Interesting Science fact #2

There is enough DNA in an average person's body to stretch from the sun to Pluto and back – 17 times.

NATURAL SCIENCES & TECHNOLOGY

LESSON PLAN
GRADE 5 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

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PROGRAMME ORIENTATION

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

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

Lesson Plan Structure

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

   1 x 1 hour 30 minutes

   2 x 1 hour

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

Lesson Plan Contents

1. The lesson plan starts with a **CONTENTS PAGE** that lists all the topics for the term, together with a breakdown of the lessons for that topic. You will notice that lessons are named by the week and lesson number, for example, Week 8 Lesson 8C.

2. Every topic begins with a 2 - 4 page **TOPIC OVERVIEW**. The topic overview pages are grey, making them easy to identify. The topic overview can be used to introduce the topic to learners. The topic overview includes:

   a. A ***general introduction*** to the topic that states how long the topic runs for, the value of the topic in the final exam and the number of lessons in the topic.

   b. A table showing the ***position of the topic*** in the term.

   c. A ***sequential table*** that shows the prior knowledge required for this topic, the current knowledge and skills that will be covered, and how this topic will be built on in future years. Use this table to give learners an informal quiz to test their prior knowledge. If learners are clearly lacking in the knowledge and skills required, you may need to take a lesson to cover some of the essential content and skills. It is also useful to see what you are preparing learners for next, by closely examining the 'looking forward' column.

   d. A glossary of ***scientific and technological vocabulary***, together with an explanation of each word or phrase. It is a good idea to display these words and their definitions somewhere in the classroom, for the duration of the topic. It is also a good idea to allow learners some time to copy down these words into their personal dictionaries or science exercise books. You must explicitly teach the words and their meanings as and when you encounter these words in the topic. A good way to teach learners new vocabulary is to use 'PATS':

- 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 5							
Term 1		**Term 2**		**Term 3**		**Term 4**	
Strands NS & Tech		**Strands NS & Tech**		**Strands NS & Tech**		**Strands NS & Tech**	
Life and Living	**Structures**	**Matter and Materials**	**Processing**	**Energy and Change**	**Systems and Control**	**Planet Earth and Beyond**	**Systems and Control**
Plants and animals on Earth Animal Skeletons Food Chains Life cycles	Skeletons and structures	Metals and non-metals Uses of metals	Processing materials Processed materials	Stored energy in fuels Energy and electricity Energy and movement	Systems for moving things	Planet Earth Surface of the Earth Sedimentary Rocks Fossils	-
These lesson plans have been designed against the stipulated CAPS requirements with topics being allocated for the time prescribed by CAPS. (Remember that some slight changes have been incorporated to accommodate time for revision, tests and examinations).							

PROGRAMME ORIENTATION

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

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

	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 1 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 1 2½ 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?		

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?		

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

TOPIC OVERVIEW:
Metals and non-metals
Term 2, Weeks 1A – 2C

A. TOPIC OVERVIEW

Term 2, Weeks 1a – 2c

- 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 4	GRADE 5	GRADE 6 & 7
LOOKING BACK	**CURRENT**	**LOOKING FORWARD**
• Raw and manufactured materials: raw materials used to make other useful materials • Properties of materials: specific properties – being hard or soft, stiff or flexible, strong or weak, light or heavy, waterproof or absorbent	• Properties of metals: metal used for certain products as they have special properties; some properties – shiny, hard, strong, malleable, ductile • Properties of non-metals: non-metals used for certain products as they have special properties: dull, brittle	• Properties of materials: physical properties and their impact on the environment

C. SCIENTIFIC AND TECHNOLOGICAL VOCABULARY

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

	TERM	EXPLANATION
1.	ore	A type of rock that contains minerals
2.	extracted (extract)	To take out by using a special method
3.	transparent	Something clear through which you can see
4.	properties	Qualities or characteristics of a substance
5.	flexible	Can bend easily without breaking
6.	mould	A shape into which something is poured
7.	dent	A hollow in a smooth surface
8.	molten	Made into liquid by heating
9.	ductile	Able to be hammered or drawn out into thin wires
10.	malleable	Able to be hammered into different shapes without breaking
11.	threads	Thin strands
12.	woven	Laced together to form cloth material

D. UNDERSTANDING THE USES / VALUE OF SCIENCE

All manufactured goods are made from metals or non-metals. They are used because of certain properties. Anyone involved in the field of design, such as engineers, architects, interior designers, etc. must have a knowledge of properties of metals and non-metals so that they can design and make successful products.

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: Properties of metals
Time for lesson: 1½ hours

A POLICY AND OUTCOMES

Sub-Topic	Introduction and examples of metals
CAPS Page Number	35

Lesson Objectives

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

- list some properties of metals
- explain what these properties mean.

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: Metal tools are hard	
Resource 2: Some metals are shiny, some are light and strong	
Resource 3: Some metals can be heated and shaped; some are strong	
Resource 4: Some metals are ductile, some are malleable	
Poster: Properties of metals and non-metals	

C CLASSROOM MANAGEMENT

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

What does the word 'manufactured' mean?

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.

Manufactured means that raw material has been used to make a product or other material.

D ACCESSING INFORMATION

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

SOME PROPERTIES OF METALS

1. Metals are raw materials found in rocks.
2. This rock is mined from under the ground.
3. Rock that has metal is called ore.
4. We make products from metals because they have useful properties.
5. Metals are strong.
6. You will not be able to pull a metal object apart.
7. If something was dropped on a metal object, the object would not break.
8. Some metals are hard.

9. Objects made from these metals will not dent easily.
10. Metals are shiny.
11. Some shiny metals become dull when they are left for a long period of time.
12. With cleaning, they become shiny again.
13. Metals are malleable.
14. This means they can be made hammered into shapes without their breaking.
15. Metals are ductile.
16. This means they can be made into thin, **flexible** wires without their breaking.
17. They can be stretched.
18. Metals melt at high temperatures.
19. Metals are heated so they can be hammered into shapes.

2. Explain this to the learners as follows:
   a. In Grade 4, the learners found out how raw materials are used to make manufactured products.
   b. Metal ore is a raw material.
   c. Metal is **extracted** from the ore and used to make many useful objects.
3. Go through each of the six properties of metals on the chalkboard: strong, hard, shiny, malleable, ductile, able to be heated to high temperatures. If a metal is hard, it means it will not dent easily.
4. Show learners Resource 1: 'Metal tools are hard' and explain that metal tools must be hard to do their job properly.
5. Show learners Resource 2: 'Some metals are shiny'. Explain:
   a. Jewellery is often made from silver and gold, as these metals are shiny.
   b. A metal is malleable if it can be made into another shape without it breaking.
   c. Most metals have a high melting point.
   d. Some metals are heated up so that they can be made into other shapes.
6. Show learners Resource 3: 'Some metals can be heated and shaped; some are strong'. Point out that the metal is melted and then poured into a **mould**. Explain:
   a. Aluminum is a strong but light metal and is therefore useful for packaging food.
   b. An iron chain is a very strong product which can be used to lift heavy loads.
7. Show learners the Poster: 'Properties of metals and non-metals'.
8. Read through the properties of hardness, appearance, malleability and ductility on the poster.
9. Show learners the metals associated with these properties.
10. Give learners time to copy this information into their workbooks.

Checkpoint 1

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

a. What does the word ‘malleable’ mean?

b. What does the word ‘ductile’ mean?

Answers to the checkpoint questions are as follows:

a. A metal is ‘malleable’ if it can be hammered into different shapes without breaking.

b. A metal is ‘ductile’ if it can be made into thin wires without breaking.

E CONCEPTUAL DEVELOPMENT

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

INVESTIGATE AND COMPARE THE PROPERTIES OF SOME METAL AND NON-METAL OBJECTS

You will need:

A coin

A piece of chalk

A nail

A stainless steel fork

A piece of cloth.

1. Copy the following table into your workbook.
2. Complete the table by testing the objects below:

Properties of materials

Object	Hard or soft	Shiny or dull	Stiff or bendy	Strong or weak
coin				
piece of chalk				
nail				
fork				
piece of cloth				

3. Answer the following questions in your workbook:
   a. Which objects were shiny?
   b. Are these objects made from metals or non-metals?
   c. Which objects do you think would break easily?
   d. Are these objects made from metals or non-metals?

2. Explain this to the learners as follows:
   a. First, learners must draw the table in their workbooks.
   b. If learners are doing this in groups, then get one person from each group to come up and collect the objects.
   c. If this is a teacher-led investigation, then the teacher must go through each object one-by-one.
   d. When the table is complete, learners must answer the questions in their workbooks.
3. A model answer:

2. **Properties of materials**

Object	Hard or soft	Shiny or dull	Stiff or bendy	Strong or weak
coin	*hard*	*shiny*	*stiff*	*strong*
piece of chalk	*soft*	*dull*	*stiff*	*weak*
nail	*hard*	*shiny*	*stiff*	*strong*
fork	*hard*	*shiny*	*stiff*	*strong*
piece of cloth	*soft*	*dull*	*bendy*	*weak*

3. a. The coin, nail and fork were shiny.
   b. These objects are made from metal.
   c. The piece of chalk and the piece of cloth would break easily.
   d. These objects are non-metals.

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

HOW TO MAKE DULL METAL OBJECTS SHINY

1. Sometimes metal objects lose their shine.
2. Metals can be polished to make them shiny.
3. They can be cleaned with natural or chemical cleaners.

INVESTIGATE HOW TO MAKE COPPER COINS SHINY

You will need:
½ cup of vinegar
table salt
teaspoon
lemon
some old copper coins
a soft cloth.

METHOD:

1. Pour ½ cup of vinegar into a bowl.
2. Add a spoonful of salt to the vinegar.
3. Stir the salt and vinegar until the salt has dissolved.
4. Add a teaspoonful of lemon juice to the mixture.
5. Put the copper coins into the mixture for five minutes.
6. Take the coins out and wipe them with a cloth until they are shiny.

5. Explain this to the learners as follows:
   a. Read through the information on the chalkboard with the learners.
   b. The investigation can either be done in groups or as a teacher-led demonstration.
   c. Metals can be cleaned and polished to make them shiny.
   d. Ask the learners why they think coins are made from metal.
      (Answer: The metal is hard and strong so the coins will last a long time.)

Checkpoint 2

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

a. What property does copper have when it is pulled to make wire?
b. What property do metals have when they can be hammered to make different shapes?

Answers to the checkpoint questions are as follows:

a. Copper is ductile.
b. Metals that can be hammered to make different shapes are malleable.

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

F REFERENCE POINTS FOR FURTHER DEVELOPMENT

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

NAME OF TEXTBOOK	TOPIC	PAGE NUMBER
Study & Master	Metals and non-metals	68-74
Viva	Metals and non-metals	53-56
Platinum	Metals and non-metals	62
Solutions for All	Metals and non-metals	69-72
Day-by-Day	Metals and non-metals	57-58
Oxford	Metals and non-metals	48-49
Spot On	Metals and non-metals	32-33
Top Class	Metals and non-metals	43-44
Sasol Inzalo Bk A	Metals and non-metals	122-125

G ADDITIONAL ACTIVITIES/ READING

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

1. http://e-classroom.co.za/wp-content/uploads/2013/05/EngGr5T2-NATSCIENCE-Metals-and-no-metals.pdf [Metals and non-metals]
2. http://www.bbc.co.uk/bitesize/ks2/science/materials/material_properties/read/1/ [Material properties]

1 B

Term 2, Week 1, Lesson B
Lesson Title: Properties of metals
Time for lesson: 1 hour

A POLICY AND OUTCOMES

Sub-Topic	Common metals and their properties
CAPS Page Number	35

Lesson Objectives

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

- name some common metals
- list the properties of these metals.

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: Some metals are ductile, some are malleable	

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 word is used to describe a metal that can be hammered into different shapes?

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 metal that can be hammered into different shapes is called malleable.

D ACCESSING INFORMATION

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

COPPER

1. Copper is ductile.
2. It can be made into thin wire.
3. Copper is used for electric wires.
4. Electrical wiring is used in cars, in electrical goods and to carry electricity to our homes and businesses.

GOLD AND SILVER

1. Gold and silver are extremely ductile, malleable, shiny and have a high melting point.
2. They can be made into very thin wire.
3. They are used for jewellery.

STEEL

1. Steel is a mixture of iron and carbon.
2. It is very strong and malleable.
3. Steel is used to make car bodies, as it can be moulded into shapes.
4. Steel rods are used in buildings and bridges to add strength.

IRON

1. Iron is strong, hard and has a high melting point.
2. Corrugated iron is used for roofing.
3. Some pots and pans are made from iron.
4. Gates are sometimes made from iron.
5. Benches need to be strong so they can also be made from iron.

2. Explain that Metals are used for a variety of purposes because of their properties.
3. Show learners Resource 4: 'Some metals are ductile'. Explain:
   a. Copper is **ductile**.
   b. It can be made into thin wires without breaking.
   c. It can be stretched.
   d. It is used for electrical wiring.
4. Show learners Resource 5: 'Gold is malleable'. Explain:
   a. Gold and silver are **malleable**.
   b. These metals can be shaped.
   c. Gold is used to make Kruger Rands and was used for the death mask of King Tutankhamen of Egypt.
   d. Steel is a mixture of iron and carbon.
   e. It is very strong, malleable and hard.
5. Show learners Resource 6: 'Steel is strong and malleable'. Explain:
   a. Steel is used to make buildings and bridges stronger.
   b. A material is strong if it does not break easily when a load is placed on it.
   c. Steel is also used for car and bus bodies.
   d. Steel is used to make tools, as it is strong.
6. Show learners Resource 1: 'Metal tools are hard'. Explain:
   a. A material is hard if it does not **dent** easily.
   b. Tools do not get dented.
7. Give learners time to copy this information into their workbooks.

Checkpoint 1

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

a. Why is gold used for jewellery?

b. Why is steel used to add strength to buildings?

Answers to the checkpoint questions are as follows:

a. Gold is malleable and ductile, so it is ideal for jewelry.

b. Steel is very strong so it adds strength to buildings.

E CONCEPTUAL DEVELOPMENT

1. Write the following onto the chalkboard:

SOME METALS AND THEIR PROPERTIES

Copy and complete the table below:

metal	**properties**	**used for**
copper		
gold and silver		
steel		
iron		

2. Explain this to the learners as follows:

   a. Fill in the table with the properties that are on the chalkboard.

   b. Also fill in what each type of metal is used for.

3. A model answer:

SOME METALS AND THEIR PROPERTIES

metal	*properties*	*used for*
copper	*ductile*	*electrical wires*
gold and silver	*ductile, malleable, shiny, has a high melting point*	*jewellery*
steel	*strong, malleable*	*car bodies; makes buildings and bridges stronger*
iron	*strong, hard, high melting point*	*corrugated roofs; benches; gates; pots and pans*

Checkpoint 2

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

a. What properties does steel have?
b. What is steel used for?

Answers to the checkpoint questions are as follows:

a. Steel is strong and malleable.
b. Steel is used to make buildings and bridges stronger, and in car bodies..

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
Study & Master	Metals and non-metals	68-70; 73-74
Viva	Metals and non-metals	48-62
Platinum	Metals and non-metals	62-65
Solutions for All	Metals and non-metals	77-78
Day-by-Day	Metals and non-metals	57-59
Oxford	Metals and non-metals	48-52
Spot On	Metals and non-metals	30-31
Top Class	Metals and non-metals	46-47
Sasol Inzalo Bk A	Metals and non-metals	124-132

G ADDITIONAL ACTIVITIES/ READING

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

1. https://goo.gl/JCafB8 (2min 22sec) [How stuff works: From ore to steel]
2. https://goo.gl/oaSJGX (2min 26sec) [Stainless steel or aluminum: how to tell?]

1 C

Term 2, Week 1, Lesson 1C
Lesson Title: Properties of metals
Time for lesson: 1 hour

A POLICY AND OUTCOMES

Sub-Topic	Common metals and their properties
CAPS Page Number	35

Lesson Objectives

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

- list some products made from metal
- choose the best metal for making some products.

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: Railway tracks	

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 copper used to make electrical wires?

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.

> *Copper is ductile and is therefore ideal for making electrical wires.*

D ACCESSING INFORMATION

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

> PRODUCTS MADE FROM METAL
>
> 1. Some metals are hard.
> 2. Hardness is the ability to resist scratches.
> 3. Metals that are hard do not bend or dent easily.
> 4. Railway tracks are made from iron, as iron is a hard metal.
> 5. Girders help support the weight of tall buildings.
> 6. Metals have high melting points.
> 7. Most metals are solid at room temperature.
> 8. Most metals only melt at very high temperatures.
> 9. The metal becomes a liquid.
> 10. It is then poured into a **mould**.
> 11. The metal then takes the shape of this mould when it cools down.
> 12. Car engines, metal poles and pieces of steel for a building are made in this way.

2. Explain and discuss the following with the learners:
   a. You have already learnt about some products made from metal in the previous lesson. The learners studied grassland, forest, river and sea habitats.

b. Car bodies, roofs, buildings, bridges, electrical wire, pots and pans, jewellery are all made from metal.

c. Hardness is an important property of some metals.

d. Many products are made out of metals that are hard: railway tracks, girders for buildings.

