first picture?
2. What is the object made of?
3. How was the object made?
4. What is the object in the second picture?
5. What is the object made of?
6. How was the object made?

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

MODEL ANSWER:

1. *It is a bottle.*
2. *It is made of glass.*
3. *Sand, limestone and soda ash were mixed together and heated to form a liquid. This was then shaped to form a bottle.*
4. *It is a pot.*
5. *It is made of clay.*
6. *Clay is wet so it can make shapes. It is then baked in an oven to become hard.*

Checkpoint 2

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

a. What is the oven called that humans make glass in and bake clay products?
b. Are clay pots new to cooking in South Africa?

Answers to the checkpoint questions are as follows:

a. The oven is called a furnace.
b. No, clay pots have been used for hundreds of years in South Africa.

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
Solutions for All	Sand and clay	93
Study & Master	Sand and clay	72
Day by Day	Sand and clay	63-64
Platinum	Sand and clay	71
Viva	Clay	69
Spot On	Sand and clay	38
Oxford Successful	Sand and clay	54-55
Shuter & Shooter	Sand and clay	51
Sasol Inzalo Bk A	Sand and clay	151

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://www.youtube.com/watch?v=IjNusHQOhTM (6min 37sec) [How glass is made]
2. https://www.youtube.com/watch?v=k8MmEuvugG4 (5min 27sec) [See how to manufacture glass bottles]
3. https://www.youtube.com/watch?v=k73IqxG4i_U (3min 18sec) [How to make a clay pot]

4 B

Term 2, Week 4, Lesson B
Lesson Title: Coal and oil
Time for lesson: 1 hour

A POLICY AND OUTCOMES

Sub-Topic	Solid Materials
CAPS Page Number	21

Lesson Objectives

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

- explain the importance of coal and oil in our lives
- identify the various products we get from coal and oil.

Specific Aims	1. DOING SCIENCE + TECHNOLOGY	
	2. UNDERSTANDING + CONNECTING IDEAS	✓
	3. SCIENCE, TECHNOLOGY + SOCIETY	

SCIENCE PROCESS + DESIGN 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 9: Coal and oil	

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 makes a clay pot keep its 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.

> *Once clay shaped, it is dried.*

D ACCESSING INFORMATION

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

> COAL AND OIL
>
> 1. Coal and oil are used to make plastics, paints and fabrics.
> 2. Coal is a raw material mined from the Earth's surface.
> 3. Coal can also be used in its raw form for heating.
> 4. Coal is a hard, black substance, formed from the remains of trees and plants which grew long ago.
> 5. Oil is a raw material that is pumped out of the Earth's surface.
> 6. Crude oil is a dark liquid. We use oil rigs and wells to get the oil out of the ground.

2. Explain this to the learners as follows:
   a. We need to know that many of the objects we rely on today are made from coal and oil.
   b. Coal is a very important raw material that we use to make electricity.
   c. Coal was formed from the remains of trees and plants which grew a long time ago.
   d. Both coal and oil are taken from the Earth's surface.
   e. Coal is mined and oil is pumped out.Give learners some time to copy the above information from the chalkboard into their workbooks.
3. Give learners some time to copy the above information from the chalkboard into their workbooks.

Checkpoint 1

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

a. Where are coal and oil found?
b. What does crude oil look like?

Answers to the checkpoint questions are as follows:

a. Coal and oil are found in the Earth's surface.
b. Crude oil is a dark liquid.

E CONCEPTUAL DEVELOPMENT

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

PROCESSING COAL AND OIL

1. Coal and oil are processed at a **refinery** to make liquid petroleum, gas, and diesel.
2. The coal and oil are also processed to make different types of **chemicals**.
3. These chemicals are used to make plastics, paints and fabrics.
4. Nylon is a **synthetic** fibre made from coal. This fibre is then used to make clothes.
5. Plastics can be made into any thickness, shape and size.

2. Read the instructions on the board to the learners.
   a. Explain that in order to use coal and oil effectively, we need to process them.
   b. Plastic is made from chemicals produced by coal and oil. It is a very flexible substance. Strong plastics are used to make cars, and thin plastics are used to make shopping bags.Ask the learners if they have any questions. Provide answers where necessary.
3. Ask the learners if they have any questions. Provide answers where necessary.
4. After looking at the pictures on Resource 9, tell the learners to copy these questions down into their book and answer them:

EXERCISE:

1. What colour is coal?
2. What everyday important part of our lives is made by burning coal?
3. Where does coal come from?
4. How was coal formed?
5. What is the structure called that pumps oil from the sea?

5. Give learners some time to complete this task in their exercise books.

MODEL ANSWER:

1. *Coal is black.*
2. *We get electricity from coal.*
3. *Coal comes from the Earth's surface.*
4. *Coal was formed from the remains of trees and plants that grew a long time ago.*
5. *It is called an oil rig.*

Checkpoint 2

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

a. What is nylon made from?
b. What is the factory called that processes coal and oil?

Answers to the checkpoint questions are as follows:

a. Nylon is made from coal.
b. This factory is called a refinery.

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
Solutions for All	Coal and oil	94
Study & Master	Coal	72
Day by Day	Coal and oil	64
Platinum	Coal and oil	71-72
Viva	Coal and oil	70
Spot On	Coal and oil	39
Oxford Successful	Coal and oil	54-55
Shuter & Shooter	Coal and oil	51
Sasol Inzalo Bk A	-	-

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://www.youtube.com/watch?v=ylkdUuNOJzw (5min 43sec) [How they do it – Coal Mining]
2. https://www.youtube.com/watch?v=SfazJ6P_g7w (8min 21sec) [Oil drilling]
3. https://www.youtube.com/watch?v=vfJDie6aU0k (9min 6sec) [Do you know how plastic is made?]

4 C

Term 2, Week 4, Lesson C
Lesson Title: Paper making
Time for lesson: 1½ hours

A POLICY AND OUTCOMES

Sub-Topic	Solid Materials
CAPS Page Number	21

Lesson Objectives

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

- explain how paper is made
- identify the early inventors of paper.

Specific Aims	1. DOING SCIENCE + TECHNOLOGY	✓
	2. UNDERSTANDING + CONNECTING IDEAS	✓
	3. SCIENCE, TECHNOLOGY + SOCIETY	

SCIENCE PROCESS + DESIGN 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 10: Paper making	

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 is coal so important for life in South Africa?

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.

> *Coal is important because we burn it to make electricity.*

D ACCESSING INFORMATION

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

> PAPER MAKING
>
> 1. Wood and plant **fibres** are raw materials, which can be used to make paper.
> 2. About 4000 years ago, the Egyptians used the stems of papyrus reeds to make materials on which people could write.
> 3. Plant stems were hammered together to forms sheets, which were left to dry in the sun, and then polished.
> 4. 2000 years ago, the Chinese used old cotton and linen rags.
> 5. Both methods took up much time and many people to make the final product - paper.

2. Explain this to the learners as follows:
   a. We know that paper is an important invention. The Egyptians made paper to write on from papyrus reeds about 4000 years ago. The Chinese invented a different method using linen and cotton.
   b. Both of these methods were very time-consuming and labour intensive.
   c. Show the learners the picture of Egyptian papyrus on Resource 10.
3. Give learners some time to copy the above information from the chalkboard into their workbooks.

Checkpoint 1

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

a. What raw material was used by the Egyptians to make paper?
b. What raw materials did the Chinese use to make paper?

Answers to the checkpoint questions are as follows:

a. The Egyptians used papyrus reeds.
b. The Chinese used cotton and linen.

E CONCEPTUAL DEVELOPMENT

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

PAPER

1. Just over 200 years ago people invented a process using wood fibres to make paper.
2. Today the trees used to make paper are grown in **plantations**.
3. Trees are cut down and the wood is chopped up into small chips.
4. The wood chips are mixed with water and chemicals that turn the wood into fibres.
5. This mixture is then beaten to make a **pulp**.
6. The pulp is drained and then put between huge rollers which press the fibres together into thin sheets of paper.

2. Read the instructions on the board to the learners.
   a. Explain that the process to make the paper we know and use these days developed about 200 years ago.
   b. Explain that the process starts with the trees being grown in plantations. The trees are cut down and the wood is chopped into small chips. Those chips are then mixed with water and chemicals which break them down into fibres. This mixture is then beaten to make a pulp. The pulp is drained and then put between big rollers which press the fibres together into sheets of paper. These are rolled and stored for future use.
   c. Show the learners the pictures on Resource 10; the examples of the raw material - wood and manufactured material – rolls of paper.
3. Ask the learners if they have any questions. Provide answers where necessary.
4. Write the following onto the chalkboard (always try to do this before the lesson starts):

EXERCISE:

1. Write down in logical order the processes used in making paper.
2. Label the different stages of the process.
3. Give your exercise a title.

5. Give learners some time to complete this task in their exercise books.

MODEL ANSWER:

1. *Paper making process*
   a. *Trees grow in plantations*
   b. *The trees are cut down and chopped into small chips.*
   c. *The chips are mixed with water and chemicals to break them down into fibres.*
   d. *The mixture is then beaten to make a pulp.*
   e. *The pulp is drained and put between rollers which press the fibres together into sheets of paper.*
   f. *These are put into rolls and stored.*
2. *Labels*
   a. *Plantation*
   b. *Wood is chipped*
   c. *Chips are broken down*
   d. *Pulp*
   e. *Pulp is drained*
   f. *Rollers press fibres together*
   g. *Paper is stored on rolls*
3. *The Paper Making Process*

Checkpoint 2

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

a. What do we use these days to make paper?
b. What are the places called from which we get the raw materials to make paper?

Answers to the checkpoint questions are as follows:

a. We use the wood from trees to make paper.
b. The trees grow in plantations.

