

"To myself I am only a child playing on the beach, while vast oceans of truth lie undiscovered before me."

**-Isaac Newton**

# **NATURAL SCIENCES**

LESSON PLAN  
GRADE 7 TERM 1



# 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 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](http://www.nect.org.za)**

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# PROGRAMME ORIENTATION

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

- A full set of lesson plans for the term (3 X 1 hour lessons per week)
- A Resourcepack with images to support the lesson plans
- A full colour poster
- An outline of the assessment requirements for the term
- A tracker to help you monitor your progress

## Lesson Plan Structure

1. Term 1 lesson plans are structured to run for 9 weeks.
2. Each week, there are three lessons, of the following notional time:

3 x 1 hour

This time allocation of 3 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 vocabulary**, together with an explanation of each word or phrase. It is a good idea to display these words and their definitions somewhere in the classroom, for the duration of the topic. It is also a good idea to allow learners some time to copy down these words into their personal dictionaries or science exercise books. You must explicitly teach the words and their meanings as and when you encounter these words in the topic. A good way to teach learners new vocabulary is to use 'PATS':

## PROGRAMME ORIENTATION

- o POINT – if the word is a noun, point at the object or at a picture of the object as you say the word.
  - o ACT – if the word is a verb, try to act out or gesture to explain the meaning of the word, as you say it.
  - o 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.
  - o SAY – say the word in a sentence to reinforce the meaning.
- a. Understanding the uses / value of science.** 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.
- b. 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.
1. 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 skills that will be covered, and whether they are lower middle 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 Resourcepack, 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.

## PROGRAMME ORIENTATION

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 ResourcePACK.** You will have seen that the *Possible Resources* section in the lesson plan will let you know which resources 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 Resources onto cardboard or paper
- Laminating all resources, or covering them in contact paper
- Filing the Resourcepapers in plastic sleeves once you have completed a topic

Have a dedicated wall or notice board in your classroom for Natural Sciences.

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

# PROGRAMME ORIENTATION

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

## Lesson Plan Roucane

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

*Remember, every Natural Sciences lesson follows this roucane:*

- 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 at least two questions to check their understanding.
- 4. Conceptual Development:** complete an activity to apply new knowledge or skills.
- 5. Checkpoint 2:** ask learners at least 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 lessons to track your progress.

# PROGRAMME ORIENTATION

## A vehicle to implement CAPS

Teaching Natural Sciences 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, 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 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 lesson plans have been developed to comply with CAPS in respect of both content and time allocation. In developing these lesson plans, consideration of the realities of teachers was taken and to this end, some simple adjustments were made, 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***



# PROGRAMME ORIENTATION

Grade 7			
Term 1	Term 2	Term 3	Term 4
NS Strand	NS Strand	NS Strand	NS Strand
<b>Life and Living</b>	<b>Matter and Materials</b>	<b>Energy and Change</b>	<b>Planet Earth and Beyond</b>
The biosphere Biodiversity Sexual Reproduction Variation	Properties of materials Separating mixtures Acids, bases and neutrals Introduction to the periodic table of the elements	Sources of energy Potential and Kinetic energy Heat transfer Insulation and energy saving Energy transfer to surroundings The national electricity supply system	Relationship of the Sun and the Earth Relationship of the Moon and the Earth Historical development of astronomy
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

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

Remember that one week equates to 3 hours or three lessons of 1 hour each.

TERM	GRADE 7		GRADE 8		GRADE 9	
	Topic	Time in weeks	Topic	Time in weeks	Topic	Time in weeks
<b>Term 1:</b> Life and Living	• The biosphere	1	• Photosynthesis and respiration	2	• Cells as the basic units of life	2
	• Biodiversity	3½	• Interactions and interdependence within the environment	5	• Systems in the human body	2
	• Sexual Reproduction	3½	• Micro-organism	2	• Human Reproduction	2
	• Variation	1			• Circulatory and respiratory systems	1½
					• Digestive system	1½
		(9 wks)		(9 wks)		(9 wks)
<b>Term 2:</b> Matter and Materials	• Properties of materials	2	• Atoms	2	• Compounds	1
	• SeparATING mixtures	2	• Particle model of matter	5	• Chemical reactions	1
	• Acids, bases and neutrals	2	• Chemical reactions	1	• Reactions of metals with oxygen	1½
	• Introduction to the periodic table of the elements	2			• Reactions of non-metals with oxygen	1
					• Acids, bases and pH value	1
				• Reactions of acids with bases (I)	½	
				• Reactions of acids with bases (II)	1	
				• Reactions of acids with bases (III)	½	
				• Reactions of acids with metals	1	
		(8 wks)		(8 wks)		(8 wks)

## PROGRAMME ORIENTATION

<b>Term 3:</b> Energy and Change	• Sources of energy	1	• Static electricity	1	• Forces	2
	• Potential and Kinetic energy	2	• Energy transfer in electrical systems	3	• Electric cells as energy systems	½
	• Heat transfer	2	• Series and parallel circuits	2	• Resistance	1
	• Insulation and energy saving	2	• Visible light	3	• Series and parallel circuits	2
	• Energy transfer to surroundings	1			• Safety with electricity	½
	• The national electricity supply system	1			• Energy and the national electricity grid	1
					• Cost of electrical power	2
		(9 wks)		(9wks)		(9 wks)
<b>Term 4:</b> Planet Earth and Beyond	• Relationship of the Sun and the Earth	4	• The Solar System	3	• The Earth as a system	1
	• Relationship of the Moon and the Earth	2	• Beyond the Solar System	3	• The Lithosphere	2
	• Historical development of astronomy	2	• Looking into space	2	• Mining of mineral resources	2
					• Atmosphere	2
					• Birth, life and death of stars	1
		(8 wks)		(8 wks)		(8 wks)
<b>TOTALS</b>		34 weeks		34 weeks		34 weeks

# PROGRAMME ORIENTATION

## REFLECTING ON THE LESSONS THAT YOU TEACH

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

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

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

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

# PROGRAMME ORIENTATION

## Accessing Information

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

## PROGRAMME ORIENTATION

Conceptual Development			
		Yes	No
17.	Was the information taught in the 'Accessing Information' part of the lesson used to foreground the activity?		
18.	Were clear instructions given for the conceptual development activity?		
19.	Were the outcomes/answers to the activities explained to the learners?		
20.	Could the learners ask questions and were explanations given?		
21.	Was a model answer supplied to the learners? (written or drawn on the board)		
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:

## The Biosphere

### Term 1, Weeks 1A – 1C

#### A. TOPIC OVERVIEW

##### Term 1, Weeks 1a – 1c

- This topic runs for 1 weeks.
- It is presented over 3 lessons.
- This topic's position in the term is as follows:

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

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

#### B. SEQUENTIAL TABLE

GRADE 7	GRADE 7	GRADE 8
<b>LOOKING BACK</b>	<b>CURRENT</b>	<b>LOOKING FORWARD</b>
<ul style="list-style-type: none"> <li>• Living and non-living things</li> <li>• Structure of plants</li> <li>• Structure of animals</li> <li>• Conditions for growth</li> <li>• Habitats</li> </ul>	<ul style="list-style-type: none"> <li>• The biosphere is where life exists and is made up of the lithosphere, hydrosphere and atmosphere</li> <li>• The biosphere contains all living organisms and dead organic matter</li> <li>• The seven life processes</li> <li>• Requirements for sustaining life</li> <li>• Environmental adaption</li> </ul>	<ul style="list-style-type: none"> <li>• Photosynthesis</li> <li>• Respiration</li> <li>• Ecosystems: balance; adaptations; conservation</li> <li>• Feeding relationships between organisms</li> <li>• Energy Flow: food chains and food webs</li> <li>• Micro-organisms</li> </ul>

### C. SCIENTIFIC AND TECHNOLOGICAL VOCABULARY

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

	TERM	EXPLANATION
1.	bacteria	Small organisms that cannot be seen with the naked eye. Some of these organisms cause diseases
2.	organic	If something is organic it means it comes from living matter
3.	organism	An individual plant, animal or single-celled life form
4.	microscope	An instrument used to look at very small things. By looking through a microscope, whatever is being looked at appears much bigger
5.	sensitive	To be sensitive means to be quick to feel and act on changes around you
6.	environment	The surroundings in which a person, animal or plant lives
7.	echolocation	The use of sound waves to find where things are
8.	abiotic	The non-living part of the Earth

### D. UNDERSTANDING THE USES / VALUE OF SCIENCE

The Earth is an integrated set of systems that can sustain life. Life is dependent on these systems. It is valuable to understand what these systems are so that they can be taken care of by future generations in order to maintain a sustainable planet for people and all living organisms.