3. Show learners Resource 7: Railway tracks. Explain that:

d. Railway tracks are made from a metal that is hard: iron.

e. The high melting point of metal is another important property.

f. **Molten** metals are poured into moulds to make many products, like car engines.

6. Give learners time to copy this information into their workbooks.

Checkpoint 1

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

a. Why are railway tracks made from iron?

b. How are car engines made using metal?

Answers to the checkpoint questions are as follows:

a. Iron is a hard metal that does not bend or dent easily.

b. The metal is molten and then poured into a mould to take the shape of the car engine.

E CONCEPTUAL DEVELOPMENT

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

TASK: KNOW THE PROPERTIES OF METALS

Rewrite the following sentences and fill in the missing words from the list.

hard, melting point, mould, molten, dent, car engines, solid

1. Metals that are ____ do not bend or ____ easily.
2. Metals have a high ____ ____.
3. This allows the ____metal to be poured into a ____.
4. Metals are ____ at room temperature.
5. ____ ____ are made from molten metal being poured into a mould.

2. Explain this to the learners as follows:
    a. Read through the list of words and sentences.
    b. Make sure that the learners understand the meaning of the words and the sentences.
    c. Learners must underline the words that they have filled in.
3. A model answer:

TASK: KNOW THE PROPERTIES OF METALS

1. Metals that are hard do not bend or dent easily.
2. Metals have a high melting point.
3. This allows the molten metal to be poured into a mould.
4. Metals are solid at room temperature.
5. Car engines are made from molten metal being poured into a mould.

Checkpoint 2

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

a. Can you name a product that is made from a molten metal being poured into a mould?
b. Do metals melt at high or low temperatures?

Answers to the checkpoint questions are as follows:

a. Either of the following answers: car engines, metal poles or pieces of steel for buildings
b. Metals melt at high temperatures.

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
Study & Master	Metals and non-metals	68-70; 73-74
Viva	Metals and non-metals	54-57
Platinum	Metals and non-metals	63
Solutions for All	Metals and non-metals	69-81
Day-by-Day	Metals and non-metals	57-59
Oxford	Metals and non-metals	48-52
Spot On	Metals and non-metals	30
Top Class	Metals and non-metals	43-50
Sasol Inzalo Bk A	Metals and non-metals	126-145

G ADDITIONAL ACTIVITIES/ READING

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

1. http://sbsciencematters.com/lesson-units/5th-grade/5physical-chemistryandmatter/ [Lesson 17: Properties of metals]
2. http://schools.bcsd.com/fremont/5th_Sci_matter_Metal.htm [Properties of metals]

2 A

Term 2, Week 2, Lesson A
Lesson Title: Properties of metals
Time for lesson: 1½ hours

A POLICY AND OUTCOMES

Sub-Topic	Where do metals come from?
CAPS Page Number	35

Lesson Objectives

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

- investigate the properties of metals and non-metals
- predict the outcome of the investigation.

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
Poster: Properties of metals and non-metals	
Pieces of metal wire, two nails, coins, chalk, pieces of coal	

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 know that a metal is hard?

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 metal will not bend or dent easily, and it will resist scratches.

D ACCESSING INFORMATION

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

PROPERTIES OF METAL

1. The properties of metals that will be investigated are: shininess, hardness, malleability and brittleness.
2. A material is brittle if it breaks when it is dropped.
3. Glass is a brittle material.
4. You will predict the outcome of the investigation.
5. To predict means you forecast what will happen in the future.
6. Data will be recorded in a table.
7. You will write a conclusion.
8. A conclusion is a summary of what you found.

2. Explain this to the learners as follows:
   a. Learners will do an investigation into the properties of metals.
   b. They will investigate four properties: shininess, hardness, malleability and brittleness.
3. Give learners time to copy this information into their workbooks.

Checkpoint 1

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

a. What does 'brittleness' mean?

b. What does 'predict' mean?

Answers to the checkpoint questions are as follows:

a. A material is brittle if it breaks when it is dropped.

b. To predict something means to forecast or to think about what will happen in the future.

E CONCEPTUAL DEVELOPMENT

1. To do this activity, each group will need the following:
    - a piece of coat hanger wire (at least 10cm long)
    - a nail
    - a coin (10c, 20c or 50c)
    - a piece of hard coal
    - a piece of chalk
    - a few small pieces of cloth for rubbing
    - something sharp for scratching a surface with (this could be a pin, a maths compass, a nail, an opened paper clip, etc)
    - a hammer or a heavy stone
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 metals and non-metals.
4. They will be looking at three metal items in this investigation; wire, a nail and a coin.
5. They will be looking at three non-metal items in this investigation; chalk, a piece of coal and a stone.
6. Divide the learners into groups of six.
7. 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 three items made of metal and three non-metal items.
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 piece of coat hanger wire (at least 10cm long)
    - a nail
    - a coin (10c, 20c or 50c)
    - a piece of hard coal
    - a piece of chalk
    - a few small pieces of cloth for rubbing
    - something sharp for scratching a surface with (this could be a pin, a maths compass, a nail, an opened paper clip, etc)
    - a hammer or a heavy stone

8. Read through the practical task with the learners.
9. Remind the learners that in previous lessons they learnt about the properties of copper, steel and iron.
10. Tell the learners that today they are going to be investigating the properties of three items made of metal and that they will record their findings for assessment.
11. Tell the learners that they will be doing the same investigation on three non-metal items and they will also record those findings as well.
12. Have each group collect the equipment they will need (as listed on the board) for the task.
13. The following will need to be written onto the chalkboard (always try to do this before the lesson starts):

Task 1: Investigating for shininess (3 marks)

1. Predict: Which item do you think will get more shiny when rubbed or shined?
2. Using the pieces of cloth, rub or polish each item as hard as you can for about a minute.
3. Which items got more shiny when you rubbed them?
4. Which items did not get more shiny when you rubbed them?

14. Read through task 1 with the learners.
15. Tell the learners that when something is shiny, it looks new.
16. Tell the learners that for each task they will need to predict what they think the outcome will be. By predicting, we mean that we think about what might happen and then make a guess.
17. Ask them if they have any questions.
18. Tell the learners they have 15 minutes to complete task 1.
19. Supervise the learners whilst they complete the task and answer any questions that they may have.

20. After 5 minutes call the learners back to attention.
21. Tell the learners that they are now going to be investigating how hard the surface of each of these materials is.
22. Remind the learners that the surface of an object it the top area of the object. Show the learners the surface of a desk.
23. Ask the learners why it would be important for someone to know how hard the surface of something is? (*Answer: So that you always use the right materials. If you need something to have a hard surface, you need to choose the right material.)*
24. The following will need to be written on the chalkboard (always try to do this before the lesson starts):

Task 2: Investigating hardness (5 marks)

1. Predict: Which item/s do you think will be the hardest?
2. Using a nail, pin, maths compass or something sharp, try and scratch a deep mark into each of the five items.
3. Which items could you not scratch?
4. Which items were you able to scratch?
5. Which item has the softest surface?
6. Which item had the hardest surface?

25. Read through task 2 with the learners.
26. Ask them if they have any questions.
27. Tell the learners that they have 5 minutes to complete task 2.
28. Supervise the learners whilst they complete the task and answer any questions that they may have.
29. After 5 minutes call the learners back to attention.
30. Tell the learners that they are now going to complete a third task.
31. The following will need to be written on the chalkboard (always try to do this before the lesson starts):

Task 3: Investigating brittleness (4 marks)

1. Predict: Which item/s do you think will break when dropped?
2. Hold each item at shoulder height and drop it onto a hard floor.
2. Which items did not break up at all?
3. Which items broke up just a little?
4. Which item was the most brittle?

32. Read through task 3 with the learners.
33. Tell the learners that when something is brittle, it means it breaks easily.
34. Ask the learners if any of them can remember the name of the disease they learnt about last term where an old person breaks their bones easily. It is also called “brittle bone disease.” (Answer: Osteoporosis).
35. Ask them if they have any questions about the task.
36. Tell the learners that they have 5 minutes to complete task 3.

37. Supervise the learners whilst they complete the task and answer any questions that they may have.
38. After 5 minutes call the learners back to attention.
39. Tell the learners that they are now going to complete a fourth task.
40. The following will need to be written on the chalkboard (always try to do this before the lesson starts):

Task 4 : Investigating malleability (8 marks)

For this task you are only going to test the wire, the nail and the coin.

1. Which item/s do you think are malleable? (To test for malleability, first try and bend the item with your bare hands).
2. Name the metal items you were able to bend with your bare hands?
3. Which item/s were you unable to bend with your bare hands?

You are once again going to test the wire, the nail and the coin

Using a hammer or a stone, see if you are able to flatten a part of the item with the weight of the hammer or stone.

4. Which items were you able to flatten slightly?
5. Which item/s were you unable to flatten at all?
6. After doing these two tests for malleability, which of the three items are the most malleable?
7. Why do you say this item is the most malleable?

41. Read through the practical task with the learners.
42. Remind the learners that in previous lessons they learnt about the property of malleability.
43. Ask the learners if they can remember what malleability is.(Answer: Able to be bent and hammered into different shapes without breaking).
44. Remind the learners that they are only testing the nail, coin and wire because malleability is a property of metals.
45. Ask the learners if they have any questions about the task.
46. Tell the learners they have 5 minutes to complete task 4.
47. Supervise the learners whilst they complete the task and answer any questions that they may have.
48. Have learners hand in their workbooks for assessment.

F REFERENCE POINTS FOR FURTHER DEVELOPMENT

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

NAME OF TEXTBOOK	TOPIC	PAGE NUMBER
Study & Master	Metals and non-metals	68-70; 73-74
Viva	Metals and non-metals	54-57
Platinum	Metals and non-metals	63
Solutions for All	Metals and non-metals	69-81
Day-by-Day	Metals and non-metals	57-59
Oxford	Metals and non-metals	48-52
Spot On	Metals and non-metals	30
Top Class	Metals and non-metals	43-50
Sasol Inzalo Bk A	Metals and non-metals	126-145

G ADDITIONAL ACTIVITIES/ READING

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

1. https://goo.gl/U2x1ic (2min 4sec) [BBC Bitesize Metals and non-metals]
2. https://goo.gl/XfaFoN [Tom Newby School Natural Science and Technology Grade 5]

2 B

Term 2, Week 2, Lesson B
Lesson Title: Properties of non-metals
Time for lesson: 1 hour

A POLICY AND OUTCOMES

Sub-Topic	Properties of non-metals
CAPS Page Number	35

Lesson Objectives

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

- list some properties of metals
- explain what these properties mean.

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
Poster: Properties of metals and non-metals	
Resource 8: Non-metals: plastic bucket and electric plug	

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 know that metal wire is malleable?

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 wire is hammered, it will change shape but it will not break.

D ACCESSING INFORMATION

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

SOME PROPERTIES OF NON-METALS

1. Like metals, non-metals are used to make things because of their properties.
2. Some non-metals, like glass and ceramic pots, break easily.
3. They are brittle.
4. They will break easily when dropped.
5. Ceramic pots and glass are brittle.
6. Most non-metals are dull.
7. When they are rubbed or polished, they do not shine.
8. Some non-metals are not malleable.
9. They cannot be hammered into shapes.
10. Non-metals are not ductile.
11. They cannot be made into thin wire.
12. Non-metals are not malleable.
13. Non-metals do not conduct heat.
14. This means heat does not pass through them.
15. Non-metals are not good conductors of electricity.

16. Electrical current does not travel through non-metal materials.
17. Examples of non-metals are glass, sand, wood, plastic, leather and fabric.

2. Explain this to the learners as follows:
   a. Remind learners that in the investigations that they did in the previous lesson, some of the items were non-metals.
   b. The chalk, coal and stone were non-metals.
   c. Most non-metals can be dull and brittle.
   d. Non-metals do not conduct heat.
   e. Non-metals are not good conductors of electricity.
6. Show learners Resource 8: 'Non-metals: plastic bucket and electric plug'.
   a. Ask learners why they think an electric plug is made from plastic. (Answer: It is made from plastic so that electrical current will not flow through it. Therefore, you will not get a shock.)
   b. Ask learners why they think the bucket is made from plastic?
   c. (Answer: Plastic is waterproof, strong and light).
   d. Show learners the Poster: 'Properties of metals and non-metals'.
   e. Go through the properties of non-metals on the poster.
   f. Give learners time to copy this information into their workbooks.

Checkpoint 1

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

a. Chalk and coal are non-metals. Is this true or false?
b. Two of chalk's properties are its dullness and brittleness. Is this true or false?

Answers to the checkpoint questions are as follows:

a. True
b. True

E CONCEPTUAL DEVELOPMENT

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

TASK: METALS AND NON-METALS

1. Make a copy of the following table in your workbooks.

METALS	NON-METALS

2. Write down and place each of the following materials in the correct column: plastic, glass, aluminium, copper, steel, coal, iron, gold, wood, charcoal.

2. Explain this to the learners as follows:
    a. Read through the list of materials to make sure the learners know each material.
    b. Ask learners to copy the table into their workbooks.
    c. They must write the materials in the correct column.
3. Give learners time to complete this task in their workbooks.
4. A model answer:

TASK: METALS AND NON-METALS

METALS	**NON-METALS**
aluminium, copper, steel, iron, gold	plastic, glass, coal, wood, charcoal

Checkpoint 2

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

a. Why is plastic a good material for a bucket?
b. Why is plastic a good material for an electric plug?

Answers to the checkpoint questions are as follows:

a. Plastic is a good material for a bucket as it is waterproof, strong and light.
b. Plastic is a good material for an electric plug as it does not conduct electrical current.

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

F REFERENCE POINTS FOR FURTHER DEVELOPMENT

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

NAME OF TEXTBOOK	TOPIC	PAGE NUMBER
Study & Master	Metals and non-metals	75-81
Viva	Metals and non-metals	58-60
Platinum	Metals and non-metals	68-71
Solutions for All	Metals and non-metals	80
Day-by-Day	Metals and non-metals	63-65
Oxford	Metals and non-metals	53-55
Spot On	Metals and non-metals	32-33
Top Class	Metals and non-metals	48-51
Sasol Inzalo Bk A	Metals and non-metals	139-145

G ADDITIONAL ACTIVITIES/ READING

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

1. http://e-classroom.co.za/wp-content/uploads/2013/05/EngGr5T2-NATSCIENCE-Metals-and-no-metals.pdf [Metals and non-metals]
2. https://goo.gl/pDDm64 [Properties of metals and non-metals]

2 C

Term 2, Week 2, Lesson C
Lesson Title: Products made from non-metals
Time for lesson: 1 hour

A POLICY AND OUTCOMES

Sub-Topic	Properties of metals
CAPS Page Number	35

Lesson Objectives

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

- list some products made from non-metals
- choose the best non-metals for making some products.

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
Poster: Properties of metals and non-metals	
Resource 8: Non-metals: plastic bucket and electric plug	
Resource 9: Non-metals: Rope and wool	
Resource 10: Non-metals: Glass windows	
Tin mug, plastic mug, hot water	

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 non-metals are brittle?

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.

Ceramic pots and glass are brittle (learners might give other correct answers).

D ACCESSING INFORMATION

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

PRODUCTS MADE FROM NON-METALS

1. Plastics are waterproof, easily-shaped and are light.
2. Plastic is not a good conductor of heat or electricity.
3. Plastic is used to make products that need these properties, like plastic buckets and electric plugs.
4. Glass is brittle and **transparent**.
5. 'Transparent' means you can see through it.
6. Windows are made from glass.
7. Wood is strong and hard.
8. Furniture is made from wood.
9. Fabric is made from tiny **threads**.

10. These threads can be knitted or **woven** together.
11. These threads make strong, flexible fabric.

2. Explain this to the learners as follows:
   a. Non-metals have properties that are needed for certain products.
   b. Read through the information on the chalkboard.
   c. The non-metals are plastic, glass, wood and fabric.
   d. The products that are made from these materials because the materials have certain properties.
3. Show learners Resource 8: 'Non-metals: plastic bucket and electric plug'. Explain:
   a. Plastic is light and strong and not a good conductor of electricity.
   b. It forms a good material for making buckets and electric plugs.
4. Show learners Resource 9: 'Non-metals: Rope and wool'. Explain:
   a. Rope and wool are made from threads.
   b. This makes them strong and **flexible**.
5. Show learners Resource 10: 'Non-metals: Glass windows.
   Explain:
   a. Glass is transparent so it forms a good material for windows.
   b. Wood is strong and hard.
   c. It forms a good material for furniture.
6. Give learners time to copy this information into their workbooks.

Checkpoint 1

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

a. Why are windows made from glass?
b. Why is furniture made from wood?

Answers to the checkpoint questions are as follows:

a. Glass is transparent.
b. Wood is strong and hard.

E CONCEPTUAL DEVELOPMENT

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

INVESTIGATION: A TIN MUG AND A PLASTIC MUG

You will need:
a tin mug
a plastic mug
hot water.

METHOD

1. Feel the outside temperature of each mug before hot water is poured in.
2. Pour the same amount of hot water into each mug.
3. Feel the outside temperature of each mug after 30 seconds.
4. In your workbooks, describe the properties of each mug.
5. Say which property makes one of the mugs a more useful mug.