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
Solutions for All	Raw materials from plants and animals	95
Study & Master	-	-
Day by Day	Wood and fibre from plants are used to make paper	65
Platinum	Wood and fibre from plants are used to make paper	74-75
Viva	The story of paper	68
Spot On	How paper is made	40-41
Oxford Successful	How paper is made	55
Shuter & Shooter	Materials around us	52-53
Sasol Inzalo Bk A	The paper story	154-160

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://www.youtube.com/watch?v=E4C3X26dxbM (13min 21 sec) [The paper making process]
2. https://www.youtube.com/watch?v=DCR8n7qS43w (7min 28sec) [How to make papyrus paper]

5 A

Term 2, Week 5, Lesson A
Lesson Title: Animal wool and hide
Time for lesson: 1 hour

A POLICY AND OUTCOMES

Sub-Topic	Solid Materials
CAPS Page Number	21

Lesson Objectives

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

- explain the benefits of using the raw materials provided by animals
- explain the method which is used to process wool and animal hides.

Specific Aims	1. DOING SCIENCE + TECHNOLOGY	✓
	2. UNDERSTANDING + CONNECTING IDEAS	✓
	3. SCIENCE, TECHNOLOGY + SOCIETY	

SCIENCE PROCESS + DESIGN 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 11: Animal wool and hides	

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 raw material is used to make paper?

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.

> *Wood is used to make paper.*

D ACCESSING INFORMATION

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

> ANIMAL WOOL AND HIDES
>
> 1. Animal **hides** and wool are raw materials.
> 2. Sheep that are kept for their wool are **sheared** once a year.
> 3. The wool in one piece is called a **fleece**.
> 4. Animals are **slaughtered** to be eaten. Their skin is called a hide.
> 5. After being treated the hides are called leather, and can be used for many things.

2. Explain this to the learners as follows:
   a. We need to know that the animals that we keep provide us with not only food, but we use their coats and skins, too.
   b. Sheep hair is allowed to grow for a year, and then the coat is sheared (cut off) in one piece. This piece is called a fleece.
   c. Cows are sent to be slaughtered to provide beef for people to eat. Their skins are taken and sent to a tannery to be turned into leather.
3. Give learners some time to copy the above information from the chalkboard into their workbooks.

Checkpoint 1

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

a. Are animal hides raw or processed materials?
b. What is the process called when they cut wool off sheep?

Answers to the checkpoint questions are as follows:

a. Animal hides are raw materials.
b. This process is called shearing.

E CONCEPTUAL DEVELOPMENT

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

PROCESSING WOOL AND HIDES

1. Wool fleeces are sent to a **textile mill** to be cleaned and processed.
2. The wool fibres are combed into a flat mat, and then sent to be **spun** together to form long threads.
3. The threads are woven into fabric or wound into balls.
4. Animal hides are processed at a **tannery**.
5. The hides are soaked in chemicals to remove all the hair and then treated to preserve them.
6. To produce coloured leather, the hides are placed in hot water and a dye is added.
7. The hides are then dried.

2. Read the instructions on the board to the learners.
   a. Explain that in order to use raw materials, we need to process them.
   b. Fleeces are sent to a textile mill to be cleaned and processed. The fibres are combed into a flat mat and then sent to be spun together to form long threads.
   c. These threads are then woven into fabrics or wound into balls to make products such as blankets and jerseys.
   d. Animal hides are processed at a tannery.
   e. They are mixed with chemicals to remove all the hair, and then treated to preserve them.
   f. They can be coloured with dye, and then dried. The leather is then used to make other products, such as shoes, handbags and belts.
3. Ask the learners if they have any questions. Provide answers where necessary.
4. Write the following onto the chalkboard (always try to do this before the lesson starts):

EXERCISE:

Draw the following table in your workbook and complete it, using the information from this lesson:

	Sheep	Cow
Animal alive		
Raw material		
Factory name for processing		
Product once treated		
A product manufactured with it		

5. Give learners some time to complete this task in their exercise books.

MODEL ANSWER:

	Sheep	*Cow*
Animal alive	*Yes*	*No*
Raw material	*Fleece*	*Hide*
Factory name for processing	*Textile Mill*	*Tannery*
Product once treated	*Wool*	*Leather*
A product manufactured with it	*Jersey/ socks / blankets*	*Shoes/ handbags / belts*

Checkpoint 2

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

a. What happens when wool is spun?
b. How is hair removed from a hide at a tannery?

Answers to the checkpoint questions are as follows:

a. Wool fibres are spun together to form long threads.
b. Hair is removed by soaking the hide in chemicals.

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
Solutions for All	Animal wool and hides are used to make fabrics and leather	96
Study & Master	Raw and manufactured materials	73-74
Day by Day	Animal wool and hide are used to make fabrics and leather	68
Platinum	Animal wool and hide are used to make fabrics and leather	73-74
Viva	Wool is a natural material produced by sheep	66-67
Spot On	Animals hides are used to make leather	39-40
Oxford Successful	Raw and manufactured materials	55
Shuter & Shooter	Raw and manufactured materials	52-53
Sasol Inzalo Bk A	Examples of raw materials used to make other materials	149-150

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://www.youtube.com/watch?v=uEYsmzophTA (5min 34sec) [How it's made into wool]
2. https://www.youtube.com/watch?v=9vbTCeYwt_g (5min) [Leather – How it's made]

5 B

Term 2, Week 5, Lesson B
Lesson Title: Properties of materials
Time for lesson: 1½ hours

A POLICY AND OUTCOMES

Sub-Topic	Solid Materials
CAPS Page Number	21

Lesson Objectives

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

- explain what properties different materials might possess
- explain the importance of being able to select the right material according to its properties.

Specific Aims	1. DOING SCIENCE + TECHNOLOGY	✓
	2. UNDERSTANDING + CONNECTING IDEAS	✓
	3. SCIENCE, TECHNOLOGY + SOCIETY	

SCIENCE PROCESS + DESIGN 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 12: Properties of materials	

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 manufactured material is produced from cow hides?

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.

> *Leather is produced from cow hides.*

D ACCESSING INFORMATION

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

> PROPERTIES OF MATERIALS
>
> 1. Different materials have different properties.
> 2. Properties of a material describe what it is like and what it can do.
> 3. Materials can be hard or soft, stiff or flexible, strong or weak, light or heavy, **waterproof** or **absorbent**.
> 4. We need to choose the material that is suitable for the job it has to do.
> 5. For example: a raincoat needs to be waterproof, flexible and light.

2. Explain this to the learners as follows:
   a. We need to know that all materials have different properties that make them best suited for different tasks.
   b. Properties of a material describe what it is like and what it can do.
   c. Materials can be hard or soft, stiff or flexible, strong or weak, light or heavy, waterproof or absorbent.
   d. Waterproof means that liquid will not be able to get through. Absorbent means that it will soak up liquids.
   e. All manufactured materials are made using raw materials.
   f. Using Resource 12, show the learners the examples of waterproof and absorbent materials.

3. Give learners some time to copy the above 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 meant when we say that a material has certain properties?
b. What is one property we need a raincoat to have?

Answers to the checkpoint questions are as follows:

a. Properties describe what a material is like and what it can do.
b. We need a raincoat to be waterproof.

E CONCEPTUAL DEVELOPMENT

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

DIFFERENT PROPERTIES

When choosing a material, we look at the following properties:

1. Hardness – can it be scratched, cut off or dented?
2. Flexibility – how stiff is it? How far can it bend before it breaks?
3. Strength – how hard must you pull before the material snaps?
4. Toughness – how strong is this material?
5. Weight – how heavy or light is the material?
6. Absorbency – will it absorb water?

2. Read the instructions on the board to the learners.
   a. Explain that in order to know what material is best to use, we need to know what properties it has.
   b. Hardness, flexibility, strength, toughness, weight and absorbency are examples of properties.
3. Ask the learners if they have any questions. Provide answers where necessary.
4. After copying down the information above, tell the learners to copy this task down into their workbook and answer it. Write the following onto the chalkboard (always try to do this before the lesson starts):

EXERCISE:

Look at the objects listed in the table. Identify the different properties of the material each object is made of. Copy the table into your workbook and tick the material of each object.

Object	Properties				
	Hard	Tough	Waterproof	Flexible	Light
Bathroom Tile					
Plastic bucket					
Sheet of paper					
Glass bowl					
Leather shoes					
Nylon curtain					

5. Give learners some time to complete this task in their exercise books.

MODEL ANSWER:

Object	*Properties*				
	Hard	*Tough*	*Waterproof*	*Flexible*	*Light*
Bathroom Tile	✓	✓	✓		
Plastic bucket		✓	✓		✓
Sheet of paper				✓	✓
Glass bowl	✓		✓		
Leather shoes		✓	✓	✓	
Nylon curtain				✓	✓

Checkpoint 2

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

a. What does flexibility of a material mean?
b. What is the opposite of absorbent?

Answers to the checkpoint questions are as follows:

a. The measure of how far the material can bend before it breaks.
b. Waterproof is the opposite of absorbent.

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
Solutions for All	Properties of materials	98-101
Study & Master	Properties of materials	70-71
Day by Day	Properties of materials	69-71
Platinum	Properties of materials	76-79
Viva	Properties of materials	71-76
Spot On	Properties of materials	42-43
Oxford Successful	Properties of materials	56-57
Shuter & Shooter	Properties of materials	54-59
Sasol Inzalo Bk A	Properties of materials	161-172

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://www.youtube.com/watch?v=TzR9fXL-Obo (4min 33sec) [Properties of materials]

TOPIC OVERVIEW:
Strengthening materials
Term 2, Weeks 5C – 6B

A. TOPIC OVERVIEW

Term 2, Weeks 5c – 6b

- This topic runs for 1 week.
- 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	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 1 & 3	GRADE 4	GRADE 5
LOOKING BACK	**CURRENT**	**LOOKING FORWARD**
• Products and processes • The Earth • What we get from the Earth • Process from clay to brick	• Ways to strengthen materials • There are different ways to strengthen materials (such as paper) to build a strong structure • We can fold paper into hollow pillars which are circular, triangular or square • We can roll paper into long thin tubes (struts)	• Materials such as Plaster of Paris, concrete, fabrics, ceramics and glass, plastics and paints have their own special properties • Processed materials are useful because of their special properties. They can be strong, durable, waterproof, fire resistant, have interesting colours or textures.