### E. PERSONAL REFLECTION

Reflect on your teaching at the end of each topic:

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



# TOPIC: The Biosphere

# 1 A

**Term 1, Week 1, Lesson A**

**Lesson Title: The Biosphere**

**Time for lesson: 1 hour**

## A POLICY AND OUTCOMES

<b>Sub-Topic</b>	The concept of the biosphere		
<b>CAPS Page Number</b>	17		
<b>Lesson Objectives</b>			
By the end of the lesson, learners will be able to:			
<ul style="list-style-type: none"> <li>• name the 3 components of the biosphere</li> <li>• describe the important part that each component plays</li> <li>• classify living organisms according to their biosphere</li> </ul>			
<b>Specific Aims</b>	1. DOING SCIENCE		
	2. KNOWING THE SUBJECT CONTENT & MAKING CONNECTIONS		✓
	3. UNDERSTANDING THE USES OF SCIENCES & INDIGENOUS KNOWLEDGE		

## SCIENCE PROCESS SKILLS

1. Accessing & Recalling Information	✓	6. Identifying Problems & Issues		11. Doing Investigations	
2. Observing		7. Raising Questions		12. Recording Information	✓
3. Comparing		8. Predicting	✓	13. Interpreting Information	
4. Measuring		9. Hypothesizing		14. Communicating	
5. Sorting & Classifying	✓	10. Planning Investigations		15. Scientific Process	

# TOPIC: The Biosphere

## B POSSIBLE RESOURCES

For this lesson, you will need:

IDEAL RESOURCES	IMPROVISED RESOURCES
Resource 1: The biosphere	

## C CLASSROOM MANAGEMENT

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

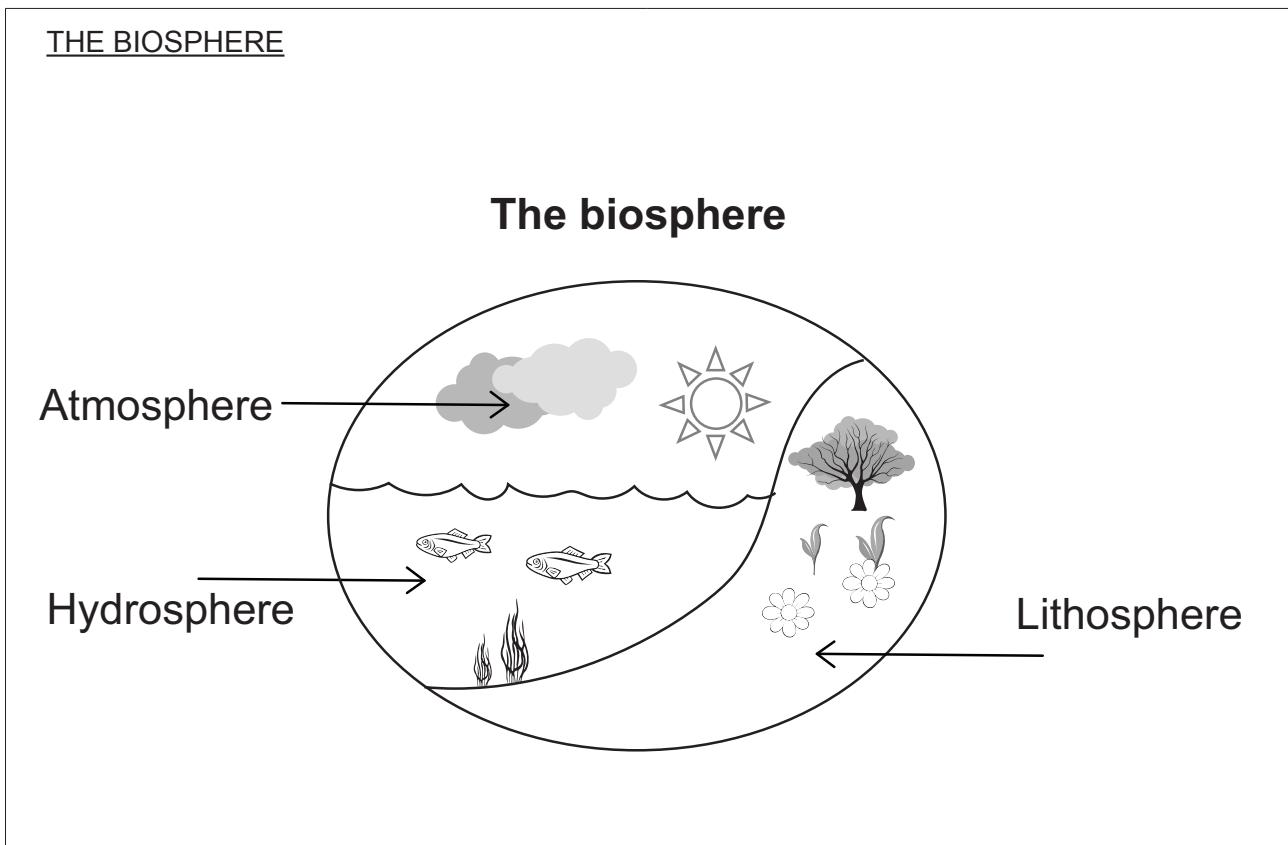
Name two places on Earth where you would find living creatures.

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.

*Possible answers: In water, on land, in the air.*

## D ACCESSING INFORMATION

1. Draw the following picture (or use Resource 1) and write the following information on the chalkboard (always try to do this before the lesson starts):



## TOPIC: The Biosphere

### THE BIOSPHERE

1. The biosphere is the place on Earth where all life is found.
2. Dead organic matter is also found in the biosphere.
3. The biosphere is made up of three parts: the atmosphere, the lithosphere and the hydrosphere.

#### A. The atmosphere

1. The atmosphere is the gas layer around the Earth.
2. This is made up of nitrogen, oxygen, carbon dioxide, water vapour and small amounts of other gasses.
3. Birds and insects travel through atmosphere.
4. Plant pollen and **bacteria** are also found in the atmosphere.

#### B. The lithosphere

1. The lithosphere is the surface of the Earth that is covered in soil and rocks.
2. Plants and animals are found both on the surface and also under the soil.

#### C. The hydrosphere

1. The hydrosphere is the parts of the Earth that are covered in water.
2. This could be oceans, rivers, lakes or underground water.
3. Plants and animals are found both on the surface of water and also under water.

2. Explain this to the learners as follows:
  - a. The biosphere is that part of the Earth where all life is found.
  - b. The biosphere is made up of three parts:
    - The atmosphere
    - The lithosphere
    - The hydrosphere
  - c. The atmosphere is the gas layer around the Earth. It is made up of nitrogen, oxygen, carbon dioxide, small amounts of other gases and water vapour.
  - d. This layer of gases provides oxygen for living organisms as well as protection from the Sun's dangerous ultraviolet rays.
  - e. The lithosphere is the surface of the Earth that is made up of soil, minerals and rocks.

## TOPIC: The Biosphere

- f. The lithosphere has soil which is necessary to grow plants and food.
  - g. The hydrosphere is the parts of the Earth that are covered in water. This can be the oceans, lakes, rivers and underground water.
  - h. Water is essential for all life on Earth.
  - i. All living **organisms** (and dead organic matter) are found in the biosphere.
  - j. Living organisms can be big like elephants and trees or so small that you cannot see them, like bacteria and viruses.
  - k. Dead organic matter is dead plant and animal matter that has started to decompose. Decompose is another word for “starTING to rot”.
3. Ask the learners:
- a. Why is water essential for life?  
*(Possible answer: All living things need water to live and grow. Plants, animals and humans will die without water.)*
  - b. Can you think of living things that might live or nest under the soil?  
*(Possible answers: earthworms, ants, moles, snakes)*
  - c. Which part of the biosphere do humans need to survive?  
*(Answer: All three parts)*
4. Read through the information written on the chalkboard with the learners.
5. Ask the learners if they have any questions.
6. Tell the learners to copy the drawing and information written on the chalkboard into their workbooks.
7. Give the learners some time to complete this task.

### **Checkpoint 1**

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

- a. What is the biosphere?
- b. What are the three parts of the biosphere called?

Answers to the checkpoint questions are as follows:

- a. The biosphere is the parts of the Earth where all life is found.
- b. The atmosphere, the lithosphere and the hydrosphere.