2. Explain this to the learners as follows:
   a. This can be done in groups or as a teacher-led demonstration.
   b. Be careful when working with hot water.
   c. Get the learners to feel the temperatures of the outside of the mugs, after hot water has been poured in.
3. Give learners time to complete the investigation and to write the properties of the mugs in their workbooks.
4. A model answer (answers may vary): The model answers are as follows:

Properties of the tin mug:
hard, good conductor of heat, strong.

Properties of the plastic mug:
hard, not a good conductor of heat, strong.

The plastic mug is a more useful mug as it does not conduct heat and therefore does not get hot.

Checkpoint 2

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

a. What property of metals makes the tin mug hot when it is filled with hot water?
b. Why is the same amount of water poured into each mug?

Answers to the checkpoint questions are as follows:

a. Metals are good conductors of heat.
b. This is then a fair test for an investigation.

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

F REFERENCE POINTS FOR FURTHER DEVELOPMENT

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

NAME OF TEXTBOOK	TOPIC	PAGE NUMBER
Study & Master	Metals and non-metals	68-70; 73-74
Viva	Metals and non-metals	54-57
Platinum	Metals and non-metals	63
Solutions for All	Metals and non-metals	69-81
Day-by-Day	Metals and non-metals	57-59
Oxford	Metals and non-metals	48-52
Spot On	Metals and non-metals	30
Top Class	Metals and non-metals	43-50
Sasol Inzalo Bk A	Metals and non-metals	126-145

G ADDITIONAL ACTIVITIES/ READING

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

1. http://chemistry.tutorvista.com/inorganic-chemistry/uses-of-non-metals.html [Uses of non-metals]
2. http://www.edu.helsinki.fi/malu/materials/materials_around_us.pdf [Materials around us]

TOPIC OVERVIEW:
Uses of metals
Term 2, Weeks 3A – 4A

A. TOPIC OVERVIEW

Term 2, Weeks 3a – 4a

- This topic runs for 1½ weeks.
- It is presented over 4 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 4	GRADE 5	GRADE 6 & 7
LOOKING BACK	**CURRENT**	**LOOKING FORWARD**
• Raw and manufactured materials: raw materials used to make other useful materials • Properties of materials: specific properties – being hard or soft, stiff or flexible, strong or weak, light or heavy, waterproof or absorbent	• Other properties of metals: conduct heat, some are magnetic, iron rusts • Uses of metals: used to make products such as coins, wire, jewellery, furniture, buildings and bridges, motor cars, kitchen utensils, roofs	• Properties of materials: physical properties and impact on the environment

C. SCIENTIFIC AND TECHNOLOGICAL VOCABULARY

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

	TERM	EXPLANATION
1.	conductors	Materials that transmit heat
2.	attracts	A force that draws things towards one another or makes them stay together
3.	junk yard	A place where recyclable metal is taken to be processed so that it can be melted to make new products
4.	exposed	Left open to the weather
5.	coated	To provide a covering of some sort
6.	pylons	Tall tower-like structures that hold up the cables and roadway of a bridge
7.	cables	A thick rope made of wire or steel
8.	cutlery	Knives, forks and spoons

D. UNDERSTANDING THE USES / VALUE OF SCIENCE

Many manufactured goods are made from metals. These metals are chosen because of certain properties. Metals conduct heat and some are magnetic. It is also useful to know that some metals tarnish and become dull, while iron rusts.

E. PERSONAL REFLECTION

Reflect on your teaching at the end of each topic:

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

3 A

Term 2, Week 3, Lesson A
Lesson Title: Other properties of metals
Time for lesson: 1½ hours

A POLICY AND OUTCOMES

Sub-Topic	Other useful properties of metals
CAPS Page Number	36

Lesson Objectives

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

- list some other properties of metals such as good conductors of heat and magnetism
- name some products made from metals that possess these 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	✓		

TOPIC: Uses of metals

B POSSIBLE RESOURCES

For this lesson, you will need:

IDEAL RESOURCES	IMPROVISED RESOURCES
Resource 14: Metals are good conductors of heat	
Resource 15: Iron is magnetic: Crane used to lift cars	
Resource 16: A magnet attracts paper clips	
A magnet, a 50c coin, a nail, a piece of chalk, a piece of aluminium foil, a metal paper clip for each group	

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 are windows made from glass?

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.

Windows are made from glass as glass is transparent.

D ACCESSING INFORMATION

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

MORE PROPERTIES OF METALS

1. Good conductors of heat

   a. Metals are good conductors of heat.
   b. This means that heat can travel easily through the metal.
   c. The metal heats up quickly.
   d. Therefore, cooking pots and pans are made from metal.
   e. Copper, iron and steel are good conductors of heat.

2. Some metals are magnetic

   a. Some metals are magnetic.
   b. A magnet is a piece of metal that can stick to some other metals or make other metals move towards it.
   c. Iron is a metal that is magnetic.
   d. Stainless steel is magnetic as it is made with iron.
   e. Copper, gold, tin and aluminium are not magnetic.

2. Explain to the learners that some metals are good conductors of heat:
   a. Some, not all, metals are good conductors of heat.
   b. These metals are used to make pots and pans.
   c. The heat will travel easily through the metal so that the food can cook quickly.
   d. Show learners Resource 14: 'Metals are good conductors of heat'.
   e. Copper pots are used for cooking.
3. Explain to the learners that some metals are magnetic:
   a. A magnet is a piece of metal that pulls certain things towards it.
   b. We say that the magnet attracts the objects.
   c. Not all metals are magnetic.
   d. Iron is a magnetic metal.
   e. Show learners Resource 15: 'Iron is magnetic: Crane used to lift cars'.
   f. At the end of the cable is a huge magnet.
   g. The magnet is strong enough to lift a car.
   h. This type of crane is used in a junk yard.
4. Give learners time to copy this information into their workbooks.

Checkpoint 1

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

a. What product is made from metal because metals are good conductors of heat?
b. What is a magnet?

Answers to the checkpoint questions are as follows:

a. Pots and pans are made from metal so that heat can travel through the metal to the food.
b. A magnet is a piece of metal that can stick to some other metals or make other metals move towards it.

E CONCEPTUAL DEVELOPMENT

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

TASK: METALS ARE GOOD CONDUCTORS OF HEAT

Some homes are made from corrugated iron.

1. What will these homes be like in summer?
2. Why are spoons for cooking made from wood and not metal?
3. Why are pots and pans for cooking made of metal?

2. Explain the following to the learners:
   a. Ask learners to think carefully about their answers and then write them down.
   b. When they have written down their answers, give them two minutes to share their answers with a partner.
   c. They can change their answers, if they would like to.
   d. Get some learners to share their answers with the class.
3. Give learners time to complete this task in their workbooks.
4. A model answer:

METALS ARE GOOD CONDUCTORS OF HEAT

1. *Homes with corrugated iron roofs will be very hot in summer as iron is a good conductor of heat.*
2. *Cooking spoons are made from wood as wood does not conduct heat. Therefore, the spoons will not get hot.*
3. *Pots and pans need to be made of metal as metal is a good conductor of heat and heat will travel quickly through the metal to the food.*

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

TASK: INVESTIGATE WHICH PRODUCTS ARE MAGNETIC

You will need:

a magnet

a 50c coin

a nail

a piece of chalk

a piece of aluminium foil

a metal paper clip.

METHOD

1. *Take each item and move the magnet close to it.*
2. *Observe which item moves toward the object.*
3. *Record your results in a table.*

Table: Magnetism of materials

Item	*Magnetic: Yes or no?*
a 50c coin	
a nail	
a piece of chalk	
a piece of aluminium foil	
a paper clip	

6. Explain this to the learners as follows:
   a. This task is to find out which items are magnetic.
   b. This can be done as a teacher-led demonstration or learners can be put into groups.
   c. Learners must first draw the table into their workbooks.
   d. Learners must then gather the magnet and items.
   e. Learners can add their own items to the list.
   f. They can use the metal legs of a chair, wooden desk tops, and the door handle.
   g. Not all metals are magnetic.
7. A model answer:

TASK: INVESTIGATE WHICH PRODUCTS ARE MAGNETIC

Table: Magnetism of materials

Item	**Magnetic: Yes or no?**
a 50c coin	Yes
a nail	Yes
a piece of chalk	No
a piece of aluminium foil	No
a paper clip	Yes

8. Explain this to the learners as follows:
   a. Not all metals are magnetic.
   b. Metals with iron in them are magnetic.

Checkpoint 2

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

a. Can you name a metal that is magnetic?
b. Can you name a metal that is not magnetic?

Answers to the checkpoint questions are as follows:

a. Iron is magnetic.
b. Any of the following answers: gold, silver, aluminium, copper.

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

F REFERENCE POINTS FOR FURTHER DEVELOPMENT

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

NAME OF TEXTBOOK	TOPIC	PAGE NUMBER
Study & Master	Uses of metals	82-84
Viva	Uses of metals	63-66
Platinum	Uses of metals	73-76
Solutions for All	Uses of metals	83-86
Day-by-Day	Uses of metals	67-68
Oxford	Uses of metals	56-58
Spot On	Uses of metals	34-36
Top Class	Uses of metals	51-54
Sasol Inzalo Bk A	Uses of metals	147-163

G ADDITIONAL ACTIVITIES/ READING

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

1. https://goo.gl/h2ywPo (2min 9sec) [Magnetism - 5th Grade]
2. https://goo.gl/vkpV8h (5min 38sec) [Bill Nye Magnetism Part 1]
3. https://goo.gl/i4yKGr (3min) [Magnets for kids]

3 B

Term 2, Week 3, Lesson B
Lesson Title: Other properties of metals
Time for lesson: 1 hour

A POLICY AND OUTCOMES

Sub-Topic	Heat conductivity
CAPS Page Number	35

Lesson Objectives

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

- explain why iron rusts
- investigate how iron rusts
- describe ways to prevent iron from rusting.

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: Some metals rust: iron drums	
Resource 12: Rusty corrugated iron roofing	
Resource 13: Rusty nails	
Resource 17: Prevent rusting: tin cans	
Metal objects such as a nail, copper wire, copper coin, drawing pin, paper clip; a beaker, water	Glass jars can be used as beakers

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 does a house with a corrugated iron roof get hot?

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.

> *As metals are good conductors of heat, the heat travels through the iron quickly.*

D ACCESSING INFORMATION

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

> SOME METALS RUST
>
> 1. Iron is a strong metal.
> 2. It is used to make nails, wire and building materials.
> 3. When iron comes into contact with air or water, it rusts.
> 4. Iron and steel are both metals that rust.
> 5. Steel has iron in it.
> 6. A reddish-brown solid forms a layer on the outside of the metal.
> 7. This weakens the metal.

TO PREVENT RUSTING

1. Iron and steel can be prevented from rusting by painting the metal with anti-rust paint.
2. Bridges and buildings are painted with anti-rust paint.
3. Food cans are made from iron but **coated** with tin.
4. Machine parts are covered with a layer of grease.
5. These methods stop the air or water from getting to the iron or steel. Give learners some time to copy this information into their exercise books.

2. Explain rusting to the learners as follows:
   a. Rusting is a process that occurs when iron and steel are **exposed** to air or water.
   b. Rusting weakens the metal.
   c. Rusting can be prevented by using anti-rust paint, coating with a layer of tin or covering the iron or steel in grease.
   d. Show learners Resource 11: 'Some metals rust: iron drums'.
   e. Show learners Resource 13: 'Rusty bolts'.
   f. Remind learners that not all metals rust; however, iron and steel rust.
3. Explain how to prevent rust to the learners as follows:
   a. Show learners Resource 12: 'Rusty corrugated iron roofing'.
   b. Rusting on buildings can be prevented by painting.
   c. Show learners Resource 17: 'Prevent rusting: tin cans'.
   d. Tell the learners that tin cans are made from iron and then coated with tin to stop them rusting.
4. Give learners time to copy this information into their workbooks.

Checkpoint 1

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

a. Can you name two metals that rust?
b. Can you give three ways to prevent rusting?

Answers to the checkpoint questions are as follows:

a. Iron and steel are metals that rust.
b. To prevent rusting, iron and steel can be painted with anti-rust paint, coated with a layer of tin or covered in grease.

E CONCEPTUAL DEVELOPMENT

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

ACTIVITY: PLACING OBJECTS IN WATER TO SEE IF THEY RUST

You will need:
metal objects such as a nail, copper wire, copper coin, drawing pin, paper clip
a beaker for each item; water.

METHOD

1. Place each object into a separate beaker of water.
2. Leave the metal object in the beaker for 2-4 weeks.
3. Record the results after 2-4 weeks in a table. Use the table below.

TABLE TO RECORD RESULTS OF RUSTING INVESTIGATION

Metal object	**rusted**	**not rusted**
iron nail		
copper wire		
copper coin		
drawing pin		
paper clip		

2. Explain this to the learners as follows:
   a. Learners must copy the table into their workbooks.
   b. Other metal objects can be chosen.
   c. These must be filled in on the table.
   d. This must be a teacher-led investigation.
   e. The beakers must be left on the window sill for 2-4 weeks.
   f. Learners must fill in the results after this time.
3. A model answer (answers may vary):

TABLE TO RECORD RESULTS OF RUSTING INVESTIGATION

Metal object	*rusted*	*not rusted*
iron nail	*Yes*	
copper wire		*No*
copper coin		*No*
drawing pin	*Yes*	
paper clip	*Yes*	

4. Explain this to the learners as follows:
   a. The paper clips and drawing pins have a coating of zinc.
   b. When the zinc is worn through, the paper clip and drawing pin will then start to rust.

Checkpoint 2

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

a. Why does copper wire not rust?
b. How does coating a can with tin stop rust?

Answers to the checkpoint questions are as follows:

a. Not all metals rust, only those with iron in them.
b. It stops the air or water from getting to the iron.

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

F REFERENCE POINTS FOR FURTHER DEVELOPMENT

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

NAME OF TEXTBOOK	TOPIC	PAGE NUMBER
Study & Master	Uses of metals	83-84
Viva	Uses of metals	66-69
Platinum	Uses of metals	76-77
Solutions for All	Uses of metals	86-89
Day-by-Day	Uses of metals	69
Oxford	Uses of metals	58-59
Spot On	Uses of metals	36
Top Class	Uses of metals	54
Sasol Inzalo Bk A	Uses of metals	126-145

G ADDITIONAL ACTIVITIES/ READING

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

1. https://goo.gl/8Nom7c (3min 32sec) [Rusting of iron]
2. https://goo.gl/rVdFG1 (2min 52sec) [Corrosion of metals]
3. https://goo.gl/hJsyL6 (1min 37sec) [Rusting of iron]
4. https://e-classroom.co.za/wp-content/uploads/2015/05/EngGr5T2-NS-Matter-and-materials-Uses-of-metals-other-properties-of-metals.pdf [Uses of metals]

3 C

Term 2, Week 3, Lesson C
Lesson Title: Other properties of metals
Time for lesson: 1 hour

A POLICY AND OUTCOMES

Sub-Topic	Magnesium
CAPS Page Number	36

Lesson Objectives

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

- list several uses for metals used in structures
- give examples of products made from certain metals.

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: Nelson Mandela Bridge: made from steel	
Resource 19: Golden Gate Bridge – made from iron	
Resource 20: Aluminium furniture	
Resource 6: Steel is strong and malleable	

C CLASSROOM MANAGEMENT

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

Can you name three ways in which rusting can be prevented?

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.

Rust can be prevented by painting, coating with tin or applying a layer of grease.

D ACCESSING INFORMATION

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

STRUCTURES MADE FROM METAL

1. Iron is a strong metal but should be painted with anti-rust paint.
2. Steel is strong and light.
3. Bridges are made from iron or steel.
4. Car bodies are often made from steel.
5. Aluminium is strong and light.
6. Some furniture is made from aluminium.

2. Explain and discuss the following with the learners:
    a. Show learners Resource 18: ‘Nelson Mandela Bridge: made from steel’.
    b. The cables on this bridge are made from steel.
    c. Steel is very strong and light.
    d. Show learners Resource 19: ‘The Golden Gate Bridge: made from iron’.
    e. This roadway and **pylons** are made from iron but they should be painted with anti-rust paint.
    f. Iron is very strong but it rusts.
    g. The cables are made from steel.
3. Explain how metals are used in other structures to the learners as follows:
    a. Show learners Resource 20: ‘Aluminium furniture’.
    b. Aluminium is very strong and light.
    c. It is ideal for making outdoor furniture, as it does not rust.
    d. Show learners Resource 6: ‘Steel is strong and malleable’.
    e. Steel is often used to make car bodies as it can be shaped and it does not rust.
4. Give learners time to copy this information into their workbooks.

Checkpoint 1

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

a. Why are some bridge made from iron?
b. Why is some outdoor furniture made from aluminium?

Answers to the checkpoint questions are as follows:

a. Iron is a very strong metal.
b. Aluminium does not rust and it is strong and light.

E CONCEPTUAL DEVELOPMENT

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

TASK: IDENTIFY PROPERTIES AND USES OF METALS

1. Match each of the uses in Column A with the property in Column B.
   Each product may have more than one property.
   Each property can be used more than once.