C. SCIENTIFIC AND TECHNOLOGICAL VOCABULARY

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

	TERM	EXPLANATION
1.	stable	Firm and steady, not likely to give way
2.	strut	A part of a structure which gives the structure strength
3.	arrangement	The way something is set out
4.	concertina	Folded in rows similar to the look of the musical instrument
5.	pillar	An upright structure normally used as a building support
6.	circular	Looking like a circle, having the same shape
7.	dowel	A round wooden rod

D. UNDERSTANDING THE USES / VALUE OF SCIENCE

There is a value in knowing how to strengthen materials to make them more suitable for specific work. It is useful to know simple techniques that work very effectively, and how these techniques can be scaled upwards to produce increasingly stronger materials.

E. PERSONAL REFLECTION

Reflect on your teaching at the end of each topic:

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

5 C

Term 2, Week 5, Lesson C
Lesson Title: Strengthening materials
Time for lesson: 1 hour

A POLICY AND OUTCOMES

Sub-Topic	Solid Materials
CAPS Page Number	21

Lesson Objectives

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

- explain why people want to make materials stronger
- explain how to strengthen materials.

Specific Aims	1. DOING SCIENCE + TECHNOLOGY	✓
	2. UNDERSTANDING + CONNECTING IDEAS	✓
	3. SCIENCE, TECHNOLOGY + SOCIETY	

SCIENCE PROCESS + DESIGN 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
Many sheets of scrap A4 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:

> Some things do not absorb water. What is this quality 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.

> *It is called waterproof.*

D ACCESSING INFORMATION

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

> STRENGTHENING MATERIALS
>
> 1. A structure is something made up of several parts.
> 2. Structures need to be strong and **stable** to support objects.
> 3. Structures can be strengthened by choosing strong materials.
> 4. Structures can be strengthened by using specific shapes.
> 5. A **strut** is used to support a structure by pushing against the structure to keep it in place.

2. Explain this to the learners as follows:
   a. We need to know the different properties of structures.
   b. Structures are built for a purpose. They need to be strong and able to hold the object they were designed to hold.
   c. Structures can be made stronger by adding parts, or by changing the shapes in the structure, or the arranging the struts in a particular way.
3. Give learners some time to copy the above 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 structure?
b. What does a strut do?

Answers to the checkpoint questions are as follows:

a. A structure is something made up of several parts.
b. A strut is used to support a structure by pushing against the structure to keep it in place.

E CONCEPTUAL DEVELOPMENT

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

CHANGING THE MATERIAL

1. There are different ways to strengthen materials to make a stronger structure.
2. We can do this by changing the shape of the material.
3. We can add layers of material.
4. We can add something to hold them together.
5. We can change the **arrangement** of the materials.

2. Read the instructions on the board to the learners.
   a. Explain that in order to use materials to create strength, we need to process them to ensure that they meet the requirements of the job.
   b. We can change the shape of the material so it fits more tightly, and cannot stretch past a certain point.
   c. We can add a substance like glue to hold materials together or join them. Ask the learners if they have any questions. Provide answers where necessary.
3. Ask the learners if they have any questions. Provide answers where necessary.
4. Write the following onto the chalkboard (always try to do this before the lesson starts) Tell the learners to first copy these instructions down into their workbooks and then follow them:

ACTIVITY

1. Take a piece of scrap A4 paper.
2. Put it across the gap between two desks.
3. Press down slowly on the middle.
4. Notice how it bends easily.
5. Take a ruler, then measure and draw a line across the page every two centimetres.
6. Fold along those lines: one fold to the front, one fold to the back.
7. You should now have a **concertina** of small triangles.
8. Place your folded paper across the gap between the desks.
9. Press down slowly in the middle
10. Notice how the paper does not bend as easily.
11. You have just given the paper strength.

5. Give learners some time to complete this task in their exercise books.

Checkpoint 2

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

a. Why do we need strong structures?
b. What are two ways to strengthen materials?

Answers to the checkpoint questions are as follows:

a. We need strong structures to support different objects.
b. We can strengthen materials by changing the shape of the material, and adding further layers of material.

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
Solutions for All	Strengthening materials	105-106
Study & Master	Strengthening materials	76
Day by Day	Strengthening materials	73
Platinum	Strengthening materials	82-83
Viva	Strengthening materials	78-79
Spot On	Strengthening materials	44
Oxford Successful	Strengthening materials	58
Shuter & Shooter	Strengthening materials	60-61
Sasol Inzalo Bk A	Strengthening materials	182-184

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://www.youtube.com/watch?v=tGfLhPslEjQ&t=62s (4min 36sec) [Material world]

6 A

Term 2, Week 6, Lesson A
Lesson Title: Hollow paper pillars
Time for lesson: 1½ hours

A POLICY AND OUTCOMES

Sub-Topic	Strengthening Materials
CAPS Page Number	22

Lesson Objectives

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

- explain how to make circular, triangular and square paper tubes
- explain which of the shaped tubes is the strongest through testing.

Specific Aims	1. DOING SCIENCE + TECHNOLOGY	✓
	2. UNDERSTANDING + CONNECTING IDEAS	✓
	3. SCIENCE, TECHNOLOGY + SOCIETY	

SCIENCE PROCESS + DESIGN 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
Many sheets of scrap A4 paper	
Sticky tape and/or glue	
Resource 13: Hollow paper tubes	

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 strut?

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 strut is the part of a structure which gives it strength.

D ACCESSING INFORMATION

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

HOLLOW PAPER PILLARS

1. We need to find out which shape of a paper **pillar** is the strongest.
2. We will need:
   c. Sheets of A4 paper
   d. Sticky tape or glue.
3. Roll one sheet of paper into a **circular** tube. Tape or glue the edges.
4. Fold one sheet of paper into five equal sections. Stick the last two sections together in order to form a square tube.
5. Fold one sheet of paper into four equal sections. Stick the last two sections together so that the paper forms a triangular tube.

2. Explain this to the learners as follows:
    a. We need to investigate the strength of differently shaped tubes.
    b. Tubes are built for a purpose. They need to be strong and able to hold an object.
    c. Structures can be made stronger by changing the shapes in the structure.
3. Give learners some time to copy the above information from the chalkboard into their workbooks.

Checkpoint 1

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

a. What do you need to stick the edges of the paper together?
b. What tube shape will you make if you fold your sheet of paper into five equal sections and stick the last two together?

Answers to the checkpoint questions are as follows:

a. You will need glue or sticky tape.
b. You will have a square tube.

E CONCEPTUAL DEVELOPMENT

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

MEASURING STRENGTH

1. Stand each tube upright on a flat surface.
2. Place a pencil on the top of your tube. Remove it.
3. Place a small book on the top of your tube.
4. Add more books until you see the tube starting to collapse.
5. Do exactly the same for each of your tubes.
6. Fill in the table. Note that everyone will have different answers, depending on how they made their tubes.

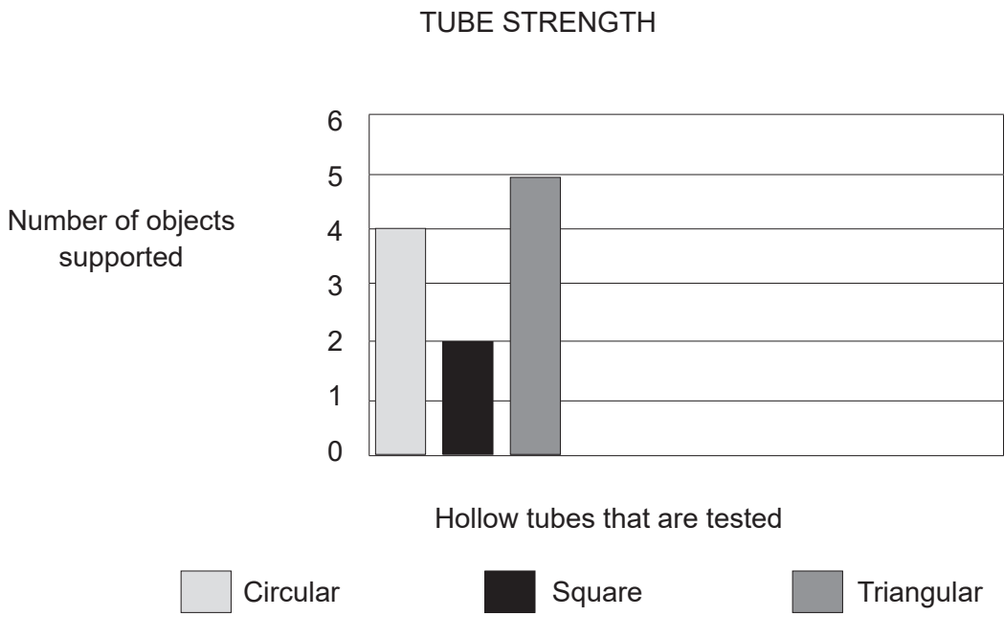
Shape of tube	Number of books it can support
Circular	
Square	
Triangular	

2. Read the information on the board to the learners.
    a. Explain that in order to use strong tubes, we need to test them to ensure that they meet the requirements for the job.
    b. The shape of the tube will have different impacts on its strength.
    c. Tell the learners to follow the instructions.
    d. Ask them to watch their tubes carefully as they place objects on top of them.
    e. Note the number of objects that go onto each tube.
3. Ask the learners if they have any questions. Provide answers where necessary.
4. Draw and write the following onto the chalkboard (always try to do this before the lesson starts). Tell the learners to draw a bar graph similar to the one in the activity below.

ACTIVITY

Draw a bar graph to show your findings.

Use the example to help you.



5. Give learners some time to complete this task in their exercise books.

Checkpoint 2

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

a. Why do you have to place the tube on a flat surface?
b. Why did you have to add objects to the top of the tubes?