## TOPIC: The Biosphere

### E

### CONCEPTUAL DEVELOPMENT

1. Explain the following to the learners:
  - a. The different parts of the biosphere have different conditions that make them suitable for different living organisms to live:
    - Some living organisms are adapted to live on the surface of the Earth, like monkeys.
    - Some living organisms are adapted to live under the soil, like earthworms.
    - Some living organisms are adapted to live under water, like fish.
    - Some living organisms are adapted to float or fly through the air, like birds.
    - Some living organisms have adapted to live in multiple places, like frogs.
2. Write and draw the following on the chalkboard (always try to do this before the lesson starts):

Arrange the following organisms into the part of the biosphere where they can be found. Note that some can be found in more than one part of the biosphere.

cow, worm, tree, crocodile, virus, flower, bacteria, bat, bee, shark, hippopotamus, algae, seaweed, fish, bird

ATMOSPHERE	LITHOSPHERE	HYDROSPHERE

3. Explain to the learners the activity as follows:
  - a. Draw the table into your workbook.
  - b. Fill in the living organisms under the part of the biosphere you would find them.
  - c. Pay careful attention because some can be found in more than one biosphere.
4. Allow the learners some time to complete this task.
5. With the learners' input, complete the model answer on the chalkboard:

## TOPIC: The Biosphere

ATMOSPHERE	LITHOSPHERE	HYDROSPHERE
virus	cow	crocodile
bacteria	worm	shark
bat	tree	hippopotamus
bee	crocodile	fish
bird	flower	algae
	bat	seaweed
	bee	bird
	bird	

6. Discuss the answers with the learners.

### **Checkpoint 2**

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

- What is the hydrosphere made up of?
- What is the lithosphere made up of?

Answers to the checkpoint questions are as follows:

- All the water on the Earth: the oceans, rivers, lakes and underground water.
- The soil and rocks of the Earth.

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

## TOPIC: The Biosphere

### 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
Oxford Successful	The biosphere	12-14
Via Afrika	The biosphere	8-10
Platinum	The biosphere	1-2
Spot On	The biosphere	1-2
Step-by-Step	The biosphere	3-10
Pelican	The biosphere	3-7
Solutions for All Natural Sciences	The biosphere	1-4
Shuters Top Class Natural Sciences	The biosphere	2-3
Sasol Inzalo Bk A	The biosphere	4-11

### 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.geography4kids.com/files/land\\_intro.html](http://www.geography4kids.com/files/land_intro.html) [A big ball of life]
2. <https://www.nationalgeographic.org/encyclopedia/biosphere/> [Biosphere]

## TOPIC: The Biosphere

# 1 B

**Term 1, Week 1, Lesson B**

**Lesson Title: Life on planet Earth**

**Time for lesson: 1 hour**

### A POLICY AND OUTCOMES

<b>Sub-Topic</b>	Living organisms		
<b>CAPS Page Number</b>	17		
<b>Lesson Objectives</b>			
By the end of the lesson, learners will be able to:			
<ul style="list-style-type: none"> <li>• name the 3 living groups of organisms on the Earth</li> <li>• list the seven processes of life</li> <li>• describe each life process</li> <li>• define what an <b>abiotic</b> element is.</li> </ul>			
<b>Specific Aims</b>	1. DOING SCIENCE		✓
	2. KNOWING THE SUBJECT CONTENT & MAKING CONNECTIONS		✓
	3. UNDERSTANDING THE USES OF SCIENCES & INDIGENOUS KNOWLEDGE		

### SCIENCE PROCESS SKILLS

1. Accessing & Recalling Information	✓	6. Identifying Problems & Issues		11. Doing Investigations	
2. Observing		7. Raising Questions		12. Recording Information	
3. Comparing	✓	8. Predicting		13. Interpreting Information	
4. Measuring		9. Hypothesizing		14. Communicating	
5. Sorting & Classifying	✓	10. Planning Investigations		15. Scientific Process	



## TOPIC: The Biosphere

### B POSSIBLE RESOURCES

For this lesson, you will need:

IDEAL RESOURCES	IMPROVISED RESOURCES
Whistle	
Computer with internet connection	

### C CLASSROOM MANAGEMENT

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

What is the name we give to the part of the Earth that holds all living things?

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 biosphere.*

### D ACCESSING INFORMATION

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

#### THE SEVEN LIFE PROCESSES

1. The living part of the Earth is made up of animals, plants and micro-organisms.
2. We call the living part of the Earth, the organic part.
3. We call the non-living part of the Earth, the abiotic part.
4. All living things have 7 life processes that they carry out. These are:
  - a. Feeding (Nutrition)
  - b. Growth
  - c. Reproduction
  - d. Breathing
  - e. Excretion (getting rid of waste)
  - f. Responding to the environment
  - g. Movement

## TOPIC: The Biosphere

2. Ask the learners:
  - a. How do we know if something is dead?  
*(Possible answers: It isn't moving. It isn't breathing. It has no heartbeat. It is starTING to rot.)*
3. Read over the information written on the chalkboard with the learners.
4. Explain this to the learners as follows:
  - a. The living part of the Earth is made up of animals, plants and micro-organisms.
  - b. Micro-organisms are living things that are so small we cannot see them without a **microscope**.
  - c. We call the living things, biotic matter and the non-living things abiotic matter.
  - d. All living organisms have 7 things that they do in common. They may not all do them in the same way, but they all do them.
5. Now explain each of the seven live processes:
  - a. The first is Feeding. A scientific word we can use for this is nutrition.
  - b. Nutrition is needed for energy, growth and repair.
  - c. Plants make their own food in their leaves through a process called photosynthesis.
  - d. Animals eat either plants, other animals or plants and animals for nutrition.
  - e. The second thing all living things have in common is growth.
  - f. Think of a human. It is born small, grows bigger and eventually gets old.
  - g. The third thing they have in common is reproduction.
  - h. Reproduction is an important part of keeping life on Earth continuous.
  - i. Animals reproduce by having live babies or laying eggs.
  - j. Plants produce seeds that produce more plants.
  - k. Micro-organisms reproduce by cell division.
  - l. All living things breathe. Plants and animals breathe differently and process gases differently but all living creatures breathe.
  - m. All living things need to get rid of waste from their system. We call this excretion.
  - n. Excretion can take place through sweat, urine, faeces (a polite word for poo).
  - o. An example of a plant excreTING is gum being pushed through the bark of a tree.
  - p. All living things are also **sensitive** to their **environment** and adapt to their environment.
  - q. An example of this might be how we sneeze if we get dust in our nose.
  - r. Lastly, all living things move. Plants grow up or down or towards the light.
  - s. Animals move, too.

## TOPIC: The Biosphere

6. Ask the learners:
  - a. Can you name some of the different ways animals might move?  
(Possible answer: Birds fly with wings. Some animals walk on four legs, some on two legs. Some animals hop. Some animals swing through trees. Fish swim. Snakes slither.)
7. Ask the learners if they have any questions.
8. Tell the learners to copy the drawing and information written on the chalkboard into their workbooks.
9. Give the learners some time to complete this task.

### **Checkpoint 1**

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

- a. What do we call non-living things?
- b. What would happen if a species did not reproduce?

Answers to the checkpoint questions are as follows:

- a. We call them abiotic.
- b. The species would die out.

## **E**

### **CONCEPTUAL DEVELOPMENT**

1. Do the following activity with the learners:
  1. Put the learners into groups of 5 or 6.
  2. Take the learners outside.
  3. Tell the learners that in their groups they must find, and bring back to class, as many abiotic things as they can find.
  4. Tell the learners they will have 1 minute, after which you will blow the whistle to call them back.
  5. Once the minute is over, take the learners and their findings back to class.
  6. Items the learners might collect could be: stones, sand, feathers, food wrappers, tins, branches, leaves.
  7. Discuss as a class, all the items that have been brought in.
  8. Decide if each item is in fact abiotic.
  9. Learners may say leaves are abiotic because they are no longer alive.
  10. Remind learners that abiotic items were never alive.
  11. Leaves and branches are dead organic matter.
  12. Make a list on the chalkboard of the abiotic things that were found.
  13. The list could include: stone, brick, sand, chip packet, tin.

## TOPIC: The Biosphere

2. Draw the following table on the chalkboard:




<u>THE SEVEN PROCESSES OF LIFE</u>		
PROCESS	DRAW	DESCRIBE
Movement		
Reproduction		
Nutrition		
Excretion		
Breathing		
Respiration		
Growth		

3. Explain to the learners the activity as follows:





- a. Draw the table on the chalkboard into your workbook.
- b. Draw a symbol or picture to represent each process in the column labelled “draw”.
- c. Write a sentence to describe the process in the column labelled “describe”.