Column A **Products made from metal**	**Column B** **Properties of metals**
1. outdoor furniture (aluminium)	a. strong
2. bridges (iron)	b. hard
3. cars (steel)	c. shiny
4. pot and pans (copper)	d. light
5. cable-stayed bridges (steel)	e. good conductor of heat
	f. does not rust
	g. malleable

2. Explain this to the learners as follows:
   a. Learners must match each product in Column A with the properties in Column B.
   b. Each product may have more than one property.
   c. Learners must draw a table in their workbooks.
   d. Write the products in Column A.
   e. Write down all the properties of the metal used in that product in Column B.
3. Give learners time to complete this task in their workbooks.
4. Model answer. Discuss the answers with the learners.

TASK: IDENTIFY PROPERTIES AND USES OF METALS

Column A **Products made from metal**	**Column B** **Properties of metals**
1. outdoor furniture (aluminium)	strong, light
2. bridges (iron)	strong
3. cars (steel)	shiny, strong, does not rust, malleable
4. pot and pans (copper)	good conductor of heat, does not rust
5. cable-stayed bridges (steel)	strong, light

Checkpoint 2

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

a. Why is aluminium a good metal to use for outdoor furniture?
b. Why are some bridges made from iron?

Answers to the checkpoint questions are as follows:

a. It is a good metal to use as it does not rust and it is strong and light.
b. Iron is a very strong metal.

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

F REFERENCE POINTS FOR FURTHER DEVELOPMENT

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

NAME OF TEXTBOOK	TOPIC	PAGE NUMBER
Study & Master	Uses of metals	84-85
Viva	Uses of metals	70-74
Platinum	Uses of metals	80-81
Solutions for All	Uses of metals	90
Day-by-Day	Uses of metals	70-72
Oxford	Uses of metals	60-61
Spot On	Uses of metals	36
Top Class	Uses of metals	55
Sasol Inzalo Bk A	Uses of metals	164-171

G ADDITIONAL ACTIVITIES/ READING

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

1. https://goo.gl/B9C2YN (3min 59sec) [Hunting for properties]
2. https://goo.gl/hFztXs (47sec) [Uses of metals and non-metals]

4 A

Term 2, Week 4, Lesson A
Lesson Title: Other properties of metals
Time for lesson: 1 hour

A POLICY AND OUTCOMES

Sub-Topic	Rusting
CAPS Page Number	36

Lesson Objectives

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

- list several uses for metals used in structures
- give examples of products made from certain metals.

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
Examples of objects with metal in them. E.g. batteries, spoons, etc.	

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 steel used to make car bodies?

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.

> *Steel is used as it is malleable and it does not rust.*

D ACCESSING INFORMATION

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

> EVERYDAY PRODUCTS MADE FROM METAL
>
> 1. Many metal products can be found in the kitchen area of a house.
> 2. A stove, sink, pots and pans, **cutlery**, kettle and taps are all made from metal.
> 3. Stainless steel is used to make sinks, taps and door handles as it does not rust. It is also strong and shiny.
> 4. Steel is used to make car bodies and bicycles.
> 5. Steel is strong but it does rust.
> 6. Water pipes are made from copper or a metal that does not rust.
> 7. Aluminium is often used for window frames and cooking pots.
> 8. Aluminium does not rust. It is malleable and a good conductor of heat.
> 9. Iron and steel are used for machinery in factories.
> 10. Machinery needs to be strong.
> 11. Gold and silver are used for jewellery.
> 12. Gold and silver are malleable and shiny.

2. Explain this to the learners as follows:
    a. There are many uses for metals in everyday life.
    b. Metals are used in many products because of their properties.
    c. Metals that conduct heat well are used to make pots and pans for cooking.
    d. Copper and aluminium are used to make pots and pans.
    e. Metals that are malleable and shiny are used to make jewellery.
    f. Point out all the other metals in the classroom and their uses.
3. Give learners time to copy this information into their workbooks.

Checkpoint 1

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

a. Why are gold and silver used for jewellery?
b. Why are some water pipes made from copper?

Answers to the checkpoint questions are as follows:

a. Gold and silver are malleable and shiny.
b. Copper does not rust.

E CONCEPTUAL DEVELOPMENT

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

TASK: EVERYDAY USES OF METALS

1. Write down the metal items you have used at home that contain metal.
2. If you can, write down what type of metal was used to make this product and why this metal was used.

2. Explain this to the learners as follows:
    a. Get learners to write down in their workbooks the items they have used at home that contain metal.
    b. They must identify the metal and say why this specific metal was used.
    c. Let them share this information with a partner. This should take two minutes.
    d. Ask a few learners to share what they have written down with the class.
3. Write the following on the chalkboard (always try to do this before the lesson starts):

TASK: CHOOSE THE RIGHT METAL

Write down the metal that is used to make the products below. Choose one of the metals from the list (one of the metals is used twice): stainless steel, gold, steel, copper.

a. a wedding ring
b. the body of a helicopter

c. a door handle
d. water pipes
e. a bridge like the Nelson Mandela Bridge

4. A model answer:

TASK: CHOOSE THE RIGHT METAL

a. a wedding ring: gold
b. the body of a helicopter: steel
c. a door handle: stainless steel
d. water pipes: copper
e. a bridge like the Nelson Mandela Bridge: steel

Checkpoint 2

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

a. What metals are used to make pots and pans?
b. Why is aluminium a better metal than steel to make window frames?

Answers to the checkpoint questions are as follows:

a. Copper and aluminium. They do not rust and they are strong metals.
b. Aluminium is better as it does not rust, whereas steel does.

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

F REFERENCE POINTS FOR FURTHER DEVELOPMENT

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

NAME OF TEXTBOOK	TOPIC	PAGE NUMBER
Study & Master	Uses of metals	84-85
Viva	Uses of metals	70-74
Platinum	Uses of metals	80-81
Solutions for All	Uses of metals	89-94
Day-by-Day	Uses of metals	70-72
Oxford	Uses of metals	61
Spot On	Uses of metals	37
Top Class	Uses of metals	55-56
Sasol Inzalo Bk A	Uses of metals	164-171

G ADDITIONAL ACTIVITIES/ READING

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

1. https://goo.gl/WEiec6 [Uses of metals]
2. https://www.studyread.com/uses-of-metals [10 metal uses: Their role and importance in daily life]

TOPIC OVERVIEW:
Processing materials
Term 2, Weeks 4B – 6C

A. TOPIC OVERVIEW

Term 2, Weeks 4b – 6c

- 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 4	GRADE 5	GRADE 6 & 7
LOOKING BACK	**CURRENT**	**LOOKING FORWARD**
• Strengthening materials	• Combining materials to make new materials/ • products, such as • plaster, concrete, glue, dough, jelly, clay bricks • Properties of new materials may be different to properties of materials used to make new materials • Processing and comparing properties before and after combining • Write about these uses	• Dissolving • Mixtures and water resources • Processes to purify water • Physical properties of materials

C. SCIENTIFIC AND TECHNOLOGICAL VOCABULARY

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

	TERM	EXPLANATION
1.	udaka	A mixture of soil and cow dung used to make floors in Kwa-Zulu-Natal; an indigenous building material used for flooring
2.	adobe	Adobe bricks are made with a mixture of clay and straw; they are used all over the world.
3.	mosque	A Muslim place of worship
4.	original	The first or earliest
5.	expensive	Costing a lot of money
6.	sets	To solidify; to become hard
7.	paste	A thick, soft, moist (not runny) substance made by mixing dry ingredients with a liquid
8.	depend	To rely on; to need something in order to work
9.	dessert	A sweet food eaten at the end of the meal
10.	solidifies	To become solid
11.	texture	The feel of something when it is touched
12.	waterproof	Not allowing water to enter
13.	fired	Baked in a kiln or oven

D. UNDERSTANDING THE USES / VALUE OF SCIENCE

If you study materials engineering, you will study the combination of materials and the making of new engineering products from this combination. To design successful products, it is necessary to understand how properties of materials can change when they are combined.

E. PERSONAL REFLECTION

Reflect on your teaching at the end of each topic:

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

4 B

Term 2, Week 4, Lesson B
Lesson Title: Combining materials
Time for lesson: 1 hour

A POLICY AND OUTCOMES

Sub-Topic	Mixing and setting
CAPS Page Number	37

Lesson Objectives

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

- define what combining is
- understand that the properties from the original materials will be changed in the combined product
- describe what udaka is and why it is an ideal material for flooring
- describe what adobe is and why this is an ideal material for making bricks.

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 21: The mosque at Djenne, Mali	
Resource 22: Making adobe bricks in Peru, South America	

C CLASSROOM MANAGEMENT

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

> Can you name a metal that rusts?

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.

> *Iron (or steel) rusts.*

D ACCESSING INFORMATION

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

> COMBINING MATERIALS
>
> 1. People sometimes need a material with certain properties.
> 2. Manufacturers and engineers, among others, can make a new material by combining materials in different ways.
> 3. This method produces a new type of material or a product.
> 4. This new material or product can have different properties from the **original** materials.
> 5. Bread is different from all the ingredients combined to make it.

2. Explain this to the learners as follows:
   a. Combining is one method of changing materials.
   b. Other methods are heating, drying and cooling.
   c. When materials are combined to make a new material or product, the properties of the new product may be different to the original materials.
   d. Bread is made from flour, yeast, sugar, salt and oil.
   e. Bread has different properties from the ingredients used to make it.
3. Give learners time to copy this information into their workbooks.

Checkpoint 1

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

a. Is the following statement true or false: 'Combining is a method used to make new materials and products'?
b. Is the following statement true or false: 'The properties of the new material or product will be the same as the materials used to make it'?

Answers to the checkpoint questions are as follows:

a. True.
b. False: the new material or product may have different properties from the materials used to make it.

E CONCEPTUAL DEVELOPMENT

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

INDIGENOUS BUILDING MATERIALS: UDAKA AND ADOBE

1. In rural KwaZulu-Natal, houses are built using local materials.
2. The floor of the home is often made of **udaka**.
3. Udaka is a mixture of clay and cattle dung.
4. The grass fibres in the cattle dung **bind** the clay.
5. This makes a material that is ideal for floors.
6. The cattle dung also keeps mosquitoes away.
7. Using plant fibres to bind clay has been used by many cultures for many centuries.
8. A**dobe** bricks are found in many structures and these bricks are still used today.
9. The **mosque** in Djenne, Mali, is over 500 years old.
10. It was made with adobe bricks.
11. Adobe is a mixture of clay and straw that is then baked in the sun.
12. Udaka and adobe are materials made by combining other materials.

2. Explain udaka to the learners as follows:

a. Indigenous peoples use local materials to make their homes.
b. Udaka makes an ideal combined material which can be used to make flooring.
c. Udaka uses local materials and so is easy to make.
d. It lasts for a long time.
e. It is easy to use and is not **expensive**.
f. It is also environmentally friendly.
g. Udaka is an ideal combined material which can be used for flooring.

3. Explain adobe bricks to the learners as follows:
    a. Adobe bricks have been used all over the world for centuries.
    b. Adobe is a combination of clay and straw mixed together.
    c. When heated in the sun, it makes bricks for building houses.
    d. Adobe bricks last for a long time.
    e. It is not expensive and is environmentally friendly.
    f. It uses local materials and lasts for a long time.
    g. Show learners Resource 21: 'The mosque at Djenne, Mali'.
    h. This huge structure is made from adobe bricks and is over 500 years old.
    i. Show learners Resource 22: 'Making adobe bricks in Peru, South America'.
    j. People all over the world make adobe bricks.
4. Give learners time to copy the information into their workbooks.

Checkpoint 2

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

a. What materials are combined to make udaka for flooring?
b. What materials are combined to make adobe bricks?

Answers to the checkpoint questions are as follows:

a. Udaka is a combination of cow dung and clay.
b. Adobe is a combination of clay and straw.

5. Discuss and explain the information to the learners.
6. Ask the learners if they have any questions and provide answers and explanations.

F REFERENCE POINTS FOR FURTHER DEVELOPMENT

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

NAME OF TEXTBOOK	TOPIC	PAGE NUMBER
Study & Master	Processing materials	87
Viva	Processing materials	75-78
Platinum	Processing materials	85
Solutions for All	Processing materials	95-97
Day-by-Day	Processing materials	77
Oxford	Processing materials	62
Spot On	Processing materials	38-39
Top Class	Processing materials	57-58
Sasol Inzalo Bk A	Processing materials	173-174

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

4 C

Term 2, Week 4, Lesson C
Lesson Title: Combining materials
Time for lesson: 1½ hours

A POLICY AND OUTCOMES

Sub-Topic	Mixing and setting
CAPS Page Number	37

Lesson Objectives

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

- describe how to combine materials to make plaster
- make a mixture of plaster

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
paper cup, plastic spoon, 125 ml (1/2 cup), warm water, 62,5 ml (1/4 cup) plaster of Paris powder, newspaper	empty yoghurt tub stick polyfilla
Resource 23: Plaster of Paris	

C CLASSROOM MANAGEMENT

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

> Will a combined material have the same properties as the materials that were used to make it?

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.

> *No, it will not.*

D ACCESSING INFORMATION

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

> MIXING AND SETTING: MAKING PLASTER
>
> 1. Mixing a solid and a liquid and leaving it to set will give a material different properties from the original materials.
> 2. A mixture sets when it is left to become hard.
> 3. The properties of the new material will depend on how much of each type of material is in the mixture.
> 4. Look carefully during the mixing process to get the mixture that is needed.
> 5. Plaster is made by mixing a solid and a liquid.
> 6. Plaster of Paris is made by mixing gypsum with water.
> 7. Gypsum is mined from rocks.
> 8. It is a white powdery substance that becomes a soft, malleable paste when mixed with water.
> 9. When this mixture sets, it becomes hard and strong.
> 10. Plaster of Paris is used as a mould to fix broken bones.
> 11. To make ornaments, Plaster of Paris is placed in a mould and allowed to dry and become hard.
> 12. Polyfilla is just like Plaster of Paris.
> 13. It is used to fill up cracks in walls.

2. Explain this to the learners as follows:
    a. New materials are made when a mixture sets after it has been mixed.
    b. The new material has different properties to the original materials.
    c. Plaster of Paris is a soft, white powder.
    d. When it is mixed with water and left to set, it becomes hard.
    e. It is used to make casts to fix broken bones.
    f. Show learners Resource 23: Plaster of Paris.
    g. The photograph on the left shows what gypsum looks like.
    h. Polyfilla is similar.
    i. Polyfilla is used to fill in cracks in walls.
3. Give learners time to copy this information into their workbooks.

Checkpoint 1

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

a. What does 'to set' mean?
b. Is the following statement true or false: The properties of the new mixture will depend on how much of each type of material is used in the mixture?

Answers to the checkpoint questions are as follows:

a. 'To set' means that when a solid and liquid have been mixed together and the mixture has been left for a while, the mixture becomes hard.
b. True.

E CONCEPTUAL DEVELOPMENT

1. Write the following on the chalkboard (always try to do this before the lesson starts):
2. Choose one of the activities. If you are unable to get plaster of Paris, then do the Polyfilla activity.

ACTIVITY: MIXING AND SETTING TO MAKE PLASTER

PLASTER OF PARIS

You will need:

paper cup or empty yoghurt tub

plastic spoon or a stick

125 ml (1/2 cup) warm water

62,5 ml (1/4 cup) plaster of Paris powder

newspaper.

METHOD

1. Observe and record the properties of each material.
2. Lay newspaper over workspace.
3. Put plaster of Paris in paper cup.
4. Slowly add warm water stirring all the time with the plastic spoon.
5. Add enough water until it is runny.
6. Allow the mixture to set.
7. Observe and record properties of the new material.

ACTIVITY: MIXING AND SETTING TO MAKE PLASTER POLYFILLA

You will need:

paper cup or yoghurt tub

plastic spoon or stick

125 ml warm water

62.5 ml Polyfilla

METHOD

1. Lay newspaper over workspace.
2. Put Polyfilla in paper cup.
3. Slowly add warm water stirring all the time with the plastic spoon.
4. Add enough water until it is a **paste**.
5. Allow the mixture to set.

Table for observations

Material	**Properties**
plaster of Paris/Polyfilla	
water	
new material	

3. Explain this to the learners as follows:
   a. Mixing different materials and leaving the mixture to set gives the material different properties.
   b. These properties are different to the properties of water and plaster of Paris or Polyfilla.
   c. The new material cannot be separated back into the original materials.
   d. This new material changes properties when it sets.

4. A model answer:

Table for observations

Material	*Properties*
plaster of Paris/Polyfilla	*white, powdery, a solid, soft*
water	*wet, liquid, can pour, fills the container it is placed in*
new material	*hard when set – malleable before it sets, solid, white*

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

TASK: QUESTION

How do you know that after the mixture has set, that there is a new material?

6. Explain this to the learners as follows:
   a. Write down the answer to the question in their workbooks.
   b. Discuss their answers with a partner.
   c. Ask some learners to discuss their answers. The new material will have different properties to the original properties.
   d. Have a discussion on how new materials are formed when a solid and liquid are mixed and then set.
   e. Ask learners what would happen if each material was not carefully measured to make the plaster? It could end up being too runny or too solid and not be suitable for its job (making a cast for a broken bone, filling cracks in a wall)

Checkpoint 2

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

a. What are the properties of plaster of Paris/Polyfilla?
b. What are the properties of the material when plaster of Paris/Polyfilla has been mixed with water?