Answers to the checkpoint questions are as follows:

a. The tube needs to be on a flat surface to be balanced.
b. We added objects to the top of the tubes to test how strong the tubes were

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
Solutions for All	Strengthening materials	107-108
Study & Master	Strengthening materials	77-78
Day by Day	Strengthening materials	74-77
Platinum	Strengthening materials	84-89
Viva	Strengthening materials	82-84
Spot On	Strengthening materials	44
Oxford Successful	Strengthening materials	61
Shuter & Shooter	Strengthening materials	63-65
Sasol Inzalo Bk A	Strengthening materials	185-188

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://www.youtube.com/watch?v=_jGPlh7NSSQ (1min 11 sec) [STEM challenge: paper columns]
2. https://www.youtube.com/watch?v=UeB5XhQ2FL4 (6min) [How to do the paper book tower experiment]

6 B

Term 2, Week 6, Lesson A
Lesson Title: Making struts
Time for lesson: 1 hour

A POLICY AND OUTCOMES

Sub-Topic	Strengthening Materials
CAPS Page Number	22

Lesson Objectives

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

- explain how to make tightly rolled tubes of paper
- explain why the tightly rolled tube is the strongest.

Specific Aims	1. DOING SCIENCE + TECHNOLOGY	✓
	2. UNDERSTANDING + CONNECTING IDEAS	✓
	3. SCIENCE, TECHNOLOGY + SOCIETY	

SCIENCE PROCESS + DESIGN 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
Many sheets of scrap A4 paper	
Sticky tape and/or glue, dowel sticks	
Resource 14: Hollow paper tubes	

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 do we test paper pillars?

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.

We place the pillars on a flat surface and put a load on top of them.

D ACCESSING INFORMATION

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

MAKING STRUTS

1. We need to find another way to strengthen a sheet of paper.
2. It will be stronger if we roll it tightly.
3. The sheet must be placed flat on the table.
4. A wooden **dowel** or stick slightly longer than the paper is placed toward the bottom.
5. Fold the bottom of the paper over the dowel, and then roll tightly up to the top.
6. Glue the top edge and remove the dowel.

2. Explain this to the learners as follows:
   a. We need to continue investigating the strength of differently shaped tubes.
   b. The next tube is tightly wound paper. It gets its strength from the tightness of the way it is wound.
3. Give learners some time to copy the above information from the chalkboard into their workbooks.

Checkpoint 1

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

a. How must the paper be placed on the table? Why?
b. What should be added to make sure the paper does not unroll?

Answers to the checkpoint questions are as follows:

a. The paper must be placed flat on the table. If it is not flat, it will not roll properly.
b. Glue should be added to the top edge.

E CONCEPTUAL DEVELOPMENT

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

MEASURING STRENGTH

1. Take the rolled-up paper off the dowel stick.
2. Try to bend the roll in the middle. It should not bend easily.
3. Make four more rolls using the same method and place them over a gap between two desks.
4. Place an object in the middle of the rolls.
5. Add more objects until the rolls bend or give way.
6. You should notice that these are very strong structures.

2. Read the information on the board to the learners.
   a. Explain that in order to use tubes for a job requiring strength, we need to test them to ensure that they meet the job requirements.
   b. Changing the shape of the tube will have different impacts on the strength of the structure itself.
   c. Tell the learners to follow the instructions.
   d. Ask them to watch their tubes carefully, as they place objects on top of them.
   e. Note the number of objects that are used in each test.
3. Ask the learners if they have any questions. Provide answers where necessary.
4. Write the following onto the chalkboard (always try to do this before the lesson starts) Tell the learners to copy these instructions down into their workbooks and follow them:

ACTIVITY

1. Add a column to the bar graph activity in the previous lesson.
2. Add the number of objects onto the new tubes/ struts.
3. On the bar graph from the last lesson, add a column for your new data.

5. Give learners some time to complete this task in their exercise books.

Checkpoint 2

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

a. Where should you place the objects on the rolls?

b. Why are the rolls stronger?

Answers to the checkpoint questions are as follows:

a. You should place the objects on the middle of the rolls.

b. The rolls are stronger because the paper is rolled up tightly.

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
Solutions for All	Strengthening materials	109-110
Study & Master	Strengthening materials	79
Day by Day	Strengthening materials	78-80
Platinum	Strengthening materials	90-91
Viva	Strengthening materials	81
Spot On	Strengthening materials	45
Oxford Successful	Strengthening materials	60
Shuter & Shooter	Strengthening materials	65-66
Sasol Inzalo Bk A	Strengthening materials	188

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://www.youtube.com/watch?v=U_DhtDPdR6I (4min 42sec) [How to make a strong paper bridge]

TOPIC OVERVIEW:
Strong frame structures
Term 2, Weeks 6C – 8C

A. TOPIC OVERVIEW

Term 2, Weeks 6c – 8c

- This topic runs for 2½ weeks.
- It is presented over 7 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	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 1 & 3	GRADE 4	GRADE 5
LOOKING BACK	**CURRENT**	**LOOKING FORWARD**
• Different parts of my body which move • Parts of my body I cannot see - skeleton	• Struts are joined into triangular shapes making a strong, stable structure, such as roof trusses, bridges, cranes, pylons and skeletons (limb bones are struts) • Indigenous, traditional homes such as a Zulu hut (uguqa), Xhosa hut (rontabile and ungqu-phantsi) and Nama hut (matjieshuis), make use of a framework of struts (such as branches)	• Skeletons of vertebrates • A vertebrate skeleton consists of bones and joints, and is inside the body • Bones are hard and form a strong frame structure • A skeleton provides support for an animal's body and protection for its organs • Vertebrate animals can move because there are muscles attached to the skeleton and joints between the bones

C. SCIENTIFIC AND TECHNOLOGICAL VOCABULARY

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

	TERM	EXPLANATION
1.	rigid	Stiff, not flexible, hard
2.	joints	The place at which two things that are connected meet
3.	triangulation	The network of triangles in a structure
4.	indigenous	Local to a particular place. People or things have always been in this place.
5.	elevated	Raised up above the ground, or the normal level
6.	pressurise	To raise the pressure inside something so something is forced to move
7.	power outage	When there is no electricity
8.	reservoir	A place where water is collected and stored for use
9.	design brief	A short, clear statement that explains what needs to be done to solve a problem
10.	specifications	A description of features to include in a design
11.	constraints	The limits that are placed on the designer

D. UNDERSTANDING THE USES / VALUE OF SCIENCE

The value of knowing how to design a basic structure, factoring in the strength of materials and the arrangement of the materials. There is a value to knowing that triangulation is important in the design of structures.

E. PERSONAL REFLECTION

Reflect on your teaching at the end of each topic:

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

6 C

Term 2, Week 6, Lesson C
Lesson Title: Strut and frame structures
Time for lesson: 1 hour

A POLICY AND OUTCOMES

Sub-Topic	Strong frame structures
CAPS Page Number	22

Lesson Objectives

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

- explain what struts are and how they strengthen frame structures
- explain why struts are so important for structures.

Specific Aims	1. DOING SCIENCE + TECHNOLOGY	✓
	2. UNDERSTANDING + CONNECTING IDEAS	✓
	3. SCIENCE, TECHNOLOGY + SOCIETY	

SCIENCE PROCESS + DESIGN 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: Strong frame structures

B POSSIBLE RESOURCES

For this lesson, you will need:

IDEAL RESOURCES	IMPROVISED RESOURCES
Resource 15: Strut and frame structures	

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 is it important to use a dowel stick when you roll the paper rolls?

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 makes the rolls tighter and stronger.*

D ACCESSING INFORMATION

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

> STRUT AND FRAME STRUCTURES
>
> 1. Structures need to be strong, **rigid** and stable.
> 2. Structures must be able to hold their own weight and other weights.
> 3. Structures must not bend, break or fall over.
> 4. We build strong structures using strong materials like steel or wood.
> 5. Frame structures are made of different parts or struts joined together.
> 6. Struts push against each other to support the load.

2. Explain this to the learners as follows:
   a. We need to understand the purpose of structures.
   b. Structures need to be strong, rigid and stable.
   c. Structures that are meant to last need to be built with materials that will last a long time.
   d. We add struts to our structures to give them more strength.
3. Give learners some time to copy the above information from the chalkboard into their workbooks.

Checkpoint 1

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

a. What are three ideal characteristics of structures?
b. What are two materials that could be used for structures?

Answers to the checkpoint questions are as follows:

a. Structures need to be strong, rigid and stable.
b. Steel or wood could be used for structures.

E CONCEPTUAL DEVELOPMENT

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

THE HUMAN BODY

1. There are also struts in the human body.
2. They form part of our skeleton, which is also a frame structure.
3. The bones in our legs and arms are struts and give shape to our bodies.
4. In the human body, struts are joined together at **joints** with muscles.
5. Our bones need to be strong for the body to work properly.

2. Read the information on the board to the learners.
   a. As with man-made structures, the human body is made up of many struts in its skeleton.
   b. The bones in our bodies help the body to keep its shape.
   c. The bones have to be strong to support the functions of the body.
3. Ask the learners if they have any questions. Provide answers where necessary.
4. Write the following onto the chalkboard (always try to do this before the lesson starts) Tell the learners to copy these instructions down into their workbooks and follow them:

ACTIVITY

Look at Resource 15: Strut and frame structures

1. What structure is being shown in the first picture?
2. What sort of shapes do you see in the structure?
3. What structure is being shown in the second picture?
4. What sort of shapes do you see in the structure?
5. What structure is being shown in the third picture?
6. What sort of shapes do you see in the structure?
7. What does this tell you?

5. Give learners some time to complete this task in their exercise books.

MODEL ANSWER

1. *A roof*
2. *Triangles*
3. *A bridge*
4. *Triangles*
5. *Electricity pylons*
6. *Triangles*
7. *Many strong structures are built using triangles.*

Checkpoint 2

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

a. What sort of structure is the skeleton?
b. What sort of bones in the skeleton are struts?

Answers to the checkpoint questions are as follows:

a. The skeleton is a frame structure.
b. The bones in our legs and arms are struts.