4. Allow the learners some time to complete this task.

5. Write the model answer on the chalkboard:

<u>THE SEVEN PROCESSES OF LIFE</u>		
PROCESS	DRAW	DESCRIBE
Movement		Living things can move. Some can move fast like cheetahs. Some move very slowly like a plant growing towards the sunlight.
Reproduction		Living things reproduce. Animals can produce live young or may lay eggs. Plants produce seeds. Micro-organisms reproduce by dividing their cells.
Nutrition		Plants produce their own food. This is called photosynthesis. Animals eat plants or other animals or both for food.

## TOPIC: The Biosphere

Excretion		All living things get rid of waste through a process called excretion.
Breathing		All living things use the gases in the atmosphere to breathe. Plants and animals use these gases differently.
Respiration		All living things are suited to the environment in which they live. They are sensitive to the environment around them.
Growth		All living things start by being born and then grow.

6. Read over the model answer with the learners.

7. Tell the learners to add anything they are missing to their own tables.

### **Checkpoint 2**

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

- What do we call the process whereby plants make their own food?
- What do we call the process of getting rid of waste in living organisms?

Answers to the checkpoint questions are as follows:

- Photosynthesis.
- Excretion.

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

## TOPIC: The Biosphere

### 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
Oxford Successful	The biosphere	15
Via Afrika	The biosphere	11-13
Platinum	The biosphere	3
Spot On	The biosphere	3
Step-by-Step	The biosphere	11
Pelican	The biosphere	3-5
Solutions for All Natural Sciences	The biosphere	5-10
Shuters Top Class Natural Sciences	The biosphere	3-5
Sasol Inzalo Bk A	The biosphere	11-12

### 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.passmyexams.co.uk/GCSE/biology/life-processes.html> [Mrs Gern]
2. <https://www.youtube.com/watch?v=1JMT8VAWtEs> (3min 25sec) [The seven life processes]

## TOPIC: The Biosphere

# 1 C

**Term 1, Week 1, Lesson C**

**Lesson Title: Requirements for sustaining life**

**Time for lesson: 1 hour**

### A POLICY AND OUTCOMES

<b>Sub-Topic</b>	Requirements for sustaining life	
<b>CAPS Page Number</b>	17	
<b>Lesson Objectives</b>		
By the end of the lesson, learners will be able to:		
<ul style="list-style-type: none"> <li>• name the 5 basic requirements for sustaining life</li> <li>• explain why each requirement is necessary for sustaining life</li> <li>• give examples of how living things have adapted to their environment.</li> </ul>		
Specific Aims	1. DOING SCIENCE	
	2. KNOWING THE SUBJECT CONTENT & MAKING CONNECTIONS	✓
	3. UNDERSTANDING THE USES OF SCIENCES & INDIGENOUS KNOWLEDGE	

### SCIENCE PROCESS SKILLS

1. Accessing & Recalling Information	✓	6. Identifying Problems & Issues		11. Doing Investigations	✓
2. Observing		7. Raising Questions		12. Recording Information	
3. Comparing		8. Predicting		13. Interpreting Information	✓
4. Measuring		9. Hypothesizing		14. Communicating	
5. Sorting & Classifying		10. Planning Investigations		15. Scientific Process	

# TOPIC: The Biosphere

## B POSSIBLE RESOURCES

For this lesson, you will need:

IDEAL RESOURCES	IMPROVISED RESOURCES
Resource 2: Composition of air	
Resource 3: Polar Bears	
Resource 4: The Aloe	

## C CLASSROOM MANAGEMENT

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

What is the process called where plants make their own food using energy from the Sun?

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.

*Photosynthesis.*

## D ACCESSING INFORMATION

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

### WHAT WE NEED FOR LIFE

1. All living things have some basic things they need to survive.
2. They get all they need from their environment.
3. The basic needs provided by the environment are:

### ENERGY

1. Energy is needed for growth and movement.
2. The main source of energy for the Earth is the Sun.
3. Plants use the energy from the Sun to make their own food. We call this photosynthesis.
4. Animals get their energy by eating the plants or by eating other animals.

### GASES

1. The atmosphere is the blanket of gases around the Earth.



## TOPIC: The Biosphere

2. Two of the gases in the atmosphere that are important for life are carbon dioxide (CO<sub>2</sub>) and oxygen (O<sub>2</sub>).
3. Plants use carbon dioxide for photosynthesis.
4. All living things need oxygen to breathe.

### WATER

1. All life processes need water in some way.
2. Plants get water from the soil.
3. The average adult body is made up of about 60% water.

### SOIL

1. Plants need soil to grow in.
2. Some animals live in soil.

### FAVOURABLE TEMPERATURES

1. The temperatures on Earth range from -50°C to 50°C.
2. This is a suitable range of temperatures for a whole range of living organisms.

2. Ask the learners:
  - a. What do we, as humans, need to live?  
(Possible answers: Air, food, water.)
3. Explain that in order for life to continue on earth, there are 5 things that need to be in place. All living things get what they need to stay alive from the environment that they live in.
4. Tell the learners the following:
  - a. The first thing that living things need from the environment is energy.
  - b. The Earth gets energy from the Sun.
  - c. Plants use this energy to make food in their leaves. This process is called photosynthesis.
  - d. Animals get their energy by eating the plants or by eating other animals.
  - e. All living things need air to survive.
  - f. Earth is surrounded by a blanket of gases called the atmosphere.
  - g. This blanket of gases is made up of nitrogen, oxygen, carbon dioxide and other gases.  
(Show learners Resource 2.)
  - h. Nitrogen makes up the largest part of air. We will learn about its importance later.
5. Ask learners if they have any questions. Provide answers where necessary.

## TOPIC: The Biosphere

6. Now tell the learners:
  - a. Plants use the carbon dioxide in the air during photosynthesis.
  - b. All living things need oxygen to breathe.
  - c. In the last lesson, we learnt about the 7 life processes. They all need water in some way.
  - d. The average adult body is made up of about 60% water.
  - e. We can live for much longer without food than we can without water.
  - f. Another important thing that is needed for life, is soil.
  - g. Plants need soil in which to grow.
7. Ask the learners what they think would happen if there were no plants on earth. Guide the discussion.
8. Now explain the following:
  - a. Planet Earth has a temperate range from  $-50^{\circ}\text{C}$  to  $50^{\circ}\text{C}$ .
  - b. This is a suitable temperature range for a wide range of living organisms.
  - c. We say that living things adapt to the environment they live in.
9. Now tell the learners that we are going to look at two examples. (Show learners Resource 3 and 4.)
10. Ask the learners:
  - a. Resource 3 is a picture of a polar bear. What about the polar bear makes it suited to live in a very cold environment?  
*(Possible answers: Thick fur, layer of fat under skin, big paws so it doesn't sink into the snow.)*
  - b. Resource 4 is a picture of an aloe plant. Look carefully at its structure. What makes it suitable for living in areas of low rainfall?  
*(Possible answers: Thick leaves to store water, thorns to stop animals eating it.)*
11. Ask the learners if they have any questions.
12. Tell the learners to copy the information written on the chalkboard into their workbooks.
13. Give the learners some time to complete this task.

### **Checkpoint 1**

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

- a. Name the three main gases that air is made up of?
- b. Where does Earth get its energy from?

Answers to the checkpoint questions are as follows:

- a. Nitrogen, carbon dioxide and oxygen.
- b. The Sun.

# TOPIC: The Biosphere

## E

### CONCEPTUAL DEVELOPMENT

1. Explain the following to the learners:
  - a. Living organisms are suited in different ways to the environment in which they live.
  - b. We say they are adapted to their environment.
  - c. These adaptations can take many forms.
  - d. Some examples are:
    - Fish have fins that allow them to move easily through water.
    - Polar bears have thick fur to keep warm.
    - Giraffes have long necks to reach the leaves on the tops of trees.
2. Write the following activity on the chalkboard (always try to do this before the lesson starts):

<u>ADAPTIONS TO THE ENVIRONMENT</u>	
ORGANISM	ADAPTATION
elephant	Sharp beak for tearing apart food
flower	Can live in a dry environment because it stores water in its leaves
bat	Has a trunk that is able to reach up to pick leaves to eat
eagle	Has fangs and poison to help catch food
shark	Brightly coloured to attract bees
cactus	Can hunt at night using <b>echolocation</b>
snake	Gills to breathe under water

3. Explain the activity as follows:
  - a. On the left of the table is the name of a living organism.
  - b. On the right is a description of a way the organisms have adapted to their environment.
  - c. You need to match the living organism with its description.
  - d. Write the organism's name, followed by a colon and the correct description.
  - e. Do this activity in your workbooks.
4. Read over the information written on the chalkboard with the learners.
5. Allow the learners some time to complete the task.
6. Write the model answer on the chalkboard with input from the learners:

## TOPIC: The Biosphere

### ADAPTIONS TO THE ENVIRONMENT

*Elephant: Has a trunk that is able to reach up to pick leaves to eat*

*Flower: Brightly coloured to attract bees*

*Bats: Can hunt at night using echolocation*

*Eagle: Sharp beak for tearing apart food*

*Shark: Gills to breathe under water*

*Cactus: Can live in a dry environment because it stores water in its leaves*

*Snake: Has fangs and poison to help catch food*

7. Read over the model answer with the learners.
8. Tell the learners to make any corrections.

### **Checkpoint 2**

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

- a. Which gas do plants use to make food during photosynthesis?
- b. Name some ways in which fish are adapted to their environment?