Answers to the checkpoint questions are as follows:

a. Plaster of Paris/Polyfilla is white, powdery, soft and a solid.
b. The properties of the new material is that it is hard, solid and white.

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

F REFERENCE POINTS FOR FURTHER DEVELOPMENT

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

NAME OF TEXTBOOK	TOPIC	PAGE NUMBER
Study & Master	Processing materials	87-89
Viva	Processing materials	-
Platinum	Processing materials	87-88
Solutions for All	Processing materials	98-99
Day-by-Day	Processing materials	78-79
Oxford	Processing materials	63
Spot On	Processing materials	-
Top Class	Processing materials	58-59
Sasol Inzalo Bk A	Processing materials	165-166

G ADDITIONAL ACTIVITIES/ READING

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

1. https://goo.gl/bk8TxF [Combining materials]
2. http://scienceweb.asta.edu.au/years-f-2/unit3/lesson-two/yrf2-unit-3-lesson-2.html [Mixing things together]

5 A

Term 2, Week 5, Lesson A
Lesson Title: Combining materials
Time for lesson: 1½ hours

A POLICY AND OUTCOMES

Sub-Topic	Mixing and setting
CAPS Page Number	37

Lesson Objectives

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

- describe how to combine materials to make concrete
- make concrete.

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 24: Making concrete in a mixer	
One cup cement, three cups of clean sand, three cups of gravel or small stones, water, an empty container, a strong stick, plastic gloves	An ice-cream or margarine tub

C CLASSROOM MANAGEMENT

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

Is the following statement true or false: Plaster is made from mixing a liquid with another liquid?

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.

False: Plaster is made from mixing a powdery solid with a liquid.

D ACCESSING INFORMATION

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

MIXING AND SETTING: MAKING CONCRETE

1. Concrete is another material made from combining materials and leaving the mixture to set.
2. Concrete is made from a mixture of sand, gravel, cement and water.
3. The cement, gravel and sand are mixed in the ratio of 1:3:3.
4. This means 1 part of cement to 3 parts of gravel to 3 parts of sand.
5. After these materials are mixed, water is added.
6. When water is added, it makes the cement stick the sand and gravel together.
7. Concrete is very strong, hard, lasts a long time and is waterproof.
8. Concrete is used in buildings, silos, water pipes and other structures.
9. When combined with iron, it is used to make skyscrapers.
10. Concrete was first used approximately 7500 years ago.

2. Explain and discuss the following with the learners:
   a. Concrete is a mixture of sand, gravel, cement and water.

b. It needs to be mixed in the ratio of 1 part of cement to 3 parts of gravel to 3 parts of sand.
c. Structures have purposes.
d. Two of these purposes are that they support something, or that they contain and protect something.
e. Structures can be found in the natural world and the human-made world.
f. Structures need to be strong enough to support something otherwise they will collapse.
g. Structures need to be stable which means they will not fall over easily.

3. Give learners time to copy this information into their workbooks.

Checkpoint 1

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

a. What four ingredients do you need to make concrete?
b. Is concrete a modern material?

Answers to the checkpoint questions are as follows:

a. You need cement, gravel, sand and water.
b. No, concrete was used approximately 7500 years ago.

E CONCEPTUAL DEVELOPMENT

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

ACTIVITY: MIXING AND SETTING CONCRETE – MAKE A BRICK

You will need:
one cup of cement
three cups of clean sand
three cups of gravel or small stones
water
an empty container (ice-cream or margarine tub)
a strong stick
plastic gloves.

METHOD

1. Mix the cement, sand and gravel together in the container.
2. Slowly add water to the mixture.
3. Stir the mixture with the stick.
4. Add enough water so that the mixture is wet but not watery.
5. Using gloves, press the mixture down in the container.

6. Leave the brick to set.
7. When the mixture has set, turn the container upside down.
8. Tap out the brick.

2. Explain this to the learners as follows:
   a. This will be a teacher-led activity.
   b. A few learners could assist with the activity.
   c. If the brick is not strong and has cracks, ask the learners what could be done differently.
   d. Sometimes stronger concrete can be made by adding less water.
   e. Adding more water will make concrete that can flow easily into different shapes or moulds.
3. Copy and complete the table:

TABLE TO COMPARE THE PROPERTIES

	Materials used to make new material				**New material**
	cement	**stone**	**sand**	**water**	**concrete**
Description (hard, soft, smooth, rough, strong, weak, powdery, dry, wet)					

1. Which materials have the same properties as the concrete brick?
2. Which materials had their properties changed during the process?

4. Explain this to the learners as follows:
   a. Fill in all the properties of each of the materials and the new material (concrete).
   b. Answer the two questions in their workbooks.
   c. Let learners compare their answers with a partner.
   d. Ask a few learners to share their answers with the class.
5. A model answer (answers may vary slightly):

TABLE TO COMPARE THE PROPERTIES

	Materials used to make new material				*New material*
	cement	*stone*	*sand*	*water*	*concrete*
Description (hard, soft, smooth, rough, strong, weak, powdery, dry, wet)	*soft, powdery, weak, dry*	*hard, rough, strong, dry*	*hard, rough, strong, dry*	*soft, smooth, wet*	*hard, rough, strong, dry*

1. The sand and the stone have the same properties as the concrete brick.
2. The cement and water would have had their properties changed during the process.

Checkpoint 2

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

a. Which of the following ingredients changed their properties when mixed: cement, stone, sand, water?

b. What can you do to make concrete stronger?

Answers to the checkpoint questions are as follows:

a. Cement and water had their properties changed.

b. To make concrete stronger, add less water.

F REFERENCE POINTS FOR FURTHER DEVELOPMENT

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

NAME OF TEXTBOOK	TOPIC	PAGE NUMBER
Study & Master	Processing materials	89-92
Viva	Processing materials	77-82
Platinum	Processing materials	-
Solutions for All	Processing materials	99
Day-by-Day	Processing materials	79-80
Oxford	Processing materials	63
Spot On	Processing materials	-
Top Class	Processing materials	-
Sasol Inzalo Bk A	Processing materials	171-175

G ADDITIONAL ACTIVITIES/ READING

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

1. http://www.tomnewbyschool.co.za/wp-content/upload /2016/04/Grd-5-NS-Tech-T2-2016-approved.pdf [Processing materials]

5 B

Term 2, Week 5, Lesson B
Lesson Title: Combining materials
Time for lesson: 1 hour

A POLICY AND OUTCOMES

Sub-Topic	Mixing
CAPS Page Number	37

Lesson Objectives

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

- describe how to combine materials to make a paste
- make a paste
- find uses for glue.

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
One tablespoon of flour, one cup of water, a mixing bowl, a spoon, two pieces of paper, newspaper	

C CLASSROOM MANAGEMENT

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

> Can you list the four ingredients used to make concrete?

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.

> *Cement, sand, gravel and water are mixed to make concrete.*

D ACCESSING INFORMATION

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

> MIXING A SOLID AND A LIQUID TO MAKE A PASTE
>
> 1. When we mix a little water with a powdery solid, we get a paste.
> 2. A paste is a stiff mixture of a powdery solid and a liquid.
> 3. When a little water is mixed with flour, it will become a sticky paste that can be used as glue.
> 4. The properties of the paste will be different to the properties of the flour and the water. .

2. Explain and discuss the following with the learners:
   a. Mixing a powdery solid and a liquid will make a paste.
   b. Toothpaste is a paste.
3. Give learners time to copy this information into their workbooks.

Checkpoint 1

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

a. What makes a paste?
b. What two ingredients do you need to make a paste that can be used as glue?

Answers to the checkpoint questions are as follows:

a. A powdery solid and a liquid make a paste.
b. b. Flour and water can be made into a paste that can be used as glue.

E CONCEPTUAL DEVELOPMENT

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

ACTIVITY: HOW TO MAKE GLUE

You will need:
one tablespoon of flour
one cup of water
a mixing bowl
a spoon
two pieces of paper
newspaper.

METHOD

1. Place the newspaper on your desk.
2. Put the flour in the mixing bowl.
3. Add a little bit of water – a teaspoonful.
4. Mix the flour with the water.
5. Keep adding teaspoonfuls of water until the mixture is a runny paste.
6. Put a few drops of the paste onto one piece of paper.
7. Place the other piece of paper over the first piece and press together.
8. Leave to dry.
9. Tidy up your workspace.

QUESTIONS

1. Can you describe the properties of the original materials?
2. Can you describe the properties of water?
3. Can you describe the properties of the new material (glue)?
4. Why is glue useful?

2. Explain this to the learners as follows:
    a. Learners will work in groups for this activity.
    b. Gather all the materials together.
    c. Add small drops of water at a time to the flour.
    d. Do not make the mixture too runny.
3. A model answer:

HOW TO MAKE GLUE

1. *Properties of flour: dry, soft, powdery, a solid*
2. *Properties of water: wet, soft, a liquid*
3. *Properties of new material: sticky, a paste, malleable*
4. *Glue is useful as it can fix broken things and it can stick things together.*

Checkpoint 2

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

a. What are the properties of the paste made from flour and water?
b. What can this paste be used for?

Answers to the checkpoint questions are as follows:

a. This paste is sticky and malleable.
b. This paste can be used to glue things together.

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
Study & Master	Processing materials	92-93
Viva	Processing materials	-
Platinum	Processing materials	88
Solutions for All	Processing materials	100-101
Day-by-Day	Processing materials	78-79
Oxford	Processing materials	65
Spot On	Processing materials	40-41
Top Class	Processing materials	59-69
Sasol Inzalo Bk A	Processing materials	-

G ADDITIONAL ACTIVITIES/ READING

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

1. https://goo.gl/RZ7xfw [Home-made glue and paste recipes]
2. https://goo.gl/if7p7W (2min 13sec) [How to make your own glue]
3. https://goo.gl/KMxAXj ((52sec) [How do you make glue?]

5 C

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

A POLICY AND OUTCOMES

Sub-Topic	Mixing
CAPS Page Number	37

Lesson Objectives

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

- describe how cooking changes the properties of a mixture
- describe how cooking is necessary to make some food mixtures edible.

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
Maize meal, salt, a teaspoon, water, a bowl, a pot, source of heat,	

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 paste?

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 paste is a mixture of a powdery solid and a liquid.

D ACCESSING INFORMATION

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

MIXING AND COOKING

1. Some mixtures need heat so that they can change into edible products.
2. Cooking means heating.
3. When an egg is cooked, the properties of the egg change.
4. The runny egg yolk becomes firmer and lighter.
5. The white of the egg solidifies and the clear colour turns white.
6. The white of the egg becomes rubbery.

2. Explain this to the learners as follows:
   a. Some food is made edible when it is cooked.
   b. When mielies ripen, their seeds become hard.
   c. These seeds are ground and made into maize meal.
   d. The maize meal is then cooked to make porridge.
   e. Many foods are cooked to change their properties and to make them easier to digest.
3. Give learners time to copy this information into their workbooks.

Checkpoint 1

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

a. What happens to egg white when it is cooked?
b. Why do we cook food?

Answers to the checkpoint questions are as follows:

a. The egg white turns white and becomes rubbery when cooked.
b. Cooking food makes food more edible and easier to digest.

E CONCEPTUAL DEVELOPMENT

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

ACTIVITY: MIXING AND COOKING

You will need:
maize meal
salt
a teaspoon
water
a bowl

METHOD

1. Gather the solid items in the list.
2. Taste the maize meal and the salt by putting a small amount in your hand.
3. Write down in the table what each of these tastes like. Also write down the colour and the **texture** (what it feels like) of the maize meal and the salt.

Property	**Mielie meal**	**Salt**
Taste (sweet, salty, bitter, sour, no taste)		
Colour		
Texture (smooth, rough, fine, coarse, soft, hard)		

4. Write a few sentences in which you describe the properties of cooked maize meal.
5. Which properties of the maize meal stayed the same through the cooking process?

2. Explain this to the learners as follows:
    a. Learners must copy and complete the table in their workbooks.
    b. Learners will first taste the original solid materials used to make maize meal.
    c. Cook the maize meal and allow the learners to taste and touch it.
    d. Learners must then taste cooked maize meal.
    e. Learners must compare the properties of the original materials with the new material.
3. A model answer:

ACTIVITY: MIXING AND COOKING

Property	*Mielie meal*	*Salt*
Taste (sweet, salty, bitter, sour, no taste)	*not much taste*	*salty*
Colour	*yellowy white*	*white*
Texture (smooth, rough, fine, coarse, soft, hard)	*slightly rough*	*coarse*

4. *Write a few sentences in which you describe the properties of cooked maize meal.*
5. *Which properties of the maize meal stayed the same through the cooking process?*

Checkpoint 2

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

a. What does cooking mean?
b. What does 'texture' mean?

Answers to the checkpoint questions are as follows:

a. Cooking means that food is heated to change its properties and to make it more edible.
b. Texture describes how a material feels when you touch it.

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
Study & Master	Processing materials	93-95
Viva	Processing materials	-
Platinum	Processing materials	89
Solutions for All	Processing materials	104-106
Day-by-Day	Processing materials	82
Oxford	Processing materials	64
Spot On	Processing materials	-
Top Class	Processing materials	-
Sasol Inzalo BkA	Processing materials	178-182

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

6 A

Term 2, Week 6, Lesson A
Lesson Title: Combining materials
Time for lesson: 1 hour

A POLICY AND OUTCOMES

Sub-Topic	Mixing and cooling
CAPS Page Number	37

Lesson Objectives

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

- describe how mixing and cooling can change the properties of a mixture
- describe how cooling is necessary to make some food mixtures edible.

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
A packet of jelly powder, one cup of boiling water, one cup of cold water, a mixing bowl, a spoon, a container to set the jelly	

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 cooking?

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.

Cooking is heating food to change its properties to make it more edible.

D ACCESSING INFORMATION

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

MIXING AND COOLING

1. Cooling occurs when you remove the heat from something.
2. Mixing and cooling are useful for cooking.
3. Cooling changes the properties of the new material.
4. When we need a food to set, it needs to cool.
5. Many **desserts** are made this way.

2. Explain and discuss the following with the learners:
   a. Mixing and cooling are often used to make desserts.
   b. Cream, milk and sugar can be mixed and cooled to make ice-cream.
   c. The mixture needs to be put in the freezer.
3. Give learners time to copy this information into their workbooks.

Checkpoint 1

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

a. What is cooling?

b. What type of food is often made with mixing and cooling?

Answers to the checkpoint questions are as follows:

a. Cooling is removing the heat from something.

b. Desserts are often made with mixing and cooling.

E CONCEPTUAL DEVELOPMENT

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

ACTIVITY: MIXING AND COOLING – MAKING JELLY

You will need:

a packet of jelly powder

one cup of boiling water

one cup of cold water

a mixing bowl

a spoon

a container to set the jelly.

METHOD

1. Put the jelly powder in the mixing bowl.
2. Carefully add the boiling water.
3. Stir well until all the jelly powder has dissolved.
4. Add the cold water.
5. Stir and pour the contents into the container.
6. Leave to set in a fridge or cold place.
7. This will take some time.
8. Copy and complete the table below:

Compare properties of jelly powder and jelly

Property	**jelly powder**	**jelly**
Taste (sweet, salty, bitter, sour, no taste)		
Colour		
Texture (smooth, rough, fine, coarse, soft, hard)		

9. Which properties stayed the same throughout the process?

2. Explain this to the learners as follows:
   a. This needs to be a teacher-led demonstration as there is boiling water involved.
   b. Tell the learners to observe strict rules of safety when working with boiling water.
   c. Make the jelly and leave it somewhere to set.
   d. This will take a few hours.
   e. Learners can copy the table into their workbooks and complete the table and Question 9 at a later stage.
3. A model answer:

Compare properties of jelly powder and jelly

Property	*jelly powder*	*jelly*
Taste (sweet, salty, bitter, sour, no taste)	*sweet*	*sweet*
Colour	*red*	*red*
Texture (smooth, rough, fine, coarse, soft, hard)	*coarse*	*smooth*

9. The taste and the colour stayed the same throughout the process of mixing and cooling, but the texture changed completely. The texture went from being coarse and sugary to very smooth.

Checkpoint 2

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

a. When making jelly, which property changes during the process?
b. What does ‘to set’ mean?

Answers to the checkpoint questions are as follows:

a. The texture of the jelly powder and the jelly changes.
b. ‘To set’ means that the mixture becomes solid.

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
Study & Master	Processing materials	95-96
Viva	Processing materials	-
Platinum	Processing materials	90
Solutions for All	Processing materials	106-107
Day-by-Day	Processing materials	85
Oxford	Processing materials	64
Spot On	Processing materials	-
Top Class	Processing materials	-
Sasol Inzalo BkA	Processing materials	-

G ADDITIONAL ACTIVITIES/ READING

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

1. http://catsquared.com/further-processing-tools/ [Mixing, cooking and cooling]

6 B

Term 2, Week 6, Lesson B
Lesson Title: Combining materials
Time for lesson: 1 hour

A POLICY AND OUTCOMES

Sub-Topic	Mixing and cooling
CAPS Page Number	37

Lesson Objectives

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

- describe how drying and firing change the properties of a mixture
- describe how cooking is necessary to make some food mixtures edible.