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
Solutions for All	Strut and frame structures	112-114
Study & Master	Strut and frame structures	80-81
Day by Day	Strut and frame structures	83
Platinum	Strut and frame structures	94-95
Viva	Strut and frame structures	90-91
Spot On	Strut and frame structures	46
Oxford Successful	Strut and frame structures	62-63
Shuter & Shooter	Strut and frame structures	67-68
Sasol Inzalo Bk A	Strut and frame structures	192

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://www.youtube.com/watch?v=oVOnRPefcno (3min 44sec) [What makes bridges so strong?]

7 A

Term 2, Week 7, Lesson A
Lesson Title: Joining Struts
Time for lesson: 1½ hours

A POLICY AND OUTCOMES

Sub-Topic	Strong frame structures
CAPS Page Number	22

Lesson Objectives

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

- explain what struts are and how they strengthen frame structures
- explain why struts are so important for structures.

Specific Aims	1. DOING SCIENCE + TECHNOLOGY	✓
	2. UNDERSTANDING + CONNECTING IDEAS	✓
	3. SCIENCE, TECHNOLOGY + SOCIETY	

SCIENCE PROCESS + DESIGN 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 16: Joining struts	
Cardboard pieces – one per learner	
Split pins – seven per learner	

C CLASSROOM MANAGEMENT

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

> Which shape do we see more than others in building structures?

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.

> *Triangles feature the most.*

D ACCESSING INFORMATION

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

> JOINING STRUTS
>
> 1. When struts are joined together to form a triangle, a strong frame is formed.
> 2. We can use struts to strengthen other shapes, like squares and rectangles.
> 3. Triangular struts stop the sides of a structure from splitting open at a corner joint.
> 4. They also stop two sides of a structure from moving closer together.
> 5. Putting triangles into a structure is called **triangulation**.

2. Explain this to the learners as follows:
   a. We need to understand that, when we add struts to structures, we make them a lot stronger.
   b. Because structures need to be strong, rigid and stable, adding struts helps to do this.
   c. Triangulation is an important concept. It describes the use of triangular shapes (struts) which are added to a structure for strength.
3. Give learners some time to copy the above 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 strongest shape?
b. What is the term used when triangles are put into structures?

Answers to the checkpoint questions are as follows:

a. The strongest shape is the triangle.
b. The term is triangulation.

E CONCEPTUAL DEVELOPMENT

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

ACTIVITY TO INVESTIGATE ADDING STRUTS

INSTRUCTIONS

1. Cut out:
   a. seven equal sized strips of cardboard, 2cm wide by 10cm long.
   b. one strip of cardboard, 2cm wide by 14cm long.
2. Collect seven split pins.
3. Make a hole toward the end of each of the cardboard strips.
4. Use split pins to join four pieces of the 10cm long cardboard to make a square, and three pieces to make a triangle.
5. Push the corners of the shapes toward each other.
6. Take the 14cm strip and join the opposite corners of the square.
7. Push the same corners of the shapes toward each other.

2. Read the information on the board to the learners.
   a. Explain that we are observing a practical example of adding a strut to improve the strength of a structure.
   b. Ask the learners to follow the instructions and cut out the pieces that are required.
   c. Continue to follow the instructions and join the pieces of card together to form a square and a triangle.
   d. Demonstrate to the learners how the square changes shape when you push on the sides.
   e. Show the learners the much stronger triangle.
   f. Add in the cross strut to the square, and show the learners the two triangles that have been formed in the square.
   g. Ask the learners to push the sides of the square in.

3. Tell the learners to copy the above instructions into their workbooks and follow them.
4. Ask the learners if they have any questions. Provide answers where necessary.
5. 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 shape is made with four pieces of card?
b. What did the card going through the middle of the square do to it?

Answers to the checkpoint questions are as follows:

a. A square is made with four pieces of card.
b. It strengthened the whole shape.

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
Solutions for All	Strut and frame structures	115-116
Study & Master	Strut and frame structures	82-83
Day by Day	Strut and frame structures	84
Platinum	Strut and frame structures	96-98
Viva	Strut and frame structures	87-88
Spot On	Strut and frame structures	46
Oxford Successful	Strut and frame structures	65
Shuter & Shooter	Strut and frame structures	69
Sasol Inzalo Bk A	Strut and frame structures	193-195

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://www.youtube.com/watch?v=y6FmrOS72EA (5min 49sec) [How to demonstrate engineering principles]

7 B

Term 2, Week 7, Lesson B
Lesson Title: Indigenous structures
Time for lesson: 1 hour

A POLICY AND OUTCOMES

Sub-Topic	Strong frame structures
CAPS Page Number	22

Lesson Objectives

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

- explain the difference between three different indigenous structures
- identify the various materials used to build three indigenous structures.

Specific Aims	1. DOING SCIENCE + TECHNOLOGY	
	2. UNDERSTANDING + CONNECTING IDEAS	✓
	3. SCIENCE, TECHNOLOGY + SOCIETY	✓

SCIENCE PROCESS + DESIGN 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 17: Indigenous Structures	

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 triangulation?

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.

Triangulation is the process of putting triangles into structures to make them stronger.

D ACCESSING INFORMATION

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

INDIGENOUS STRUCTURES

1. There are many South Africans who build their own **indigenous** structures as homes.
2. The Zulu people build strong huts called uguqa, from branches and grass.
3. The Xhosa people build a rontabile or rondavel, from clay bricks with grass roofs.
4. The Nama people build a matjieshuis, from young tree branches bent into a frame, and covered with grass mats.

2. Explain this to the learners as follows:
   c. We need to know that many of the people in South Africa build their own homes.
   d. Cultures and tribes have different ways. Therefore, they build their houses and structures differently.
   e. Their different ways have been passed down from generation to generation.
3. Give learners some time to copy the above information from the chalkboard into their workbooks.

Checkpoint 1

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

a. What two materials are used in all three types of indigenous houses?
b. Which two types of huts are made similarly?

Answers to the checkpoint questions are as follows:

a. Sticks and grass are used in all three types.
b. The Zulu uguqa and the Nama matjieshuis are similar.

E CONCEPTUAL DEVELOPMENT

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

BUILDING INDIGENOUS STRUCTURES

1. The Zulu uguqa is made by first bending long branches into a dome-shaped frame.
2. These branches act as struts, helping with the frame of the structure.
3. More sticks are added and woven between the struts for more strength.
4. Layers of grass are then added.
5. The Xhosa rontabile is first built in a circle with clay bricks and then plastered. Wooden poles are then added on top as struts.
6. Grass is then thatched onto the struts to form a roof.
7. The Nama matjieshuis is first shaped with young branches to form a beehive shape.
8. Grass mats are then used to cover the shape. These can easily be taken down and used somewhere else.

2. Read the information on the board to the learners.
   a. Explain that in order to understand indigenous structures, we need to know how they are built and what materials are used.
   b. Explain to the learners that struts are very important in all three building methods as they add strength to the structure to keep its shape.
3. Ask the learners if they have any questions. Provide answers where necessary.
4. After looking at the pictures on Resource 17, tell the learners to copy these questions down into their book and answer them:

ACTIVITY

Look at the picture on Resource 17.

1. What is the name of this hut?
2. What is the shape of this hut?
3. What are the walls and roof made with?
4. Describe one other hut you have learnt about and how it is made.

5. Give learners some time to complete this task in their exercise books.

MODEL ANSWER

1. *Uguqa*
2. *The shape is a beehive.*
3. *Sticks and grass*
4. *The answer could be either the Xhosa rontabile or a Nama matjieshuis. The Xhosa rontabile is built in a circle with clay bricks and then plastered. Wooden poles are then added on the top as struts. Grass is then thatched onto the struts to form a roof. The Nama matjieshuis is first shaped into a beehive shape with young branches, then covered with many grass mats.*

Checkpoint 2

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

a. What shape is a Zulu uguqa?
b. What main difference is there between the Xhosa rontabile, and the uguqa and the matjieshuis?

Answers to the checkpoint questions are as follows:

a. It has a dome shape.
b. The walls of the rontabile use clay bricks.

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
Solutions for All	Indigenous structures	117-121
Study & Master	Indigenous structures	84-85
Day by Day	Indigenous structures	85-86
Platinum	Indigenous structures	99-103
Viva	Indigenous structures	91-92
Spot On	Indigenous structures	48-49
Oxford Successful	Indigenous structures	66-67
Shuter & Shooter	Indigenous structures	73-75
Sasol Inzalo Bk A	Indigenous structures	206-210

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://www.ulwaziprogramme.org/2017/05/zulu-traditional-houses/ [Website – Ulwazi – Zulu traditional houses]

7 C

Term 2, Week 7, Lesson C
Lesson Title: Investigating water towers
Time for lesson: 1 hour

A POLICY AND OUTCOMES

Sub-Topic	Strong frame structures
CAPS Page Number	22

Lesson Objectives

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

- explain what a water tower is
- identify the characteristics of a water tower and why they exist.

Specific Aims	1. DOING SCIENCE + TECHNOLOGY	✓
	2. UNDERSTANDING + CONNECTING IDEAS	✓
	3. SCIENCE, TECHNOLOGY + SOCIETY	✓

SCIENCE PROCESS + DESIGN 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 18: Water Towers	

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 rondavel?

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 rondavel is an indigenous structure of the Xhosa people.

D ACCESSING INFORMATION

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

INVESTIGATING WATER TOWERS

1. A water tower is an **elevated** structure supporting a water tank.
2. It is built at a height that is high enough to **pressurise** a water supply system.
3. Water towers are able to supply water, even during **power outages**.
4. A water tower also serves as a **reservoir** to help with water needs.
5. Normally a pump refills the water tank during the night.

2. Explain this to the learners as follows:
   a. We need to know that in order for water to be able to flow to the places it is needed, water pressure needs to be built up.
   b. One of the ways in which this is done is to raise the tank of water to a high level, so that gravity helps build up pressure and the water travels to where it is needed.
   c. In a power outage, water can still flow down the pipes in the tower. A problem will occur when there has been a power outage for a long time so that the pump cannot refill the tank. The tank might then be empty.
3. Give learners some time to copy the above 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 water tower?

b. Do water towers stop working during a power outage?