Answers to the checkpoint questions are as follows:

- a. Carbon dioxide.
- b. They can breathe under water (have gills), and have tails to help movement through water.

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

## TOPIC: The Biosphere

### 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
Oxford Successful	The biosphere	16-20
Via Afrika	The biosphere	13-15
Platinum	The biosphere	4-8
Spot On	The biosphere	4-8
Step-by-Step	The biosphere	12-17
Pelican	The biosphere	11-19
Solutions for All Natural Sciences	The biosphere	12-22
Shuters Top Class Natural Sciences	The biosphere	5-11
Sasol Inzalo Bk A	The biosphere	12-21

### G ADDITIONAL ACTIVITIES/ READING

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

1. <https://www.youtube.com/watch?v=O81Zle1wqa4> (2min 41sec) [Adaptions of living things]
2. <https://www.youtube.com/watch?v=2xiAacSg4bl> (9min 13sec) [What living things need]

# TOPIC OVERVIEW:

## Biodiversity

### Term 1, Weeks 2A – 5C

#### A. TOPIC OVERVIEW

##### Term 1, Weeks 2a – 5c

- This topic runs for 3¼ weeks.
- It is presented over 10 lessons.
- This topic's position in the term is as follows:

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

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

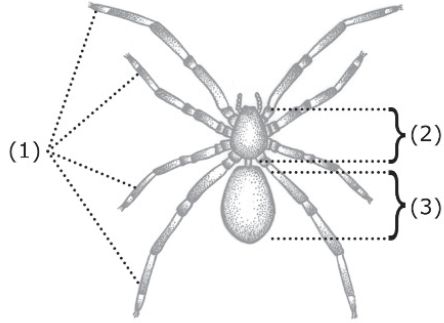
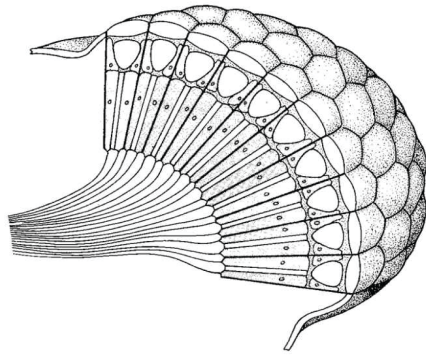
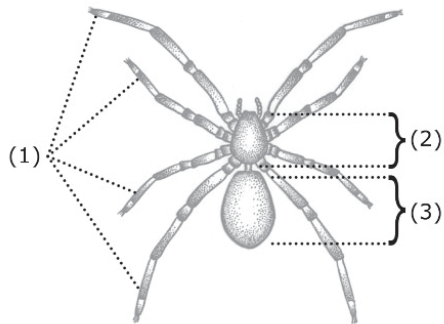
#### B. SEQUENTIAL TABLE

GRADE 7	GRADE 7	GRADE 8
<b>LOOKING BACK</b>	<b>CURRENT</b>	<b>LOOKING FORWARD</b>
<ul style="list-style-type: none"> <li>• Ecosystems</li> <li>• Food webs</li> <li>• Wetlands</li> </ul>	<ul style="list-style-type: none"> <li>• Classification of living things according to kingdoms</li> <li>• Diversity of animals</li> <li>• Vertebrates</li> <li>• Invertebrates</li> <li>• Diversity of plants</li> <li>• Angiosperms</li> <li>• Gymnosperms</li> </ul>	<ul style="list-style-type: none"> <li>• Balance in an ecosystem</li> <li>• Conservation of the ecosystem</li> <li>• Types of micro-organisms</li> <li>• Harmful micro-organisms</li> <li>• Useful micro-organisms</li> </ul>

#### C. SCIENTIFIC AND TECHNOLOGICAL VOCABULARY

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

	TERM	EXPLANATION
1.	adaption	When an organism can make changes to survive in its environment or habitat
2.	mould	A green or yellow bacterium which grows on food if left ra long time
3.	nutrition	The process of getting food

4.	anchored	To be held in one place. Plants are anchored to the Earth by roots
5.	limbs	An arm, a leg, a wing, a tail. A body part that helps movement
6.	segmented body	<p>A body that is made of different sections that are joined together, for example:</p>  <p>(2) and (3) show segmented body parts</p>
7.	compound eyes	<p>An eye that is made up of many units that can see. Flies have compound eyes, for example:</p> 
8.	jointed legs	<p>Jointed legs are made up of hard sections with soft joints that can bend to allow movement, e.g.:</p>  <p>(1) Shows jointed legs</p>
9.	exoskeleton	The hard-outside covering of the body in some invertebrate animals. This takes the place of an internal skeleton
10.	metamorphosis	Process whereby animals and insects change from one state to another
11.	biodiversity	The number and types of plants and animals that exist in a particular area or habitat

## D. UNDERSTANDING THE USES / VALUE OF SCIENCE

Understanding the **biodiversity** of our environment sensitises learners to the interdependence of all living organisms. Learning to value our planet and all its biodiversity should ensure a more responsible attitude towards environmental concerns. There are many careers relating to research into biodiversity.

## E. PERSONAL REFLECTION

Reflect on your teaching at the end of each topic:

Date completed:

Lesson successes:

Lesson challenges:

Notes for future improvement:



## TOPIC: Biodiversity

# 2 A

**Term 1, Week 2, Lesson A**

**Lesson Title: Classification of living things**

**Time for lesson: 1 hour**

### **A POLICY AND OUTCOMES**

<b>Sub-Topic</b>	Classification of living things	
<b>CAPS Page Number</b>	17	
<b>Lesson Objectives</b>		
By the end of the lesson, learners will be able to:		
<ul style="list-style-type: none"> <li>• define biodiversity</li> <li>• define habitat</li> <li>• name the five kingdoms into which organisms are classified.</li> </ul>		
Specific Aims	1. DOING SCIENCE	
	2. KNOWING THE SUBJECT CONTENT & MAKING CONNECTIONS	✓
	3. UNDERSTANDING THE USES OF SCIENCES & INDIGENOUS KNOWLEDGE	

### **SCIENCE PROCESS SKILLS**

1. Accessing & Recalling Information	✓	6. Identifying Problems & Issues		11. Doing Investigations	✓
2. Observing	✓	7. Raising Questions		12. Recording Information	✓
3. Comparing	✓	8. Predicting		13. Interpreting Information	
4. Measuring		9. Hypothesizing		14. Communicating	
5. Sorting & Classifying	✓	10. Planning Investigations		15. Scientific Process	

## TOPIC: Biodiversity

### B POSSIBLE RESOURCES

For this lesson, you will need:

IDEAL RESOURCES	IMPROVISED RESOURCES
Poster for term 1	
Resource 5: Classifying things	
Four copies of Resource 6.1: living and non-living things (6.2, 6.3 and 6.4)	
Computer with internet access	

### C CLASSROOM MANAGEMENT

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

What are the five things needed for life on Earth?

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

*Energy, gases, water, soil and suitable (favourable) temperatures.*

### D ACCESSING INFORMATION

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

#### BIODIVERSITY

1. It is believed there are between 30-50 million different living organisms on Earth.
2. Each organism has its own special conditions and place in which it lives.
3. We call this its habitat.
4. All these habitats and living organisms make up the Earth's biodiversity.
5. Scientists have sorted all these organisms into groups by looking at their similarities and differences.
6. We say they have been CLASSIFIED into groups.

Scientists looked at:

- a. How big it is?
- b. Can it move?
- c. Can it make its own food?