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 21: The mosque at Djenne, Mali	
Resource 22: Making adobe bricks in Peru, South America	
Resource 25: Bricks	-

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 cooling?

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.

Cooling is when you remove the heat from something.

D ACCESSING INFORMATION

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

MIXING, DRYING AND FIRING

1. Drying and firing are applied to materials like clay.
2. Drying and firing are both ways of taking the water out of a mixture.
3. This makes the mixture harder and stronger.
4. Clay is made into bricks this way.
5. Adobe bricks are made from a mixture of clay and straw.
6. The straw makes the bricks stronger.
7. The bricks are dried in the sun.
8. In brick factories, bricks are put into a **kiln**.
9. This is a big oven that bakes the bricks at a very high heat.
10. This makes the bricks hard and **waterproof**.
11. When clay fired, it changes the property of the clay.
12. From being wet and malleable, the clay becomes hard, strong and waterproof.

2. Explain the making of adobe bricks to the learners as follows:
    a. Remind learners that in Lesson 4B, they learnt about adobe bricks.
    b. These are clay and straw bricks that are dried in the sun.
    c. Adobe bricks have been made for centuries by many cultures around the world.
    d. Show learners Resource 22: 'Making adobe bricks in Peru, South America'.
    e. Show learners Resource 21: 'The mosque at Djenne, Mali'.
    f. This mosque was made from adobe bricks.
3. Explain the making of fired bricks to the learners as follows:
    a. Clay bricks can also be fired.
    b. They are heated to a very high temperature.
    c. This changes the property of the clay to make it hard and waterproof.
    d. Show learners Resource 25: 'Bricks'.
    e. These bricks are made from clay and the put in a kiln.
    f. The kiln bakes the bricks at a very high temperature.
4. Give learners time to copy this information into their workbooks.

Checkpoint 1

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

a. What does drying and firing take out of a mixture?
b. What material is mixed with clay to make adobe bricks?

Answers to the checkpoint questions are as follows:

a. Drying and firing take the water out of a mixture.
b. Straw is mixed with clay to make adobe bricks.

E CONCEPTUAL DEVELOPMENT

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

TASK: DRYING AND FIRING

Rewrite the following sentences by choosing the correct word from the list below:
clay, strong, cultures, adobe, straw, hard, kiln, waterproof.

1. ____ bricks are dried in the sun.
2. These bricks are made from a mixture of ____ and ____.
3. The straw makes the bricks ____.
4. Many ____ around the world build using these bricks.
5. Clay bricks are fired in an oven called a ____.
6. Firing bricks makes them ____ and ____.

2. Explain this to the learners as follows:
   a. Choose a correct word from the list to complete the sentences.
   b. Learners must underline the word they have chosen.
   c. Give learners time to complete this task in their workbooks.
3. A model answer:

TASK: DRYING AND FIRING

1. *Adobe bricks are dried in the sun.*
2. *These bricks are made from a mixture of clay and straw.*
3. *The straw makes the bricks strong.*
4. *Many cultures around the world build using these bricks.*
5. *Clay bricks are fired in an oven called a kiln.*
6. *Firing bricks makes them hard and waterproof.*

Checkpoint 2

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

a. Can you name two ways in which clay has water removed to make bricks?
b. What two properties do fired clay bricks have?

Answers to the checkpoint questions are as follows:

a. Drying and firing are two ways in which water is removed from clay to make bricks.
b. Fired clay bricks are hard and waterproof. .

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

F REFERENCE POINTS FOR FURTHER DEVELOPMENT

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

NAME OF TEXTBOOK	TOPIC	PAGE NUMBER
Study & Master	Processing materials	96-97
Viva	Processing materials	-
Platinum	Processing materials	91
Solutions for All	Processing materials	108
Day-by-Day	Processing materials	84
Oxford	Processing materials	64
Spot On	Processing materials	-
Top Class	Processing materials	61-62
Sasol Inzalo BkA	Processing materials	-

G ADDITIONAL ACTIVITIES/ READING

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

1. https://goo.gl/FFRb9E (5min 23sec) [Forming natural adobe and straw bricks]
2. https://goo.gl/gxs9sE (3min 33sec) [My mud house]
3. https://goo.gl/v9eqJD (6min 43sec) [Adobe brick maker]

6 C

Term 2, Week 6, Lesson C
Lesson Title: Combining materials
Time for lesson: 1 hour

A POLICY AND OUTCOMES

Sub-Topic	Mixing and cooling
CAPS Page Number	37

Lesson Objectives

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

- describe how the properties of a new material may be different from the properties of the original materials
- give some examples of how properties change.

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
Jelly and jelly powder	
Cement powder and a piece of concrete	

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 adobe bricks dried?

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.

They are put in the sun to dry.

D ACCESSING INFORMATION

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

PROPERTIES OF NEW MATERIALS

1. The properties of new materials may differ from the properties of the raw materials used to make the product.
2. Plaster has different properties from the raw materials used to make it.
3. Concrete is hard, rough, strong and dry.
4. Concrete has different properties from the sand, cement, gravel and water used to make it.
5. A paste is made from a powdery solid and a liquid.
6. This new material has different properties from the solid and liquid used to make it.
7. Cooking uses heat to make raw food more edible, because it changes the properties of the food.
8. Jelly powder is mixed with hot water and then cooled.
9. Jelly is different to jelly powder.
10. Clay bricks are baked in a kiln or dried in the sun to become hard and waterproof.
11. Bricks are hard and waterproof.

2. Explain this to the learners as follows:
    a. Learners have done many investigations on mixing and processing to make a new material from raw materials.
    b. The properties of the new material may be different from the properties of the raw materials used to make it.
    c. Read through the information on the chalkboard and make sure the learners understand it.
3. Give learners time to copy this information into their workbooks.

Checkpoint 1

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

a. What is a paste made from?
b. What two processes are used to make bricks?

Answers to the checkpoint questions are as follows:

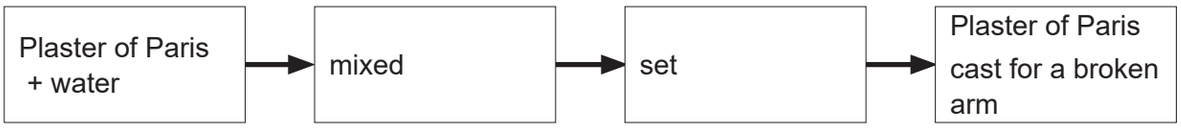
a. A paste is made from a powdery solid and a liquid.
b. Bricks are dried or fired.

E CONCEPTUAL DEVELOPMENT

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

TASK: COMBINING AND PROCESSING MATERIALS

1. Combining materials to make a new material can be shown by a flow diagram.



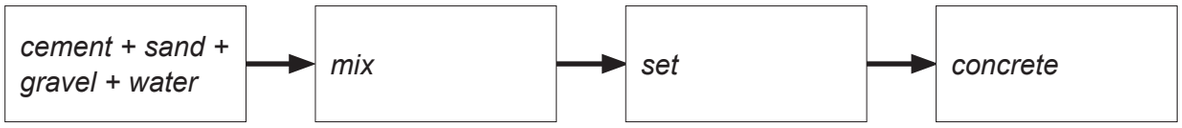
2. The flow diagram shows which materials are mixed, the processes which take place and which new materials/ products are made.
3. Draw flow diagrams for the following products:
    a. concrete
    b. jelly
    c. adobe bricks.

2. Explain this to the learners as follows:
    a. Show learners how to read a flow diagram.
    b. Read the words and follow the arrows.
    c. Learners must draw flow diagrams for the three products: concrete, jelly, and adobe bricks. Give learners some time to complete this task.

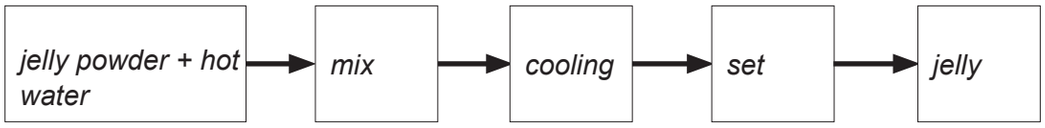
3. A model answer:

TASK: COMBINING AND PROCESSING MATERIALS

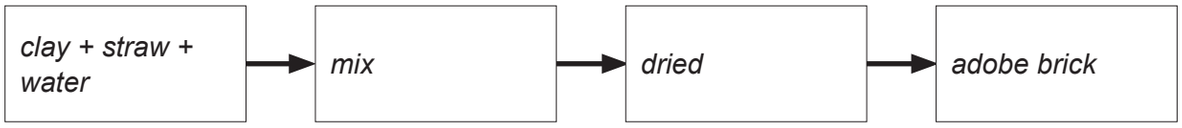
3a.



3b.



3c.



Checkpoint 2

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

a. What properties does an adobe brick have?
b. What is a property of cement?

Answers to the checkpoint questions are as follows:

a. An adobe brick is hard and waterproof.
b. Cement is a powdery solid.

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
Study & Master	Processing materials	97
Viva	Processing materials	-
Platinum	Processing materials	92-93
Solutions for All	Processing materials	110
Day-by-Day	Processing materials	85
Oxford	Processing materials	66-67
Spot On	Processing materials	41
Top Class	Processing materials	62
Sasol Inzalo Bk A	Processing materials	179-182

G ADDITIONAL ACTIVITIES/ READING

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

1. http://harriscounty.ga.schoolwebpages.com/education/components/scrapbook/default.php?sectiondetailid=10713 [Physical and Chemical Changes]

TOPIC OVERVIEW:
Processed materials
Term 2, Weeks 7A – 8C

A. TOPIC OVERVIEW

Term 2, Weeks 7a – 8c

- 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 4	GRADE 5	GRADE 6 & 7
LOOKING BACK	**CURRENT**	**LOOKING FORWARD**
• Solid materials: raw and manufactured materials; sand, clay, coal and oil, wood and fibre; animal wool and hide are used to make products	• Processed materials: properties and uses of Plaster of Paris, concrete, fabrics, ceramics and glass, plastics and paints • Processed materials: traditional processing in Africa: clay pots and bricks, baskets, hats, mats, thatched roofs	• Mixtures • Physical properties of materials; impact on the environment

C. SCIENTIFIC AND TECHNOLOGICAL VOCABULARY

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

	TERM	EXPLANATION
1.	processed materials	Materials that have been changed in some way to form new materials with new properties
2.	durable	Lasts a long time and does not wear out easily
3.	fire resistant	Does not catch fire easily
4.	texture	The feel of something; the way a surface or material feels when you touch it
5.	waterproof	Will not let water pass through it
6.	absorbent	Able to take in or soak up liquids easily
7.	paint	A liquid used to give colour or texture, or protect surfaces and objects
8.	pigment	A pigment is a colour
9.	wear out	Has been used until it is no longer in good condition
10.	thatched	A roof covered in grass which has been tied together
11.	weave woven (past tense)	The process of making something by crossing strips or threads under and over each other
12.	stitch	Uses thread to sew or join materials together
13.	kneaded	Massaged or squeezed with the hands; worked into a dough with the hands.
14.	disintegrate	To fall apart
15.	ceiling sheet	A large rectangular piece of material used for ceilings
16.	dyed (dye)	A natural or artificial substance used to add a colour to or change the colour of something
17.	manufactured	Made by man on a large scale using machinery
18.	flammable	Easily set on fire
19.	transparent	If something is transparent, you can see through it.
20.	coil	A series of circular rings

D. UNDERSTANDING THE USES / VALUE OF SCIENCE

We use many processed products in our daily lives. Understanding the materials and processes used to make these products will enable us to look after them better. It will also enable us to design and come up with ideas on how to improve existing products.

E. PERSONAL REFLECTION

Reflect on your teaching at the end of each topic:

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

7 A

Term 2, Week 7, Lesson A
Lesson Title: Properties and uses of processed materials
Time for lesson: 1 hour

A POLICY AND OUTCOMES

Sub-Topic	Special properties of materials
CAPS Page Number	38

Lesson Objectives

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

- list many different properties of materials
- identify products with these properties in their own environment.

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: Processed materials

B POSSIBLE RESOURCES

For this lesson, you will need:

IDEAL RESOURCES	IMPROVISED RESOURCES
Resource 26: Waterproof materials	
Resource 27: Coloured fabric	

C CLASSROOM MANAGEMENT

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

Do jelly and jelly powder have the same properties?

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.

No, they do not. Jelly powder is coarse while jelly is smooth.

D ACCESSING INFORMATION

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

SPECIAL PROPERTIES OF SOME PROCESSED MATERIALS

1. Processed materials are materials that have been changed in some way.
2. Processed materials are not natural materials.
3. We use many processed materials every day.
4. Some processed materials are useful because they have special properties.
5. These materials can be strong, durable, waterproof, fire resistant, light or have interesting colours and textures.
6. If a material is strong, it means it will not break or wear out easily.
7. A durable material will last a long time.
8. A waterproof material will not let water pass through it.
9. A fire-resistant material is made so that it will not be easily damaged by fire.
10. A material with a texture means that it will have a certain feel.
11. Some materials need to be light.
12. This means they will not weigh a lot.

2. Explain this to the learners as follows:
    a. Some processed materials need to have special properties.
    b. New materials have special properties which enables them to be useful.
    c. Read through all the meanings of the words used to describe the special properties of materials: strong, durable, waterproof, fire resistant, light, have colour or texture.
    d. Show learners Resource 26: 'Waterproof materials'.
    e. The raincoat, umbrella and gumboots are made from waterproof materials.
    f. Show learners Resource 27: 'Coloured fabric'.
    g. Fabric has many different textures and colours.
3. Give learners time to copy this information into their workbooks.

Checkpoint 1

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

a. What does 'durable' mean?
b. What does 'waterproof' mean?

Answers to the checkpoint questions are as follows:

a. Durable means it will last a long time.
b. Waterproof means that water will not pass through it.

E CONCEPTUAL DEVELOPMENT

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

TASK: PRODUCTS AND THEIR SPECIAL PROPERTIES

1. Choose four products that you use at home or at school.
2. Identify the material or materials used to make this product.
3. Which properties of the material make this product useful?
4. Fill this information in on the table below.

Table on properties of materials

Product	Use of object	Material that product is made from	Properties that make the product useful

2. Explain this to the learners as follows:
    a. Ask learners to copy the table into their workbooks.
    b. Learners must each choose four products.
    c. Complete the table.
    d. Get some learners to share what they have written down on their tables.
3. Give learners time to complete this task in their workbooks.
4. A model answer (answers will very according to the products chosen)

Table on properties of materials

Product	*Use of object*	*Material that product is made from*	*Properties that make the product useful*
chair	*to sit at a desk*	*wood* *steel*	*both materials are durable and strong*
school bag	*to contain and protect school books and stationery*	*fabric*	*durable, light*
jug	*to hold water*	*glass*	*waterproof, durable*
spoon	*to eat*	*stainless steel*	*strong, durable, light, smooth texture*

Checkpoint 2

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

a. What is meant by the 'texture' of a material?
b. What does it mean if we say a material is 'light'?

Answers to the checkpoint questions are as follows:

a. The texture of a material means how it feels to the touch.
b. It means the material will not weigh a lot.

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

F REFERENCE POINTS FOR FURTHER DEVELOPMENT

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

NAME OF TEXTBOOK	TOPIC	PAGE NUMBER
Study & Master	Processed materials	98-101
Viva	Processed materials	86-88
Platinum	Processed materials	95-96
Solutions for All	Processed materials	114
Day-by-Day	Processed materials	89-94
Oxford	Processed materials	68
Spot On	Processed materials	42-43
Top Class	Processed materials	64-69
Sasol Inzalo Bk A	Processed materials	188-191

G ADDITIONAL ACTIVITIES/ READING

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

1. https://goo.gl/QTt8Y3 (2min 40sec) [Materials and their properties]
2. https://goo.gl/wK89W1 (4min 33sec) [Properties of materials]
3. https://goo.gl/oXXQFf (4min 26sec) [What's my property?]

7 B

Term 2, Week 7, Lesson B
Lesson Title: Properties and uses of processed material
Time for lesson: 1 hour

A POLICY AND OUTCOMES

Sub-Topic	Uses of processed materials
CAPS Page Number	38

Lesson Objectives

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

- describe the properties of Plaster of Paris and concrete
- describe the uses of Plaster of Paris and concrete.

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 23: Plaster of Paris	
Resource 28: A concrete bridge	

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 'texture'?

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.

Texture is how a material feels to the touch.

D ACCESSING INFORMATION

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

USEFULNESS OF PLASTER AND CEMENT

1. When Plaster of Paris is mixed with water, it becomes a malleable material that can be moulded into different shapes.
2. This plaster sets and hardens very quickly.
3. Plaster of Paris is fire-resistant and water-resistant.
4. Water resistant means it will not allow water through and it will take some time to **disintegrate** in water.
5. **Ceiling sheets** contain Plaster of Paris.
6. Dentists makes casts of patient's gum from this plaster.
7. Bandages can be soaked in Plaster of Paris and then wound around a broken arm or leg to keep it still, so it can heal.
8. It can be used to fill cracks in walls.
9. Plaster of Paris can be used for works of art.
10. Concrete is very strong, hard and durable.
11. It is also fire-resistant and waterproof.
12. Concrete is used in many buildings and bridges.
13. Thick water pipes are made from concrete.