Answers to the checkpoint questions are as follows:

a. A water tower is an elevated structure supporting a water tank.

b. No, they are able to still supply water.

E CONCEPTUAL DEVELOPMENT

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

WATER TOWERS

1. There are many different types and shapes of water towers.
2. Water towers were positioned on early railroads where steam engines needed filling every few kilometres.
3. Water towers need pipes to draw water up, and pipes for water to flow out.
4. The pressure that is built up by the water falling down the pipe, forces it to reach the homes it is connected to.
5. Water towers are often connected to underground reservoirs – big water storage places.

2. Read the information on the board to the learners.
   a. Explain that water towers can take many shapes and forms.
   b. Designers have always tried to be clever in their designs so that the water towers do not look ugly.
   c. Reservoirs are large storage areas for water to fill the tanks on the water towers. Sometimes people have built reservoirs on hills to provide the water pressure needed.
3. Ask the learners if they have any questions. Provide answers where necessary.
4. After looking at the pictures on Resource 18, tell the learners to copy these instructions into their book and follow them:

ACTIVITY

1. Draw one of the water towers that you see.
2. Label your drawing with the following labels – water tank, tower.
3. Give the drawing a heading.

5. Give learners some time to complete this task in their exercise books.

MODEL ANSWER

(drawings may vary)

A drawing of a water tower with the correct labels and a heading.

Checkpoint 2

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

a. Why were there water towers near railroads?
b. What is a reservoir?

Answers to the checkpoint questions are as follows:

a. Steam engines needed water to produce steam.
b. A reservoir is a large man-made storage place for water.

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
Solutions for All	Identify the need: a tower structure	117-121
Study & Master	Design, make and evaluate a strong structure	84-85
Day by Day	Design, make and evaluate a strong structure	85-86
Platinum	Design, make and evaluate a strong structure	99-103
Viva	Design, make and evaluate a structure	91-92
Spot On	Design, make and evaluate a model of a water tower	48-49
Oxford Successful	Build a tower	66-67
Shuter & Shooter	Structure to support a load	73-75
Sasol Inzalo Bk A	Designing a strong structure	206-210

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://www.youtube.com/watch?v=ZI8WOzqHl7w (2mins 20sec) [How it works: Designing a water tower]

8 A

Term 2, Week 8, Lesson A
Lesson Title: Designing a water tower
Time for lesson: 1 hour

A POLICY AND OUTCOMES

Sub-Topic	Strong frame structures
CAPS Page Number	22

Lesson Objectives

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

- formulate the best design to use for a water tower
- identify your requirements for this design.

Specific Aims	1. DOING SCIENCE + TECHNOLOGY	✓
	2. UNDERSTANDING + CONNECTING IDEAS	✓
	3. SCIENCE, TECHNOLOGY + SOCIETY	✓

SCIENCE PROCESS + DESIGN 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 18: Water Towers	
Newspaper, sticky tape or glue, string, ruler.	

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 should be considered when designing a water tower?

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.

In the design of a water tower, strength and stability should be considered.

D ACCESSING INFORMATION

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

MY WATER TOWER DESIGN

Design Brief:

I will design and make a _____ that will be able to hold a tank of _____ for the _____.

Specifications:

The tower must be between _____ and _____ high.

The tower must hold a load of _____ which will be in place for _____.

The tower must not _____ or _____.

The only materials I can use to make my tower are:

_____, _____or_____, and _____.

Constraints:

The tower must be built in your classroom.

2. Read the following case study to the class:

TOPIC: Strong frame structures

CASE STUDY

Your school needs to put up a new tank to supply water to the school. The water tank needs to be high so that the water can run down through the pipes easily to the areas of the school that need water. Your class has been asked to suggest ideas for a structure to support the water tank. Each learner will make a model of their structure to present to their teacher. The model must be between 30cm and 40cm high. It must be able to hold a load of 1 litre of water. The load will be placed on the structure for 10 seconds to test that your structure will not bend or collapse. Use what you have learnt to help you design your water tower. The following materials must be used: newspaper, sticky tape or glue, string.

3. Explain this to the learners as follows:
   a. A **design brief** is a sentence saying what you are going to design and make.
   b. Learners must complete the sentence.
   c. Specifications tell you what the water tower must have and be able to do.
   d. Constraints are the limits placed on the design.
4. The learners need to consider the following:
   a. What shape will the water tower be?
   b. What materials are they going to need to make the water tower?
5. Give learners some time to copy the above information from the chalkboard into their workbooks. Learners must fill in the missing words and underline them.

MY WATER TOWER DESIGN

Design Brief:

I will design and make a water tower that will be able to hold a tank of water for the school.

Specifications:

The tower must be between 30cm and 40cm high.

The tower must hold a load of 1 litre of water which will be in place for 10 seconds.

The tower must not bend or collapse.

The only materials I can use to make my tower are:

newspaper, sticky tape or glue, and string.

Constraints:

The tower must be built in your classroom.

6. Model Answer

Checkpoint 1

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

a. What materials can be used?
b. Who are you designing a water tower for?

Answers to the checkpoint questions are as follows:

a. Newspaper, sticky tape or glue, string
b. We are designing a water tower for the school

E CONCEPTUAL DEVELOPMENT

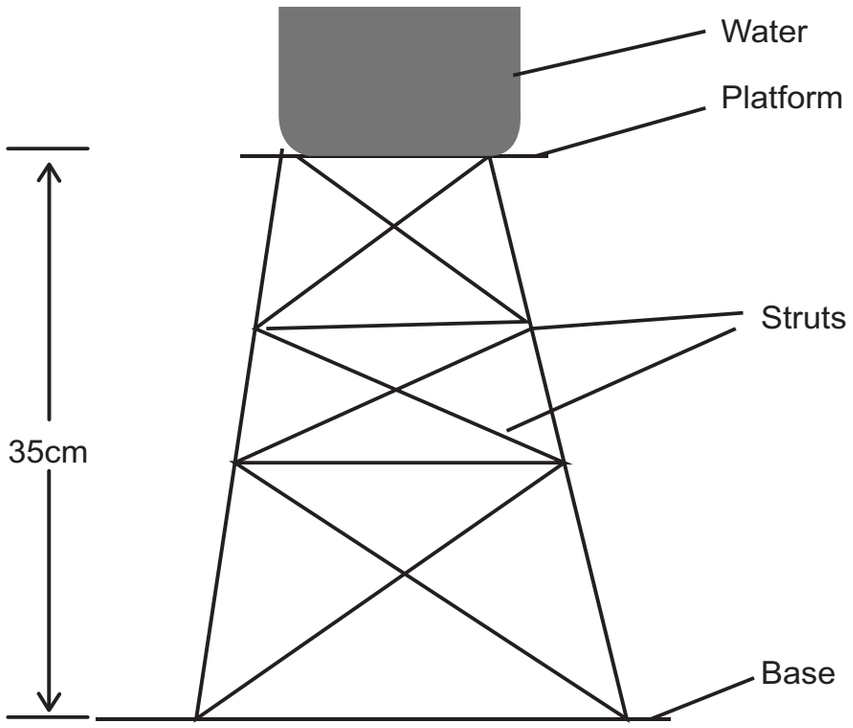
1. Write the following onto the chalkboard (always try to do this before the lesson starts):

INSTRUCTIONS

1. Always use a sharp pencil.
2. Always use print for your labels.
3. Use a ruler in the design and the labels.
4. Never cross label lines.
5. Give your drawing a title.

2. Read the information on the board to the learners.
   a. Explain to the learners that before they can design a solution, they need to remember basic drawing rules.
   b. Tell the learners to copy the rules into their workbooks.
   c. Tell the learners to do a 2D drawing of the front view of their water tower.
   d. Remind the learners to add the labels and measurements for their design.
   e. Ask the learners to give their drawing a title.
3. Give learners some time to copy the above information from the chalkboard into their workbooks to guide their design.

MODEL ANSWER:



Water Tower Design

4. Ask the learners if they have any questions. Provide answers where necessary.

Checkpoint 2

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

a. What is a brief?
b. What are specifications?

Answers to the checkpoint questions are as follows:

a. A brief is a sentence saying what you need to do.
b. Specifications indicate what the water tower model must be built of and what it must be able to do.

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
Solutions for All	Identify the need: a tower structure	122-130
Study & Master	Design, make and evaluate a strong structure	86-89
Day by Day	Design, make and evaluate a strong structure	87-88
Platinum	Design, make and evaluate a strong structure	104-105
Viva	Design, make and evaluate a structure	93-94
Spot On	Design, make and evaluate a model of a water tower	26-29
Oxford Successful	Build a tower	67-68
Shuter & Shooter	Structure to support a load	69-72
Sasol Inzalo Bk A	Designing a strong structure	202-206

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://www.youtube.com/watch?v=Qi6Rb8vJcpk (1min 44sec) [Your water tower must have a solid foundation]

8 B

Term 2, Week 8, Lesson B
Lesson Title: Making a water tower
Time for lesson: 1½ hours

A POLICY AND OUTCOMES

Sub-Topic	Strong frame structures
CAPS Page Number	22

Lesson Objectives

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

- make the best design for a model water tower
- identify the correct materials to make a water tower.

Specific Aims	1. DOING SCIENCE + TECHNOLOGY	✓
	2. UNDERSTANDING + CONNECTING IDEAS	✓
	3. SCIENCE, TECHNOLOGY + SOCIETY	

SCIENCE PROCESS + DESIGN 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 18: Water Towers	
30 sheets of scrap A4 paper or newspaper, glue, sticky tape, string, a one litre container for water, dowel sticks, pair of scissors, split pins (if necessary).	

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 one constraint does this project require?

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 model must be built at school.

D ACCESSING INFORMATION

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

MY WATER TOWER

1. Make a list of the tools you will need to make your model.
2. Make a list of the materials you will need to make your model, and their quantities.
3. Collect your tools and materials.
4. Use your design and the rolling paper dowel method to make as many solid tubes as you can.
5. Work carefully and neatly with the tools.