## TOPIC: Biodiversity

OR

- d. Does it eat food?
5. All living organisms were then grouped into five groups called KINGDOMS.
6. These are:
  - a. Bacteria
  - b. Protista
  - c. Fungi
  - d. Plantae
  - e. Animalia

2. Do the following activity with the learners:

1. Take out Resource 5 and put it on the board.
2. Explain to the learners:
  - a. When we sort things into groups, we say we are classifying them.
  - b. When we classify things, we look at similarities (what is the same) and differences.
  - c. We are going to do an activity where we classify some everyday things.
3. Divide the class into groups of 6.
4. The learners will need a piece of paper to work on or they can do this in their workbooks.
5. Look at and name all the pictures on Resource 5.
6. Explain to the learners:
  - a. As a team, you must sort or classify these items into groups.
  - b. Decide how many groups of items you will have. There should be at least three.
  - c. Give the group of items a name.
  - d. List the items that belong to this group underneath the name of that group.
  - e. All the items must be put into a group.
7. Give the learners some time to complete the task.

3. Discuss the model answer with the learners: (The names of the groups of items may be different. This can be discussed.)

CLOTHES	ANIMALS	FOOD	SOCCER EQUIPMENT
shoe	chicken	mielie	soccer boots
shirt	dog	pumpkin	ball
cap		tea	goals
		bread	

## TOPIC: Biodiversity

4. Read through the information written on the board with the learners.
5. Explain this to the learners as follows:
  - a. The Earth is a large planet with many places where organisms can live.
  - b. We have learnt about the atmosphere, the lithosphere and the hydrosphere.
  - c. Life is found in all these environments.
  - d. In each environment, there are differences. An example might be the hydrosphere.
  - e. There are various types of water: salty, fresh, moving, and still water.
6. Ask the learners if they can think of animals that live in salt water and animals that live in or need fresh water.

*(Possible answer: Salty water: whales, sharks, dolphins. Fresh water: hippopotamus, fresh-water crocodiles; mammals drink fresh water)*

7. Tell the learners:
  - a. We have learnt that organisms **adapt** to their environments.
  - b. We call these special environments their habitats.
  - c. All these habitats and organisms together are known as Earth's biodiversity.
  - d. Scientists believe there are between 30-50 million different living things on Earth.
  - e. Scientists have sorted these living organisms into groups.
  - f. We say they have been classified.
  - g. All living things have been classified into five main groups which are called kingdoms.
8. Ask the learners what you think scientists might have looked at when classifying living organisms. Guide the discussion. *(Ideas might be: size, colour, where they live, plants and animals, do they have eyes, can they swim, can they fly?)*
9. Now explain:
  - a. There were so many areas that could have been looked at, but scientists narrowed it down to just a few categories.
  - b. Scientists looked at the size of the organism, if it could move and how it got its food.

*(Show the learners the poster for term 1 and point out the different kingdoms and examples as you continue.)*

- c. The five kingdoms are:
  - Bacteria: These are so small you cannot see them. They can be useful to man or can cause illnesses like TB.
  - Protista: These are also so small that you cannot see them. They include parasites like the one that causes malaria.
  - Fungi: This kingdom includes mushrooms and the **mould** that sometimes grows on bread.
  - Plantae: All plants belong to this kingdom
  - Animalia: All animals belong to this kingdom – fish, birds, mammals and insects.

## TOPIC: Biodiversity

10. Ask the learners if they have any questions.
11. Tell the learners to copy the information written on the chalkboard into their workbooks.
12. Give the learners some time to complete this task.

### Checkpoint 1

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

- a. What does biodiversity refer to?
- b. How many groups are living organisms divided into?

Answers to the checkpoint questions are as follows:

- a. Biodiversity refers to all living organisms and their habitats on planet Earth.
- b. Five.

## **E** CONCEPTUAL DEVELOPMENT

(For this part of the lesson you will still need Resource 6.1, 6.2, 6.3, 6.4)

1. Explain the following to the learners:
  - a. Living things in the biosphere are classified into five kingdoms.
  - b. We can also classify things as living or non-living.
2. Ask the learners:
  - a. Can you remember what all living things have in common?  
(Answer: Breathing, feeding (**nutrition**), growth, reproduction, excretion (getting rid of waste), movement and sensitivity to the environment.)
3. Draw the following onto the chalkboard:

LIVING THINGS			NON-LIVING THINGS
Classification 1:	Classification 2:	Classification 3:	

4. Put copies of Resource 6 up in four different places in the classroom.
5. Have the learners draw the table from the chalkboard into their workbooks.
6. Divide the learners into four groups and have them gather near the Resource: one group in front of each page.

## TOPIC: Biodiversity

7. Explain the activity as follows:
  - a. On the page on the wall are outline pictures of living and non-living things.
  - b. Look carefully at the picture and see if you can find at least three examples of non-living things.
  - c. Write them down on your table under the heading “Non-living things”.
  - d. Next you need to look at the heading “Living things”.
  - e. Choose three classifications for your living things and label the three columns.
  - f. Look carefully at the picture again and find three examples of each classification. Write them down under the right column.
8. Allow learners some time to complete this task.
9. If time allows, have learners check each other’s classifications.
10. Write a model answer on the chalkboard: (The learners’ answers may vary. This can be discussed.)

LIVING THINGS			NON-LIVING THINGS
Classification 1: INSECTS	Classification 2: LAND ANIMALS	Classification 3: WATER ANIMALS	guitar lawnmower watering can
beetle fly cricket	rabbit snake rat	fish crocodile shark	

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

### **Checkpoint 2**

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

- a. What is the word we use when we say we are sorTING things into groups?
- b. Name the five animal kingdoms.

Answers to the checkpoint questions are as follows:

- a. We say we are classifying things.
- b. Bacteria, Protista, Fungi, Animalia, Plantae.

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

## TOPIC: Biodiversity

### 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
Oxford Successful	Classification	21-23
Via Afrika	Classification	16-20
Platinum	Classification	9-13
Spot On	Classification	9-11
Step-by-Step	Classification	18-23
Pelican	Classification	20-26
Solutions for All Natural Sciences	Classification	23-29
Shuters Top Class Natural Sciences	Classification	12-17
Sasol Inzalo Bk A	Classification	28-32

### G ADDITIONAL ACTIVITIES/ READING

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

1. <https://www.youtube.com/watch?v=7tgNamjTRkk> (7min 51sec) [What is biodiversity and why is it important?]
2. <http://sciencenetlinks.com/lessons/introducing-biodiversity/> [Introducing biodiversity]

## TOPIC: Biodiversity

# 2 B

**Term 1, Week 2, Lesson B**

**Lesson Title: Classification of living things**

**Time for lesson: 1 hour**

### A POLICY AND OUTCOMES

<b>Sub-Topic</b>	Classification of living things	
<b>CAPS Page Number</b>	17	
<b>Lesson Objectives</b>		
By the end of the lesson, learners will be able to:		
<ul style="list-style-type: none"> <li>• list the differences between plants and animals</li> <li>• name the kingdom subdivisions</li> <li>• categorise into which subdivisions of the kingdom, humans fit.</li> </ul>		
Specific Aims	1. DOING SCIENCE	
	2. KNOWING THE SUBJECT CONTENT & MAKING CONNECTIONS	✓
	3. UNDERSTANDING THE USES OF SCIENCES & INDIGENOUS KNOWLEDGE	

### SCIENCE PROCESS SKILLS

1. Accessing & Recalling Information	✓	6. Identifying Problems & Issues		11. Doing Investigations	
2. Observing		7. Raising Questions		12. Recording Information	✓
3. Comparing	✓	8. Predicting		13. Interpreting Information	
4. Measuring		9. Hypothesizing		14. Communicating	
5. Sorting & Classifying	✓	10. Planning Investigations		15. Scientific Process	



## TOPIC: Biodiversity

### B POSSIBLE RESOURCES

For this lesson, you will need:

IDEAL RESOURCES	IMPROVISED RESOURCES
Computer with internet connection	

### 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 do we call the place where a living organism lives?

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.

*Habitat*

### D ACCESSING INFORMATION

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

#### DIFFERENCES BETWEEN PLANTS AND ANIMALS

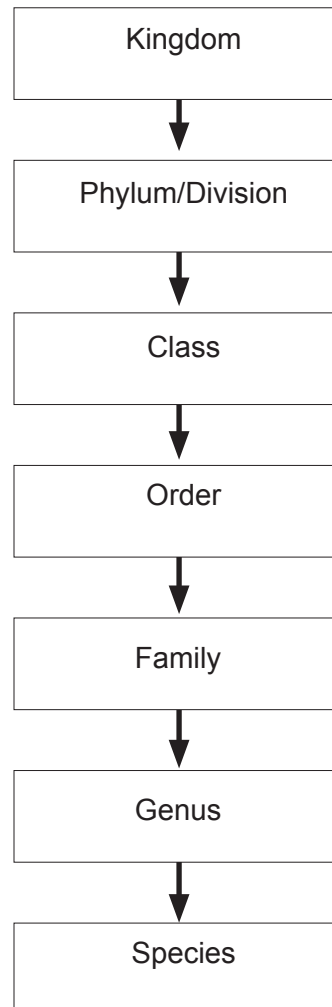
	PLANTS	ANIMALS
MOVEMENT	Plants are <b>anchored</b> in the soil and can only really move their leaves.	Animals can move using legs or wings or through water.
NUTRITION	Plants make their own food through the process of photosynthesis.	Animals cannot make their own food. They need to eat plants or other animals for food.
REPRODUCTION	Plants reproduce by making seeds or spores.	Animals reproduce by fertilized eggs which grow into young animals.