2. Explain this to the learners as follows:
    a. When mixed with water, Plaster of Paris becomes malleable.
    b. This property makes it very useful for making casts for dentists and for broken arms and legs.
    c. Show learners Resource 23: Plaster of Paris.
    d. Point to the cast made around a broken leg.
    e. This cast makes the leg not move so that it can heal.
    f. Concrete is strong and durable.
    g. These properties make it an excellent material for buildings and bridges.
    h. Show learners Resource 28: A concrete bridge.
    i. This bridge is strong, durable and waterproof.
3. Give learners time to copy this information into their workbooks.

Checkpoint 1

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

a. Can you name two properties of Plaster of Paris?
b. Can you give two uses for Plaster of Paris?

Answers to the checkpoint questions are as follows:

a. Plaster of Paris is malleable before it sets and it is fire and water resistant (any two).
b. Plaster of Paris is used to make casts for dentists and to fix broken arms and legs. It is used in ceiling sheets, it can fill cracks in walls and it is used to make works of art (any two).

E CONCEPTUAL DEVELOPMENT

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

TASK: USES OF PLASTER OF PARIS AND CONCRETE

1. Copy and complete the table below:

Material	Where it is used	Properties	Reason why this property is useful
Plaster of Paris			
Concrete			

2. Explain the following to the learners:
    a. Using the information from the previous section, fill in the table.
    b. When the learners have completed the table, ask some learners to share their answers with the class. Discuss these answers.

3. Give learners time to complete this task in their workbooks.
4. A model answer:

TASK: USES OF PLASTER OF PARIS AND CONCRETE

Material	*Where it is used*	*Properties*	*Reason why this property is useful*
Plaster of Paris	*In ceiling boards, in casts for a patient's teeth at the dentist, to make a cast for a broken arm or leg, to fix cracks in walls, for artwork*	*malleable when wet and before it sets, fire-resistant, water-resistant, hard once set*	*being malleable means it fits around people's teeth, arms and legs for casts; being hard protects the broken arms and legs*
Concrete	*Buildings, bridges, water pipes*	*strong, hard, durable, waterproof*	*It adds strength to buildings and bridges; makes buildings and bridges durable; being waterproof means it is useful for making water pipes.*

Checkpoint 2

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

a. Can you name three properties of concrete?
b. Can you give two uses for concrete?

Answers to the checkpoint questions are as follows:

a. Concrete is hard, strong, durable, waterproof and fire-resistant (any three).
b. Concrete is used in buildings and bridges, and for water pipes (any two). .

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

F REFERENCE POINTS FOR FURTHER DEVELOPMENT

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

NAME OF TEXTBOOK	TOPIC	PAGE NUMBER
Study & Master	Processed materials	98-101
Viva	Processed materials	88-89
Platinum	Processed materials	96-97
Solutions for All	Processed materials	114-115
Day-by-Day	Processed materials	89-94
Oxford	Processed materials	68-69
Spot On	Processed materials	42-43
Top Class	Processed materials	64-69
Sasol Inzalo Bk A	Processed materials	192-196

G ADDITIONAL ACTIVITIES/ READING

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

1. https://goo.gl/HxT8xL [Construction materials - BBC Bitesize]
2. https://goo.gl/j2gzFn [Processed materials]

7 C

Term 2, Week 7, Lesson C
Lesson Title: Properties and uses of processed material
Time for lesson: 1½ hours

A POLICY AND OUTCOMES

Sub-Topic	Properties of new materials
CAPS Page Number	38

Lesson Objectives

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

- describe the properties of different fabrics, ceramics and glass
- list the uses of fabrics, ceramics and glass.

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: Non-metals: Glass	
Resource 26: Waterproof materials	
Resource 27: Coloured fabric	
Resource 29: Ceramic pots	

C CLASSROOM MANAGEMENT

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

> Can you give three properties of concrete?

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.

> *Concrete is hard, durable, strong, fire-resistant, waterproof (any three).*

D ACCESSING INFORMATION

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

> USEFULNESS OF FABRICS
>
> 1. Fabrics are used to make many kinds of products.
> 2. Clothes, towels, curtains, tents, parachutes, stockings and many other products are made from fabric.
> 3. Some fabrics, like towels, are **absorbent**.
> 4. Fabrics can be **dyed** into many different colours.
> 5. They also have many different textures depending on the fibres used to weave the fabric.
> 6. Natural fabrics like wool, cotton and leather are fire-resistant.
> 7. **Manufactured** fabrics, like nylon and polyester, are crease resistant, durable and often cheap.
> 8. Some manufactured fabrics are highly **flammable**.
> 9. Manufactured fabrics are man-made and not natural.

USEFULNESS OF CERAMICS

1. Ceramics are products made with clay that has been fired in a kiln.
2. Pots are made from ceramics.
3. They are durable.
4. Ceramics are hard but brittle.
5. Once fired, ceramics are waterproof and fire-resistant.
6. Some ceramic pots can be used in the oven.
7. Ceramics can be painted to make them attractive.

USEFULNESS OF GLASS

1. Glass is a mixture of sand, soda ash and lime.
2. It is very useful as it is **transparent**.
3. Glass is used to make window panes, jars, bottles and ornaments.
4. Curved glass is used for spectacles and telescopes.

2. Explain the usefulness of fabrics to the learners as follows:
   a. There are many different types of fabrics.
   b. Natural fabrics are made from fibres such as wool, cotton, silk and leather.
   c. Show learners Resource 27:' Coloured fabric'.
   d. The cloth is made from cotton, a natural fibre.
   e. Manufactured fabrics are man-made.
   f. Show learners Resource 26: 'Waterproof materials'.
   g. Plastic raincoats and umbrellas are made from manufactured fabric.
   h. Point out all the fabrics in the classroom, like school uniforms, the teacher's jersey, curtains, etc.
3. Give learners time to copy the information on the usefulness of fabrics into their workbooks.
4. Explain the usefulness of ceramics and glass to the learners as follows:
   a. Ceramics are clay products that have been fired in a kiln.
   b. They have many useful properties: hard, durable, waterproof, fire-resistant.
   c. They are brittle so they will break if they are dropped.
   d. Show learners Resource 29: 'Ceramic pots'.
   e. These have been fired in a kiln.
   f. Ceramics are hard but brittle. They are also waterproof and fire-resistant.
   g. Glass is transparent, hard, durable and waterproof.
   h. It is an ideal material for window panes.
   i. Show learners Resource 10: 'Non-metals: Glass'.
   j. The glass in the window panes is transparent.
   k. Point out the glass window panes in the school buildings.
5. Give learners time to copy the information on the usefulness of ceramics and glass into their workbooks.

Checkpoint 1

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

a. What are the two main groups of fabrics?

b. Can you name three natural fabrics?

Answers to the checkpoint questions are as follows:

c. Fabrics can be natural or manufactured.

d. Wool, cotton, leather and silk are natural fabrics (any three).

E CONCEPTUAL DEVELOPMENT

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

TASK: USES OF FABRICS, CERAMICS AND GLASS

1. Copy and complete the table below:

Material	**Where it is used**	**Properties**	**Reason why this property is useful**
Fabrics			
Ceramics			
Glass			

2. Explain this to the learners as follows:

a. Using the information from the previous section, fill in the table.

b. When the learners have completed the table, ask some learners to share their answers with the class. Discuss these answers.

c. Give learners time to complete this task in their workbooks.

3. Model answers (answers may vary)

TASK: USES OF FABRIC, CERAMICS AND GLASS

Material	*Where it is used*	*Properties*	*Reason why this property is useful*
Fabrics	*clothes, towels, parachutes, stockings, curtains, tents*	*absorbent, light (for example, as in silk) strong*	*for towels as used in drying, for clothes to keep cool, to make curtains, table-cloths, and clothing*
Ceramics	*pots*	*after firing, heat-resistant, water-resistant*	*can go in the oven, used for cooking food*

Glass	*window panes*	*transparent, hard, durable*	*lets light in allowing people to see outside*

Checkpoint 2

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

a. What is a manufactured fabric?
b. What property of glass lets us see through it?

Answers to the checkpoint questions are as follows:

a. A manufactured fabric is not made from natural fibre, but is man-made.
b. Glass is transparent.

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
Study & Master	Processed materials	98-101
Viva	Processed materials	99-100
Platinum	Processed materials	98-99
Solutions for All	Processed materials	116-118
Day-by-Day	Processed materials	89-94
Oxford	Processed materials	69-70
Spot On	Processed materials	42-43
Top Class	Processed materials	64-69
Sasol Inzalo Bk A	Processed materials	192-196

G ADDITIONAL ACTIVITIES/ READING

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

1. https://goo.gl/DWTKwX [Processed materials]
2. http://slideplayer.com/slide/9127914/ [Processed materials]

8 A

Term 2, Week 8, Lesson A
Lesson Title: Traditional processing
Time for lesson: 1 hour

A POLICY AND OUTCOMES

Sub-Topic	Making an object from clay
CAPS Page Number	38

Lesson Objectives

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

- describe the properties of plastics and paint
- list the uses of plastics and paint.

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: Plastic bucket and electric plug	
Resource 30: A painted Ndebele hut	

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 ceramics?

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.

Ceramics are clay products that have been fired in a kiln.

D ACCESSING INFORMATION

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

USEFULNESS OF PLASTIC

1. Plastics are very useful.
2. Plastics are a manufactured material.
3. They are easily shaped and coloured.
4. They are light, strong, durable, waterproof and often cheap.
5. Plastics are not heat or fire-resistant, so they will melt when heated.
6. Plastic can be hard or soft, stiff or flexible.
7. Plastic pipes are used for plumbing.
8. Raincoats and umbrellas are made from plastic.
9. Plastic is a poor conductor of electricity and so is used for electric plugs.
10. Buckets, crates, bowls, toys, pens and brushes are made from plastic as it is light and durable.
11. Shopping bags are made from plastic.

USEFULNESS OF PAINT

1. Paint is a liquid coating applied to buildings, cars and other surfaces.
2. It protects the surface.
3. Paint adds texture and colour to the surface.
4. Paint protects the surface.

2. Explain the usefulness of plastics to the learners as follows:
   a. Plastics are very useful and have many different properties.
   b. Plastics come in many different forms.
   c. Plastics are used for many different products from buckets and electric plugs to shopping bags.
   d. Show learners Resource 8: 'Non-metals: Plastic bucket and electric plug'.
   e. Plastic is light and waterproof so it is an ideal material for a bucket.
   f. Plastic is not a conductor of electricity so it can protect people from getting shocked by electrical wiring.
3. Explain the usefulness of paint to the learners as follows:
   a. Paint is a useful material.
   b. It protects the surfaces it is painted on.
   c. Show learners Resource 30: 'A painted Ndebele hut'.
   d. The paint protects the surface of the walls of the hut.
   e. The paint makes the hut attractive.
4. Give learners time to copy this information into their workbooks.

Checkpoint 1

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

a. Are plastics a natural or manufactured material?
b. Is paint a solid, liquid or gas?

Answers to the checkpoint questions are as follows:

a. Plastics are a manufactured material.
b. Paint is a liquid.

E CONCEPTUAL DEVELOPMENT

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

TASK: USES OF PLASTICS AND PAINT

1. Copy and complete the table below:

Material	**Where it is used**	**Properties**	**Reason why this property is useful**
Plastics			
Paint			

2. Explain this to the learners as follows:
   a. Using the information from the previous section, fill in the table.
   b. When the learners have completed the table, ask some learners to share their answers with the class. Discuss these answers.
3. Give learners time to complete this task in their workbooks.
4. Model answer (answers may vary)

TASK: USES OF PLASTICS AND PAINT

Material	*Where it is used*	*Properties*	*Reason why this property is useful*
Plastics	*many uses: plastic pipes for plumbing, plastic covering on electric wires, plastic dishes, shopping bags, furniture*	*light strong durable waterproof*	*for shopping bags, furniture, covering electrical wires, in plumbing*
Paint	*on surfaces such as buildings, cars, wooden furniture, road lines*	*adds texture adds colour protects*	*makes products more attractive, adds durability to products and buildings*

Checkpoint 2

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

a. What property of plastic is useful when making umbrellas and raincoats?
b. What property of plastic us useful when making shopping bags?

Answers to the checkpoint questions are as follows:

a. Plastic is waterproof.
b. Plastic is light.

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

F REFERENCE POINTS FOR FURTHER DEVELOPMENT

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

NAME OF TEXTBOOK	TOPIC	PAGE NUMBER
Study & Master	Processed materials	98-101
Viva	Processed materials	89-94;101
Platinum	Processed materials	100-101
Solutions for All	Processed materials	118-120
Day-by-Day	Processed materials	89-94
Oxford	Processed materials	70-71
Spot On	Processed materials	42-43
Top Class	Processed materials	64-69
Sasol Inzalo Bk A	Processed materials	192-196

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.thoughtco.com/uses-of-plastics-820359 [The usefulness of plastic in our lives]

8 B

Term 2, Week 8, Lesson B
Lesson Title: Traditional processing
Time for lesson: 1 hour

A POLICY AND OUTCOMES

Sub-Topic	Making objects from plant fibre
CAPS Page Number	38

Lesson Objectives

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

- describe how people living in Africa have used local materials to make products
- describe the usefulness of these products.

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 31: Weaving baskets	
Resource 32: A Basotho hat	
Resource 33: Xhosa rondavels	
Resource 34: The process of plaiting	
Resource 29: Ceramic pots	

C CLASSROOM MANAGEMENT

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

> Is plastic a natural or manufactured material?

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.

> *Plastic is a manufactured material.*

D ACCESSING INFORMATION

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

> TRADITIONAL PROCESSING
>
> 1. In Africa, people have used local materials for centuries to make useful products.
> 2. Baskets, hats, mats and **thatched** roofs are made from grasses and reeds.
> 3. Baskets and mats are woven or plaited.
> 4. **Weaving** is making something by crossing threads over and under each other.
> 5. Baskets are used for storing grains, herbs and beer.
> 6. Grasses and reeds can also be **stitched** together to make mats.
> 7. Clay is another local material used to make useful products.
> 8. It is used for building and for making pots.
> 9. Clay bricks, known as adobe bricks, are made to build rondavels.
> 10. Clay pots are fired to make them hard, durable and waterproof.

2. Explain how grass and reeds are used to the learners as follows:
    a. Traditional processing makes use of local materials.
    b. Grass and reeds are used to make many products.
    c. Show learners Resource 31: 'Weaving baskets'.
    d. Baskets are useful products in which to keep foodstuffs and other products.
    e. Plaiting takes three different strands together and crosses them over in a certain way.
    f. Show learners Resource 34: 'Plaiting'.
    g. Show learners Resource 32: 'A Basotho hat'.
    h. These traditional hats are made from grass.
    i. Thatched roofs are made from grass sections that overlap one another.
    j. These roofs are waterproof.
3. Explain how clay is used to the learners as follows:
    a. Show learners Resource 33: 'Xhosa rondavels'.
    b. These houses are made with thatched roofs, mud walls and udaka floors.
    c. Show learners Resource 29: 'Ceramic pots'.
    d. These pots are made from clay and then fired.
4. Give learners time to copy this information into their workbooks.

Checkpoint 1

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

a. How is a thatched roof made?
b. What is weaving?

Answers to the checkpoint questions are as follows:

a. A thatched roof is made from grass sewn and tied together.
b. Weaving crosses threads over and under each other.

E CONCEPTUAL DEVELOPMENT

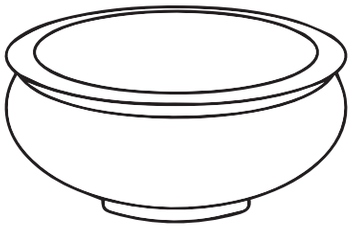
1. Write the following onto the chalkboard (always try to do this before the lesson starts):

TASK: WOVEN, STITICHED OR PLAITED

1. Find three examples of products that have been woven, stitched or plaited.
2. These products can be found in your school, your home or the community.
3. Draw these objects and label the materials used.
4. Include a heading.
5. On your drawing, include the process (weaving, stitching or plaiting) that was used to make the product.

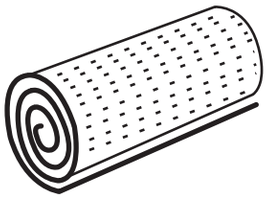
2. Explain this to you're the learners as follows:
    a. Learners must draw the three products in their workbooks.
    b. Give the drawings a heading and label the materials and the process that was used to make the product.
    c. When learners have finished this task, ask some learners to share their drawings with the class. Discuss the material and the process involved in the making of each product.
    d. Give learners time to complete this task in their workbooks.
3. Model answers (answers will vary)

TASK: WOVEN, STITCHED OR PLAITED



A clay pot

A grass basket



A grass mat

Checkpoint 2

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

a. Can you give three ways in which grass can be processed?
b. What material are ceramic pots made from?

Answers to the checkpoint questions are as follows:

a. Grass can be woven, stitched or plaited.
b. Ceramic pots are made from clay.