2. Read through the list on the board with the learners to make sure they understand the planning before they start making their water towers.

3. Explain this to the learners as follows:
    a. The list on the board provides reminders of the process to be followed when making the water tower.
    b. The learners' designs in the last lesson should help them with their model.
    c. The learners should work swiftly and neatly.
    d. Materials required per learner are: 30 sheets of scrap A4 paper or newspaper, glue, sticky tape, string, a one litre container for water, dowel sticks, pair of scissors, split pins (if necessary).
4. Give learners some time to copy the above information from the chalkboard into their workbooks.

Checkpoint 1

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

a. What height should the model water tower be?
b. Why do you need a list of materials?

Answers to the checkpoint questions are as follows:

a. The model water tower must be between 30cm and 40cm high.
b. You need a list of materials, to ensure you arrive at your desk ready to work immediately.

E CONCEPTUAL DEVELOPMENT

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

MAKE A WATER TOWER

Checklist

1. Have you collected all the materials you will need to make your water tower?
2. Have you got your design sketch in front of you?
3. Did you observe safety rules? No running, no shouting, and holding a pair of scissors downwards when walking.
4. Did you test your water tower to see if it needs improvements?
5. Have you put your water tower in a safe place for the next lesson?
6. Have you tidied up the area where you worked?

2. Read the information on the board to the learners.
3. Explain this task to the learners as follows:
    a. You will need to make a water tower.
    b. When making your model, learners must observe safety rules: no running, no shouting, and holding pairs of scissors downwards when walking.
    c. Go through the checklist on the chalkboard.
    d. Tell the learners not to waste materials.
4. Give learners enough time to make and test their water towers. Once this has been done, the learners should put their names on their water towers and place them in a safe place for evaluation in the next lesson.
5. Give learners some time to copy the above information from the chalkboard into their workbooks to guide their investigation.
6. Ask the learners if they have any questions. Provide answers where necessary.

Checkpoint 2

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

a. What are the safety rules?
b. Why is your design sketch so important?

Answers to the checkpoint questions are as follows:

a. No running, no shouting, holding pairs of scissors downwards when walking.
b. The design sketch is important because it tells you what you are making.

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
Solutions for All	Identify the need: a tower structure	122-130
Study & Master	Design, make and evaluate a strong structure	86-89
Day by Day	Design, make and evaluate a strong structure	87-88
Platinum	Design, make and evaluate a strong structure	104-105
Viva	Design, make and evaluate a structure	93-94
Spot On	Design, make and evaluate a model of a water tower	26-29
Oxford Successful	Build a tower	67-68
Shuter & Shooter	Structure to support a load	69-72
Sasol Inzalo Bk A	Designing a strong structure	202-206

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://www.youtube.com/watch?v=F5QfWUw0D_I (4min 37sec) [Off-grid water tower]

8 C

Term 2, Week 8, Lesson C
Lesson Title: Evaluating a water tower
Time for lesson: 1 hour

A POLICY AND OUTCOMES

Sub-Topic	Strong frame structures
CAPS Page Number	22

Lesson Objectives

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

- make the best design into a model water tower
- identify the correct materials to make a water tower.

Specific Aims	1. DOING SCIENCE + TECHNOLOGY	✓
	2. UNDERSTANDING + CONNECTING IDEAS	✓
	3. SCIENCE, TECHNOLOGY + SOCIETY	

SCIENCE PROCESS + DESIGN 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 18: Water Towers	
Funnel	

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 do we test our water towers?

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.

> *We test our water towers to see if there any problems that need to be corrected..*

D ACCESSING INFORMATION

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

EVALUATION

Copy this table into your workbooks.

	Yes (✓)	No (x)
Is the model of the water tower the correct size: between 30cm and 40cm?		
Did the water tower hold 1 litre of water for the whole 10 seconds?		
Is there any evidence of that the structure has been strengthened?		
Is the structure stable? Are the tubes well made?		
Have I only used the materials I was allowed to use?		
Does my model look like my design?		

2. Read through the list on the board with the learners to make sure they understand the planning before they start making their water towers.
3. Explain this to the learners as follows:
   a. The table on the board is a reminder of the specifications you had to follow when you made a water tower.

b. The learners should test their towers by filling them with one litre of water. Use a funnel.
c. The learners should work swiftly and neatly.

4. Give learners some time to copy the above information from the chalkboard into their workbooks. They should then complete the table.

Checkpoint 1

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

a. What height should the model water tower be?
b. What does stable mean?

Answers to the checkpoint questions are as follows:

a. The model water tower must be between 30cm and 40cm.
b. Stable means that the structure is sturdy and will not fall.

E CONCEPTUAL DEVELOPMENT

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

SELF-EVALUATION:

1. My water tower was / was not strong enough to hold 1 litre of water.
2. My water tower worked well / did not work well, because _____.
3. Are there any ways in which I could improve my water tower?
4. Did I tidy up the area where I worked?

2. Read the information on the board to the learners. Ask them to write the questions in their workbooks and complete them.
3. Give learners enough time to evaluate their water towers. Once this has been done, the learners should put their names on their water towers and place them in a safe place in preparation for taking them home.
4. Give learners some time to copy the above information from the chalkboard into their workbooks.
5. Ask the learners if they have any questions. Provide answers where necessary.

Checkpoint 2

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

a. Why do we evaluate our models?
b. Is there still time to fix something that is not working on our model?

Answers to the checkpoint questions are as follows:

a. We evaluate our models to make sure they work as they are supposed to.
b. Yes, there is still time to fix something not working on a model.

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
Solutions for All	Identify the need: a tower structure	122-130
Study & Master	Design, make and evaluate a strong structure	86-89
Day by Day	Design, make and evaluate a strong structure	87-88
Platinum	Design, make and evaluate a strong structure	104-105
Viva	Design, make and evaluate a structure	93-94
Spot On	Design, make and evaluate a model of a water tower	26-29
Oxford Successful	Build a tower	67-68
Shuter & Shooter	Structure to support a load	69-72
Sasol Inzalo Bk A	Designing a strong structure	202-206

G ADDITIONAL ACTIVITIES/ READING

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

N/A

NATURAL SCIENCES & TECHNOLOGY

ASSESSMENT GRADE 4 TERM 2

GRADE 4 ASSESSMENT

- This section presents the CAPS assessment requirements for this grade for this term.
- See your prescribed textbooks for examples of the required assessments.
- An example of a practical task and an exam has been included.

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*:

a. ***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.

b. ***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.

   i. ***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.

   ii. ***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 4							
Programme of Formal Assessment							
	Term 1		**Term 2**		**Term 3**		**Term 4**
Form of Assessment	Practical Task/ Investigation (40%)	Test (60%)	Practical Task/ Investigation (40%)	Examination (60%)	Practical Task/ Investigation (40%)	Test (60%)	Examination
Tools of Assessment	Memo & rubric	Memo	Memo & rubric	Memo	Memo & rubric	Memo	Memo
Minimum Marks	20	20	20	40	20	20	40
Maximum Time Allocation	Dependent on nature of the task and context	40 minutes	Dependent on nature of the task and context	80 minutes	Dependent on nature of the task and context	40 minutes	80 minutes
Content and skills focus	Term 1	Term 1	Term 2	Term 1 (40%) Term 2 (60%)	Term 3	Term 3	Term 3 (40%) Term 4 (60%)
No. of Tasks	2		2		2		1

GRADE 4 ASSESSMENT

PRACTICAL TASK - INTRODUCTION

NS & TECH
GRADE 4
PRACTICAL TASK
TERM 2

20 MARKS

Time allocation: 60 minutes (20 minutes preparation, 40 minutes task time)

NOTE TO THE TEACHER

1. This practical activity will be completed as part of Section E of lesson 1C.
2. This practical will take place during the lesson after the teaching component in Section D, "Accessing Information".
3. The first 20 minutes will be used to teach section D and prepare learners for the practical task.
4. The next 40 minutes will be used to complete the practical activity as outlined in Section E.
5. The instructions and content of the practical task should be written on the chalkboard for the learners.
6. The memorandum for assessing the practical task is provided.
7. This practical will be done in groups of 6.
8. Each group will need the following equipment and materials to complete the practical task:
   - a container of water
   - a few teaspoons of cooking oil
   - 2 cups or tins or jars
   - a flat plate or large lid or polystyrene tray
   - a spoon/stick to stir
   - a piece of newspaper
9. The learners should complete the drawings with a sharp pencil if possible and the written answers should be completed in pen.

PRACTICAL TASK - MEMORANDUM

NS & TECH
GRADE 4
PRACTICAL TASK
TERM 2

10 MARKS

(see Section E of Lesson 1C for instructions and questions)

Topic	Activity	Expected answer/outcome	Marks
	1		
Materials around us	1.1	It has no colour ✓	1
Materials around us	1.2	It has no smell ✓	1
Materials around us	1.3	Yes ✓	1
Materials around us	1.4	Feels wet ✓	1
Materials around us	1.5	The water can easily be poured. ✓	1
Materials around us	1.6	A very little of the water is left behind. Almost all of it has poured from one cup to the other. ✓	1
Materials around us	1.7	It flows and spreads to take the shape of the plate ✓	1
	2		
Materials around us	2.1	It is yellow ✓	1
Materials around us	2.2	It has a smell. (Description may vary) ✓	1
Materials around us	2.3	Yes ✓	1
Materials around us	2.4	Feels slippery/sticky ✓	1
Materials around us	2.5	The oil can easily be poured.	1
Materials around us	2.6	Some of the oil has coated the sides of the cup. ✓	1
Materials around us	2.7	It flows and spreads to take the shape of the plate. ✓	1

	3		
Materials around us	3.1	The oil and water do not mix together. ✓	1
Materials around us	3.2	The oil floats to the top. ✓	1
Materials around us	3.3	The strip dripped in water. ✓	1
Materials around us	3.4	Evaporation ✓	1
Materials around us	3.5	Choose one) They can be poured They flow to take up space You can put your finger into them ✓	1
Materials around us	3.6	(Choose one) Colour Smell Water evaporates faster Water feels wet and not slippery, oil feels wet and slippery ✓	1
		TOTAL	**20**

GRADE 4 ASSESSMENT

TERM EXAM

NS & TECH
GRADE 4
EXAM
TERM 2

40 MARKS
60 MINUTES

NOTE TO THE TEACHER:

If possible, photocopy this test for each learner. If this is not possible, write the test 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.