1. Herbivores eat plants.
2. Carnivores eat other animals.
3. Omnivores eat both plants and animals.

## TOPIC: Biodiversity

### CLASSIFICATION IN THE KINGDOM

1. Each kingdom is divided into smaller and smaller groups.
2. The smallest group is called the species.
3. Living organisms that belong to the same species can reproduce with each other.
4. The groups are divided like this:



5. A species is a group of one particular kind of living thing.
6. For example, all humans belong to the same species.

2. Read through the information written on the board with the learners.
3. Explain this to the learners as follows:
  - a. Although plants and animals are both living organisms, they have some big differences.
  - b. The three main differences are in movement, the way they get food (we call this nutrition) and the way they reproduce.
4. Ask the learners why plants don't move around.  
(Possible answer: They are anchored to the ground with roots.)

## TOPIC: Biodiversity

5. Tell the learners:
  - a. Plants need roots to get nutrients and water from the soil.
  - b. Plants can move their leaves towards the Sun.
  - c. Plants that need water will drop their leaves.
  - d. Animals can move around easily using legs or wings.
  - e. Some animals are adapted to move easily through water.
6. Ask the learners what colour most plants are.  
(Answer: Green)
7. Now explain:
  - a. The green colour in plants is from something called chlorophyll.
  - b. Chlorophyll allows plants to make their own food using energy from the Sun through a process called photosynthesis.
  - c. Animals cannot make their own food.
  - d. Animals need to eat plants or other animals for food.
  - e. Animals that eat plants are called herbivores.
  - f. Animals that eat other animals are called carnivores.
  - g. Some animals eat both plants and animals. They are called omnivores.
8. Ask the learners for examples of herbivores, carnivores and omnivores.  
(Possible answers: Herbivores: buck, rabbits, sheep, cow  
Carnivores: lion, crocodile, shark  
Omnivores: pigs, rats, chimpanzees)
9. Now explain:
  - a. Plants reproduce by producing seeds.
  - b. Some very small plants reproduce using spores.
  - c. Animals reproduce with a fertilised egg that grows into a young animal and then into an adult.
10. Ask the learners if they have any questions.
11. Now explain:
  - a. The five different Kingdoms have millions of different of living organisms in each of them.
  - b. Scientists have looked at the organisms in each Kingdom and grouped them together according to things that make them similar.
  - c. The biggest group is the Kingdom. And the groups then get smaller and smaller and the organisms get more and more similar, right to the smallest group which is the species.
  - d. The Kingdom is divided into the phylum (for animals) or division (for plants); the phylum or division into the class; the class into the order; the order into the family; the family into the genus; and the genus into the species.
  - e. Living organisms that belong to the same species are so alike that they can reproduce.

## TOPIC: Biodiversity

12. Tell the learners to copy the information written on the chalkboard into their workbooks.
13. Give the learners some time to complete this task.

### **Checkpoint 1**

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

- a. What is an omnivore?
- b. What is the smallest grouping in each Kingdom called?

Answers to the checkpoint questions are as follows:

- a. An animal that eats both plants and animals.
- b. The species.

## **E** CONCEPTUAL DEVELOPMENT

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

	LION	CAT	DOG
Kingdom	Animalia (animals)	Animalia (animals)	Animalia (animals)
Phylum	Chordata (animals with backbone)	Chordata (animals with backbone)	Chordata (animals with backbone)
Class	Mammalia (mammals)	Mammalia (mammals)	Mammalia (mammals)
Order	Carnivora (meat eaters)	Carnivora (meat eaters)	Carnivora (meat eaters)
Family	Felidae (all cats)	Felidae (all cats)	Canidae (all dogs)
Genus	Panthera (great cats)	Felis	Canis
Species	Panthera leo (lion)	Felis catus (Domestic cat)	Canis familiaris (domestic dog)

1. List the classifications that the lion, cat and dog all have in common.
2. Which classification do only the lion and cat have in common?
3. Which classifications do none of them have in common?

## TOPIC: Biodiversity

4. Humans belong to:

Order: Primate

Family: Hominidae (Great Apes)

Genus: Homo

Species: Homo sapiens

Using this information, and the information about cats, dogs and lions, classify humans from kingdom to species.

2. Read over the activity with the learners.
3. Give the learners time to complete the activity in their workbooks.
4. Write a model answer on the chalkboard:
  1. Kingdom, phylum, class, order.
  2. Family
  3. Genus, species
  4. Animalia →Chordata→Mammalia →Primate→Hominidae→Homo→Homo sapiens
5. Read through the model answers with the learners and ask them to do any corrections.

### **Checkpoint 2**

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

- a. What species do humans belong to?
- b. What class do humans, dogs, cats and lions belong to?

Answers to the checkpoint questions are as follows:

- a. Homo sapiens
- b. Mammalia.

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

## TOPIC: Biodiversity

### 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
Oxford Successful	Classification	22-24
Via Afrika	Classification	21
Platinum	Classification	9-13
Spot On	Classification	12-13
Step-by-Step	Classification	20-23
Pelican	Classification	27-39
Solutions for All Natural Sciences	Classification	27-33
Shuters Top Class Natural Sciences	Classification	15-18
Sasol Inzalo Bk A	Classification	28-40

### G ADDITIONAL ACTIVITIES/ READING

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

1. [https://www.youtube.com/watch?v=gQljL\\_0RK6U](https://www.youtube.com/watch?v=gQljL_0RK6U) (3min 32sec) [Plants and animals-similarities and differences]
2. <https://www.google.co.za/search?q=classification+in+the+kingdom+subdivisions&tbm=isch&source=lnms&sa=X&ved=0ahUKEwjxpKCYqq7WAhXMIcAKHbQgDE84ChD-8BQgKKA&biw=1019&bih=615&dpr=1#imgrc=mIUGVImPRWeDOM>: [Characteristics of life]

## TOPIC: Biodiversity

# 2 C

**Term 2, Week 2, Lesson C**

**Lesson Title: Diversity of animals**

**Time for lesson: 1 hour**

### A POLICY AND OUTCOMES

<b>Sub-Topic</b>	Vertebrates: fish, amphibians and reptiles		
<b>CAPS Page Number</b>	18		
<b>Lesson Objectives</b>			
By the end of the lesson, learners will be able to:			
<ul style="list-style-type: none"> <li>• name the two groups that animals are divided into</li> <li>• name the differences between vertebrates and invertebrates</li> <li>• list the characteristics of fish, amphibians and reptiles.</li> </ul>			
Specific Aims	1. DOING SCIENCE		
	2. KNOWING THE SUBJECT CONTENT & MAKING CONNECTIONS		✓
	3. UNDERSTANDING THE USES OF SCIENCES & INDIGENOUS KNOWLEDGE		

### SCIENCE PROCESS SKILLS

1. Accessing & Recalling Information		6. Identifying Problems & Issues		11. Doing Investigations	
2. Observing		7. Raising Questions	✓	12. Recording Information	✓
3. Comparing	✓	8. Predicting		13. Interpreting Information	
4. Measuring		9. Hypothesizing		14. Communicating	
5. Sorting & Classifying	✓	10. Planning Investigations		15. Scientific Process	

## TOPIC: Biodiversity

### B POSSIBLE RESOURCES

For this lesson, you will need:

IDEAL RESOURCES	IMPROVISED RESOURCES
Computer with internet connection	
Resource 7: Life cycle of frog	

### C CLASSROOM MANAGEMENT

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

What are the three main differences between plants and animals?

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 way they move, the way they get food (nutrition), the way they reproduce.*

### D ACCESSING INFORMATION

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

#### CLASSIFICATION OF ANIMALS

1. The animals in the Kingdom Animalia are divided into two main groups: vertebrates and invertebrates.
2. Vertebrates are animals that have a backbone.
3. Invertebrates are animals that do not have a backbone.

#### VERTEBRATES

1. Biologists classify vertebrates into smaller groups according to:
  - a. Body covering
  - b. What the skeleton is made of
  - c. Types of limbs
  - d. The way they move
  - e. Breathing organs
  - f. Habitats
  - g. If they are cold or warm blooded
  - h. The way they reproduce.