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
Study & Master	Processed materials	101-104
Viva	Processed materials	104-109
Platinum	Processed materials	107-107
Solutions for All	Processed materials	121-125
Day-by-Day	Processed materials	97-98
Oxford	Processed materials	72; 74
Spot On	Processed materials	45
Top Class	Processed materials	69-74
Sasol Inzalo Bk A	Processed materials	196-215

G ADDITIONAL ACTIVITIES/ READING

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

1. https://goo.gl/uz7s5t (3min 39sec) [Art for kids: How to weave a mat]
2. https://goo.gl/rNsCGF (3min 46sec) [How to weave with a simple loom]

8 C

Term 2, Week 8, Lesson C
Lesson Title: Traditional processing
Time for lesson: 1½ hours

A POLICY AND OUTCOMES

Sub-Topic	Making objects from clay
CAPS Page Number	34

Lesson Objectives

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

- identify the properties of clay (coil) pots
- make a clay (coil) pot.

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
Some clay (modelling clay, natural clay or play dough), a plastic sheet to work on, a stick	Plastic shopping bags could be used instead of plastic sheeting

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 material is used to thatch roofs?

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.

> *Thatching grass is used to thatch roofs.*

D ACCESSING INFORMATION

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

> AN IMPORTANT MATERIAL: CLAY
>
> 1. Clay can be found along river banks.
> 2. If the clay is dry, it is mixed with a bit of water and then **kneaded**.
> 3. The clay is then covered to keep it damp.
> 4. Sometimes other materials are added to the clay to make it stronger.
> 5. This could be sand, grass or broken bits of clay pots.

2. Explain and discuss the following with the learners:
   a. Read through the information about clay with the learners.
3. Give learners time to copy this information into their workbooks.

Checkpoint 1

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

a. Where can clay be found?
b. What can be added to clay to make it stronger?

Answers to the checkpoint questions are as follows:

a. Clay can be found along river banks.
b. Sand, grass or broken bits of clay pots can be added to make the clay stronger.

E CONCEPTUAL DEVELOPMENT

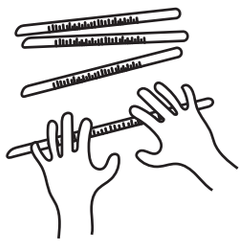
1. Write the following onto the chalkboard (always try to do this before the lesson starts):

ACTIVITY: MAKING A CLAY COIL POT

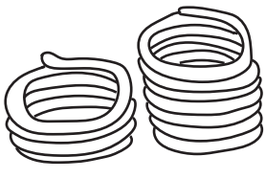
You will need:
some clay (modelling clay, natural clay or play dough)
a plastic sheet to work on
a stick.

METHOD

1. Knead the clay.
2. Take a small piece of clay and flatten and shape it to form the bottom of the bowl.
3. Take another piece of clay.
4. Make a long sausage shape by rolling a piece of clay. When it is used to form a circle, it is called a coil.
5. Use two hands and roll it backwards and forwards, moving your hands from the middle to the outside.



6. Place the coil round the edge of the bottom of the bowl.
7. Roll another coil.
8. Place this coil on top of the first coil.
9. Repeat this until your bowl is the height you would like it to be.



10. Smooth the inside and outside of the bowl with your hands or a spoon.
11. Decorate your bowl using a stick, spoon or any method you choose.
12. Leave your bowl to dry well.

2. Explain this to learners as follows:
    a. Make sure learners gather all they need before starting to make the bowl.
    b. Learners must work on a plastic sheet or a plastic shopping bag.
    c. Read through the instructions with the learners to make sure they understand the method.
    d. Show learners Resource 35: 'How to make a coil pot'.
    e. This shows how to make coils from clay.
    f. Show learners Resource 36: 'How to make a coil pot'.
    g. This shows how to place the coils on top of each other.
    h. Show learners Resource 37: 'How to make a pot'.
    i. The illustration shows how to smooth the outside of the pot.
    j. Learners must tidy their workspace when they have completed their clay coil pot.

Checkpoint 2

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

a. What is a coil?
b. Why must you work on a plastic sheet?

Answers to the checkpoint questions are as follows:

a. A coil is a long sausage shaped object.
b. A plastic sheet will keep the desk top clean and tidy.

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

F REFERENCE POINTS FOR FURTHER DEVELOPMENT

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

NAME OF TEXTBOOK	TOPIC	PAGE NUMBER
Study & Master	Processed materials	104
Viva	Processed materials	106-108
Platinum	Processed materials	104-105
Solutions for All	Processed materials	125-127
Day-by-Day	Processed materials	95-96
Oxford	Processed materials	73
Spot On	Processed materials	44
Top Class	Processed materials	70
Sasol Inzalo Bk A	Processed materials	-

G ADDITIONAL ACTIVITIES/ READING

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

1. https://goo.gl/FRrpdy (2min 41sec) [How to make clay pottery: how to make a coil pot]
2. https://goo.gl/5bBVqB [How to make a coil pot]

NATURAL SCIENCES & TECHNOLOGY

ASSESSMENT GRADE 5 TERM 2

GRADE 5 ASSESSMENT

- This section presents the CAPS assessment requirements for this grade for this term.
- See your prescribed textbooks for examples of the required assessments.
- 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 5							
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	35	20	50	20	35	50
Maximum Time Allocation	Dependent on nature of the task and context	60 minutes	Dependent on nature of the task and context	90 minutes	Dependent on nature of the task and context	60 minutes	90 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**

PRACTICAL TASK - INTRODUCTION

NS & TECH
GRADE 5
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 2A.
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 piece of coat hanger wire (at least 10cm long)
    - a nail
    - a coin (10c, 20c or 50c)
    - a piece of hard coal
    - a piece of chalk
    - a few small pieces of cloth for rubbing
    - something sharp for scratching a surface with (this could be a pin, a maths compass, a nail, an opened paper clip, etc)
    - a hammer or a heavy stone
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 5
PRACTICAL TASK
TERM 2

20 MARKS

(see Section E of Lesson 2A for instructions and questions)

Topic	Activity	Expected answer/outcome	Marks
	1		
Metals and non-metals	1.1	Predictions will vary ✓	**1**
Metals and non-metals	1.2	The coin ✓	**1**
Metals and non-metals	1.3	The wire, the nail, the chalk, the coal ✓	**1**
	2		
Metals and non-metals	2.1	Predictions will vary	**1**
Metals and non-metals	2.2	(Answers may vary) Possible answers: wire, nail, coin ✓	**1**
Metals and non-metals	2.3	(Answers may vary) Possible answers: chalk, coal ✓	**1**
Metals and non-metals	2.4	Chalk ✓	**1**
Metals and non-metals	2.5	Answers will vary ✓	**1**
	3		
Metals and non-metals	3.1	Predictions will vary	**1**
Metals and non-metals	3.2	The wire, the coin and the nail ✓	**1**
Metals and non-metals	3.3	The coal ✓	**1**
Metals and non-metals	3.4	The chalk ✓	**1**
	4		
Metals and non-metals	4.1	Predictions will vary	**1**
Metals and non-metals	4.2	The wire ✓	**1**
Metals and non-metals	4.3	The coin, the nail ✓	**1**
Metals and non-metals	4.4	Answers will vary ✓	**1**
Metals and non-metals	4.5	Answers will vary ✓	**1**
Metals and non-metals	4.6	The wire ✓	**1**
Metals and non-metals	4.7	It was easy to bend with my bare hands, It flattened easily ✓✓	**2**
		TOTAL	**20**

GRADE 5 ASSESSMENT

TERM EXAM

NS & TECH
GRADE 5
EXAM
TERM 2

50 MARKS
90 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 LEARNERS

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

Practice Question

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

1.1. Which of the following is not an invertebrate?

a. locust

b. shark

c. crab

d. butterfly

You have answered correctly if you have circled (B)

GRADE 5 ASSESSMENT

NS & TECH
GRADE 5
TERM 2
EXAM

50 MARKS

PART 1: Life and Living

Question 1: Multiple choice [3]

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

1.1. Which one of these is NOT a vertebrate?

A. fish
B. snake
C. lion
D. snail

1.2. Which of these statements is TRUE?

A. Plants are not the only living things that make their own food.
B. Plants give off oxygen when they make food.
C. Plants give off carbon dioxide when they make food.
D. The food is made in the roots of the plant.

1.3. Which of these statements is FALSE?

A. The backbone protects the spinal cord.
B. The skull protects the brain.
C. The backbone is one solid bone.
D. The ribs protect organs like the lungs and heart.

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	Destructive insect that annoys people, animals or eats crops	A. Mammal
2.1.	Refers to all things living in a habitat	B. Biodiversity
2.2.	Thin, flat hard plates that cover fish	C. Nectar
2.3.	A vertebrate that has hair or fur and suckles its young	D. Scales
2.4.	A sugary liquid found inside flowers	E. Pests

Question 3 **[6]**

Compare the following two animals by completing the table:

	butterfly	earthworm
Number of legs		
Number of wings		
Type of skeleton		

Question 4 **[3]**

Write the word that is being described in the sentence.

Only write the answer.

4.1. When pollen is moved from one plant to another by bees, other insects or wind.

_____

4.2. The time when a seed starts growing into seedling.

_____

4.3. Animals that eat both plants and other animals.

_____

Question 5 **[5]**

Read the following quote:

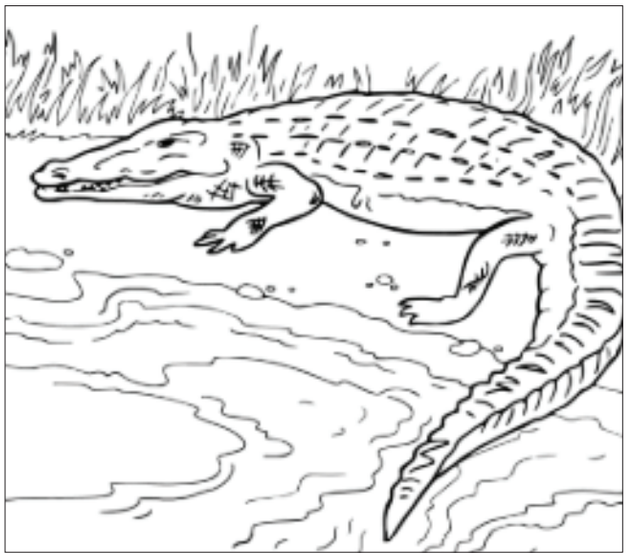
"You may have seen that where there are plants, there are animals. This relationship and inter-dependence has been ongoing for millions of years."

Using the words in the box below to help you, write 5 sentences explaining what you understand by the interdependence between plants, animals and resources.

Living, non-living, water, air, sunlight, food, shelter, habitats, survive, protection, reproduction

Question 6 **[2]**

The picture below is that of a crocodile:



(Note to teacher: Copy this picture or use Term 1 Resource 8)

Write down two ways crocodiles are adapted to living in their habitat.

Question 7 **[2]**

Put the three words in the correct order in each example.

Example: hen, egg, chick

Answer: egg, chick, hen

7.1. adult, baby, toddler

_____

7.2. reproducing, dying, mating

_____

PART 2: Matter and Materials

Question 8 **[3]**

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

8.1. Which one of these is NOT a metal?

A. Aluminium
B. Gold
C. Coal
D. Iron

8.2. Which of these statements is TRUE?

A. All metals are hard.
B. All metals have magnetic properties.
C. Metals are transparent.
D. Metals melt at high temperatures.

8.3. Which of these statements is FALSE?

A. Steel is ductile.
B. Steel is a mixture of iron and carbon.
C. Steel is very strong.
D. Steel is malleable.

Question 9: 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	Metal used to make electrical wires.	A. Ore
9.1	Metal-rich rock mined from the ground.	B. Rust
9.2	Process that occurs when iron or steel are exposed to air or water.	C. Brittle
9.3	Metal used in bridge building.	D. Iron
9.4	Breaks easily if dropped.	E. Copper

Question 10 **[4]**

Complete the following sentences using words in the block below:

heat, electricity, waterproof, threads, glass

Rewrite the sentences and underline your answers.

10.1. Plastics are easily shaped, light and _____.

10.2. Plastic is not a good conductor of heat or _____.

10.3. _____ is brittle and transparent.

10.4. Fabric is made up of tiny _____ that are woven together.

Question 11 **[4]**

Write the word that is being described in the sentence.

Only write the answer.

11.1. Able to be hammered into different shapes without breaking.
_____

11.2. Able to be drawn out into thin wires.
_____

11.3. Tall tower-like structures that hold up power cables.
_____

11.4. Materials that allow heat or electricity to flow through them easily.
_____

Question 12 **[5]**

Read the following statement:

"The high melting point of metal is one of metal's important properties."

Using the words in the box below to help you, explain what you know about the melting point of metals and why it is important. (5 sentences)

solid, liquid, room temperature, strong, molten, poured, mould, cools, melting point, hardness

_____

_____

_____

_____

_____

_____

_____

Question 13 **[5]**

Say whether the following sentences are TRUE or FALSE.

13.1. Copper, iron and steel are poor conductors of heat. _____

13.2. Food cans are coated with tin to stop them from rusting. _____

13.3. Aluminium is a strong and light in weight. _____

13.4. Non-metals can conduct heat. _____

13.5. Electrical current can flow through plastic. _____

TOTAL [50]

TERM 2 EXAM – MEMORANDUM

NS & TECH
GRADE 5
MEMORANDUM
TERM 2

50 MARKS
90 MINUTES

CAPS TOPIC	Questions	Expected answer(s)	Marks
PART 1: Life and Living			
	1		
Plants and animals on Earth	1.1	D ✓	1
Plants and animals on Earth	1.2	B ✓	1
Life cycles	1.3	C ✓	1
	2.		
Plants and animals on Earth	2.1.	B ✓	1
Plants and animals on Earth	2.2.	D ✓	1
Plants and animals on Earth	2.3.	A ✓	1
Plants and animals on Earth	2.4.	C ✓	1
	3.		
Plants and animals on Earth	3	<table><tr><th></th><th>Butterfly</th><th>Earthworm</th></tr><tr><td>Legs</td><td>6 ✓</td><td>0 ✓</td></tr><tr><td>Wings</td><td>4 ✓</td><td>0 ✓</td></tr><tr><td>Skeleton</td><td>Exo-skeleton ✓</td><td>Hydro-skeleton ✓</td></tr></table>	6
	4.		
Life cycles	4.1	pollination ✓	1
Life cycles	4.2	germination ✓	1
Plants and animals on Earth	4.3	omnivore ✓	1

CAPS TOPIC	Questions	Expected answer(s)	Marks
	5.		
Plants and animals on Earth	5.	(Any 5) • Living and non-living things need each other to survive ✓ • Plants need carbon dioxide from air ✓ • And water and minerals from soil to survive ✓ • Animals need sunlight and water from the environment ✓ • Plants provide food and oxygen for animals ✓ • The environment also gives animals places to shelter ✓ • This gives them protection from predators ✓	5
	6		
Plants and animals on Earth	6.	(Any 2) • Crocodiles live on land and water ✓ • They prey on animals that come to the watering hole to drink ✓ • Crocodiles move fast ✓ • Crocodiles are very strong with powerful jaws ✓ • Crocodiles can swim without making ripples in the water ✓ • Crocodiles can lie very still for a long time ✓ • Crocodiles can hold their breath under water for a long time ✓ • Crocodiles are well camouflaged. They look like logs ✓	2
	7		
Life cycles	7.1	Baby, toddler, adult ✓	1
Life cycles	7.2	Mating, reproducing, dying ✓	1

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CAPS TOPIC	Questions	Expected answer(s)	Marks
PART 2: Matter and Materials			
	8.		
Metals and non-metals	8.1	C ✓	1
Metals and non-metals	8.2	C ✓	1
Metals and non-metals	8.3	A ✓	1
	9.		
Uses of materials	9.1	A ✓	1
Metals and non-metals	9.2	B ✓	1
Metals and non-metals	9.3	D ✓	1
Uses of materials	9.4	C ✓	1
	10.		
Uses of materials	10.1	waterproof ✓	1
Uses of materials	10.2	electricity ✓	1
Uses of materials	10.3	glass ✓	1
Uses of materials	10.4	threads ✓	1
	11.		
Metals and non-metals	11.1	malleable ✓	1
Metals and non-metals	11.2	ductile ✓	1
Uses of metals	11.3	pylon ✓	1
Uses of metals	11.4	conductor ✓	1
	12		
Metals and non-metals	12	(Any 5) • Metals are solid at room temperature ✓ • Most metals at room temperature are very strong ✓ • Metals have a high melting temperature ✓ • This high melting temperature makes them useful for making things that need to resist heat ✓ • Metals at room temperature are hard and don't bend easily ✓ • Melted metals can be poured into moulds ✓ • Once the metal has cooled to room temperature it is strong again in its new shape ✓ • Car engines are made from molten metal ✓ • that has been poured into a mould ✓	5

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CAPS TOPIC	Questions	Expected answer(s)	Marks
	13		
Uses of metals	13.1	False ✓	1
Uses of metals	13.2	True ✓	1
Uses of metals	13.3	True ✓	1
Uses of metals	13.4	False ✓	1
Uses of metals	13.5	False ✓	1
			TOTAL 50