Which of the following is <u>not</u> a living thing?

A. bird
B. stone
C. ant
D. dog

You have answered correctly if you have circled (B)

GRADE 4 ASSESSMENT

NS & TECH
GRADE 4
TERM 1
EXAM

40 MARKS

PART 1: Life and Living

Question 1: Multiple choice [4]

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

1.1. Which one of these is NOT a life process?

A. Thinking
B. Breathing
C. Reproducing
D. Growing

1.2. Which of these statements is TRUE?

A. Plants release carbon dioxide as a waste substance
B. Sweating is a way of getting rid of waste substances
C. Animals release oxygen as a waste substance
D. Plants and animals do not need to release waste

1.3. Which of these statements is FALSE?

A. The flower of a plant produces seeds
B. The stem supports the plant and holds the leaves
C. The seeds of a fruit can be on the inside or the outside
D. The roots are only needed to hold the plant in the soil

1.4. Which one of these groups describes conditions needed for growth in plants?

A. Heat, water, oxygen, soil
B. Water, sunlight, oxygen, animals
C. Sunlight, soil, water, air
D. Heat, wind, water, soil

Question 2: Match the columns **[4]**

Instructions:

- Match the sentences in COLUMN A with the words in COLUMN B.
- Draw a line to join the sentence in COLUMN A with the correct word in COLUMN B. Do this as shown in the example below.

COLUMN A		COLUMN B
example	Non-living	A. Nutrients
2.1.	Seed	B. Habitat
2.2.	Any substance that nourishes or feeds a living thing	C. Adapted
2.3.	Grassland	D. Dormant
2.4.	An animal that is suited to its habitat	E. Rock

Question 3 **[4]**

Complete the following sentences using words in the block below:

fruits, anchored, stems, water, nutrients

Rewrite the sentences and underline your answers.

3.1. The roots of a plant grow under the ground and keep the plant_____.

3.2. Roots absorb _____ and water from the soil for the plant.

3.3. All plants have leaves, roots and _____.

3.4. Some plants also have flowers and_____.

Question 4 **[3]**

Write the word that is being described in the sentence.

Only write the answer.

4.1. The place where an animal or plant lives.

_____

4.2. An animal that hunts and eats other animals.

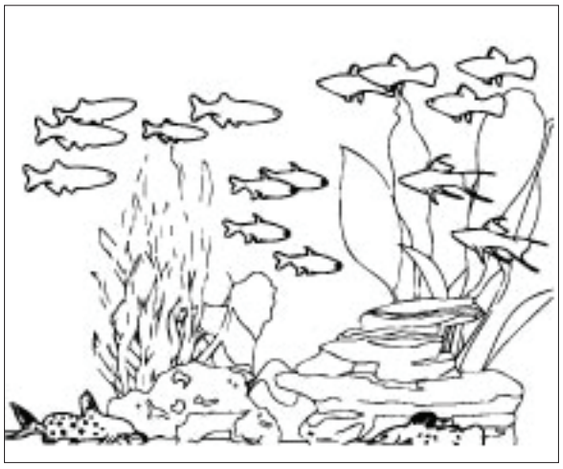
_____

4.3. All the plants and plant life in a place.

_____

Question 5 **[4]**

The diagram below shows an ocean habitat.



(Note to teacher: Copy this picture or use Term 1, Resource 18)

oceans, seas, salt water, 75 % Earth's surface, fish, turtles, predators, beaches, shores, seagulls, rocks

Using this diagram and the words above to write 4 sentences to explain what you know about ocean habitats.

_____

_____

_____

_____

_____

_____

PART 2: Matter and Materials

Question 6 **[4]**

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

6.1 Which one of these is NOT one of the three states of matter?

A. Solid
B. Liquid
C. Gas
D. Molecule

6.2 Which of these statements is TRUE?

A. All matter is made up of molecules
B. Only the molecules in liquids move
C. Molecules don't move, they are still and solid
D. Molecules are always the same distance apart from each other

6.3 Which of these statements is FALSE?

A. Oxygen is a gas
B. Gases can be stored in an open container
C. Gases can be compressed
D. Carbon dioxide is a gas

6.4 Which one of these correctly describes the melting of ice?

A. Liquid→ solid
B. Liquid→solid
C. Solid→gas
D. Solid→liquid

Question 7: Match the columns **[4]**

Instructions:

- Match the sentences in COLUMN A with the words in COLUMN B.
- Draw a line to join the sentence in COLUMN A with the correct word in COLUMN B. Do this as shown in the example below.

COLUMN A		COLUMN B
example	Solid form of water	A. Water vapour
7.1	A solid is changed to a liquid when heat is added	B. Melting
7.2	Formed when water vapour condenses high up in the air	C. Rain
7.3	Water in a gas form	D. Condensation
7.4	Process of water vapour cooling to a liquid	E. Ice

Question 8 **[5]**

Complete the following sentences using words in the block below:

manufactured, raw, processed, plastics, naturally

Rewrite the sentences and underline your answers.

8.1. Wood, wool and sand are examples of_____ materials.

8.2. Glass, shoes and petrol are examples of _____materials.

8.3. Raw materials occur _____and need to be _____ before they can be used.

8.4. _____ are flexible and can be moulded into different shapes.

Question 9 **[4]**

Write the word that is being described in the sentence.
Only write the answer.

9.1. A mixture of sand, limestone and soda ash is used to manufacture this product.
_____

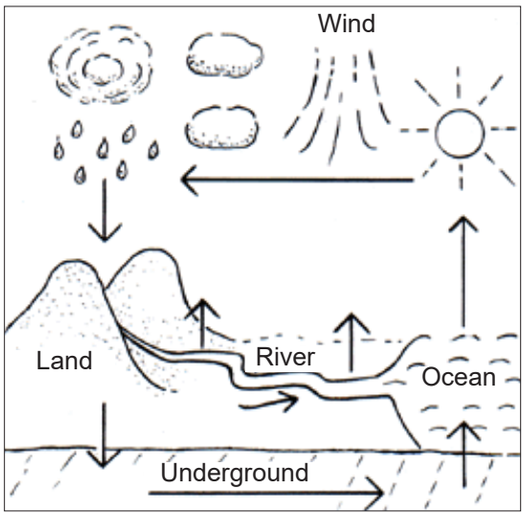
9.2. A raw material that is mined from the Earth that is used to make electricity.
_____

9.3. Animal hides are processed here to make leather.
_____

9.4. Raw material used to make paper.
_____

Question 10 **[8]**

The diagram below shows an ocean habitat.



(Note to teacher: Copy this picture or use Term 2 Poster)

ocean, river, water, evaporation, water vapour, sun, clouds, condensation, rain, ground, flows, cycle

Using this diagram and the words above to write 4 sentences to explain what you know about ocean habitats.

_____

_____

_____

_____

_____

_____

TOTAL [40]

TERM 2 EXAM – MEMORANDUM

NS & TECH
GRADE 4
MEMORANDUM
TERM 2

40 MARKS
60 MINUTES

Caps Topic	Questions	Expected answer(s)	Marks
PART 1: Life and the Living			
	1		
Living and non-living things	1.1	A✓	1
What plants need to grow	1.2	B✓	1
What plants need to grow	1.3	D✓	1
What plants need to grow	1.4	C✓	1
	2		
Living and non-living things	2.1	D✓	1
Living and non-living things	2.2	A✓	1
Habitats	2.3	B✓	1
Habitats	2.4	C✓	1
	3		
What plants need to grow	3.1	anchored✓	1
What plants need to grow	3.2	nutrients✓	1
What plants need to grow	3.3	leaves✓	1
What plants need to grow	3.4	fruits✓	1
	4		
Habitats	4.1	habitat✓	1
Habitats	4.2	predator✓	1
Habitats	4.3	vegetation✓	1

	5		
Living and non-living things	5	(Any 4) • Oceans and seas are salt water✓ • They cover 75% of the Earth's surface✓ • There are animals that live under the water, like fish ✓ • There are animals that live under water and a bit on land, like turtles ✓ • Turtles lay their eggs under the sand on the beach before going back to the ocean ✓ • Sharks are one of the predators of the sea ✓ • Lots of small creatures live in the shallow water around the rocks near the shore, ✓ • like crabs and mussels ✓ • Seagulls are birds that rely on the sea for food✓	4

GRADE 4 ASSESSMENT

Caps Topic	Questions	Expected answer(s)	Marks
PART 2: Matter and Materials			
	6		
Materials around us	6.1	D✓	1
Materials around us	6.2	A✓	1
Materials around us	6.3	B✓	1
Materials around us	6.4	D✓	1
	7		
Materials around us	7.1	B✓	1
Materials around us	7.2	C✓	1
Materials around us	7.3	A✓	1
Materials around us	7.4	D✓	1
	8		
Solid materials	8.1	raw✓	1
Solid materials	8.2	manufactured✓	1
Solid materials	8.3	naturally✓ processed✓	2
Solid materials	8.4	plastics✓	1
	9		
Solid materials	9.1	glass✓	1
Solid materials	9.2	coal✓	1
Solid materials	9.3	tannery✓	1
Solid materials	9.4	wood✓	1

	10		
Materials around us	10	(Any 4) • Water is in a liquid state in the sea or river or dam✓ • The sun heats the water ✓ • Some of the water evaporates ✓ • and turns into water vapour ✓ • The water vapour condenses to form clouds ✓ • Rain then falls to Earth ✓ • This water then flows back into the sea or rivers ✓ • It soaks into the ground into the underground water ✓ • The water cycle starts again ✓	4
		TOTAL	**40**