## TOPIC: Biodiversity

2. There are five classes of vertebrates:

- a. Fish
- b. Reptiles
- c. Amphibians
- d. Birds
- e. Mammals

### FISH, AMPHIBIANS AND REPTILES

	FISH (examples are: shark and snoek)	AMPHIBIANS (examples are: frog and toads)	REPTILES (examples are: snake and lizard)
BODY COVERING	Moist skin covered in scales	Moist, naked skin	Dry, waterproof skin. Some reptiles have scales
SKELETON	Flexible cartilage or hard bone	Bone	Bone
LIMBS	Fins for swimming	Young have tails. Adults have two front and two back legs.	Snakes have no limbs. Other reptiles have two front legs and two back legs.
MOVEMENT	Swim	Young swim. Adults swim in water and hop on land.	Walk, run, slide or swim
BREATHING ORGANS	Gills to take air from the water	Young use gills. Adults use their skin and lungs.	Lungs
HABITAT	Water	Water and land	They can live on land (lizards) or swim in water (crocodiles).
WARM OR COLD BLOODED	Cold-blooded	Cold-blooded	Cold-blooded
REPRODUCTION	Lay eggs with no shells	Lay eggs with no shells	Lay eggs with leathery shells

## TOPIC: Biodiversity

2. Read through the information written on the board with the learners.
3. Explain this to the learners as follows:
  - a. The animal kingdom is divided into two main groups.
  - b. The two main groups are vertebrates and invertebrates.
  - c. Vertebrates are animals with backbones.
  - d. Invertebrates are animals without backbones.
4. Ask the learners if they think humans are invertebrates or vertebrates and why they think so.

*(Answer: Humans are vertebrates because they have a backbone.)*

5. Tell the learners:
  - a. There are five classes of vertebrates: fish, reptiles, amphibians, birds and mammals.
  - b. When biologists were classifying animals into one of these five groups, they took into account the following things:
    - The kind of body covering: skin, scales, feathers, fur, hair
    - What kind of skeleton it has
    - What kind of limbs it has: legs, arms, wings, tails
    - How it moves
    - Its habitat
    - Whether it is warm or cold blooded
    - How it reproduces.

6. Ask the learners where fish are found.

*(Answer: The oceans, ponds, dams, rivers, streams, lakes)*

7. Now explain:
  - a. Fish have moist skin covered in scales.
  - b. They have a skeleton that is made of hard bone (like trout fish) or of cartilage which is more flexible. Flexible means it can bend. Sharks have a skeleton made of cartilage.
  - c. Fish have fins which are used for swimming.
  - d. They have gills which are used to take oxygen out of the water for breathing.
  - e. They are cold blooded which means their body temperature changes with the temperature of the environment.
  - f. To reproduce they lay eggs that have no shells.

8. Ask the learners for examples of reptiles.

*(Possible answers: Snakes, crocodiles, lizards, tortoise, chameleon)*

## TOPIC: Biodiversity

9. Now explain:
  - a. Reptiles have dry, waterproof skin.
  - b. Some reptiles, like snakes, have scales.
  - c. Some reptiles, like tortoises, have shells.
  - d. The skeleton is made of bone.
  - e. They live mainly on land (but many of them can also swim) and have lungs to breathe.
  - f. They have two front legs and two back legs.
  - g. Snakes have no legs.
  - h. They are cold blooded.
  - i. To reproduce they lay eggs with a leathery shell.
10. Ask the learners if they have any questions.
11. Show the learners Resource 7. Point out details on the page as you explain.
12. Now explain:
  - a. A frog is an amphibian.
  - b. Amphibians have moist, naked skin.
  - c. The young live in water and have tails for swimming.
  - d. They eventually develop front and back legs which allow them to move onto land where they jump and hop.
  - e. The young have gills to breathe in water.
  - f. The adults breathe with lungs and through their skin.
  - g. They are cold blooded and lay eggs with no shells.
13. Tell the learners to copy the information written on the chalkboard into their workbooks.
14. Give the learners some time to complete this task.

### **Checkpoint 1**

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

- a. What is an invertebrate?
- b. To which animal class do snakes belong?

Answers to the checkpoint questions are as follows:

- a. An animal with no backbone.
- b. Reptiles.

## TOPIC: Biodiversity

### E CONCEPTUAL DEVELOPMENT

1. Put Resource 7 on the chalkboard.
2. Write the following on the chalkboard (always try to do this before the lesson starts):

#### METAMORPHOSIS FROM EGG TO TADPOLE TO FROG

Write a paragraph in point form describing the metamorphosis from egg to frog.

3. Explain the following to the learners:
  - a. Most amphibians start their life in water and then as they become adults start living on land, too.
  - b. We call this process of change, metamorphosis.
  - c. Looking at the picture on the board, write a description, in point form, of how the frog develops from the egg.
  - d. Describe what it looks like, where it lives, how it moves and how it breathes at each stage.
4. Give the learners time to complete the activity in their workbooks.
5. Write a model answer on the chalkboard.

#### METAMORPHOSIS FROM EGG TO TADPOLE TO FROG

1. *Frog eggs hatch to become tadpoles.*
2. *Tadpoles have tails to swim with and they breathe using gills.*
3. *Tadpoles then develop two small legs. They still swim in water and breathe through gills.*
4. *A froglet then develops another two legs. It still has a tail. The froglet can now start moving onto land.*
5. *Once the tail has fallen off, the frog can live on land or swim in water.*
6. *A frog has two strong back legs for jumping and two smaller front legs for landing.*
7. *Frogs now breathe with lungs and through their skin.*

6. Read through the model answers with the learners and ask them to do any corrections.

## TOPIC: Biodiversity

### Checkpoint 2

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

- a. What do we call the process of changing from egg to frog?
- b. How do tadpoles breathe?

Answers to the checkpoint questions are as follows:

- a. Metamorphosis.
- b. Using gills.

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
Oxford Successful	Vertebrates	25-26
Via Afrika	Vertebrates	22-23
Platinum	Vertebrates	14-15
Spot On	Vertebrates	12-14
Gradually	Vertebrates	24-26
Pelican	Vertebrates	29-35
Solutions for All Natural Sciences	Vertebrates	35-38
Shuters Top Class Natural Sciences	Vertebrates	17-21
Sasol Inzalo Bk A	Vertebrates	37-49

## **G** ADDITIONAL ACTIVITIES/ READING

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

1. <https://www.youtube.com/watch?v=1Gbm5Ce0kqA> (7min 18sec) [Learning about vertebrates and invertebrates]
2. <https://www.youtube.com/watch?v=jGGTyvywJeA> (2min 21sec) [Life cycle of a frog]

## TOPIC: Biodiversity

# 3 A

**Term 1, Week 3, Lesson A**

**Lesson Title: Diversity of animals**

**Time for lesson: 1 hour**

### A POLICY AND OUTCOMES

<b>Sub-Topic</b>	Vertebrates: birds and mammals	
<b>CAPS Page Number</b>	18	
<b>Lesson Objectives</b>		
By the end of the lesson, learners will be able to:		
<ul style="list-style-type: none"> <li>• list the characteristics of birds</li> <li>• list the characteristics of mammals.</li> </ul>		
<b>Specific Aims</b>	1. DOING SCIENCE	
	2. KNOWING THE SUBJECT CONTENT & MAKING CONNECTIONS	✓
	3. UNDERSTANDING THE USES OF SCIENCES & INDIGENOUS KNOWLEDGE	

### SCIENCE PROCESS SKILLS

1. Accessing & Recalling Information	✓	6. Identifying Problems & Issues		11. Doing Investigations	
2. Observing		7. Raising Questions	✓	12. Recording Information	
3. Comparing	✓	8. Predicting	✓	13. Interpreting Information	✓
4. Measuring		9. Hypothesizing		14. Communicating	
5. Sorting & Classifying	✓	10. Planning Investigations		15. Scientific Process	

## TOPIC: Biodiversity

### B POSSIBLE RESOURCES

For this lesson, you will need:

IDEAL RESOURCES	IMPROVISED RESOURCES
Computer with internet connection	

### C CLASSROOM MANAGEMENT

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

To which class do frogs belong?

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.

*Amphibians.*

### D ACCESSING INFORMATION

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

#### BIRDS

1. Birds are found in almost all ecosystems across the world.
2. They can be very small or very big like an ostrich.
3. They are covered in feathers.
4. They have two legs that are covered in scales.
5. They have lightweight bones that are sometimes hollow.
6. They have wings, but not all birds can fly.
7. They have a beak.
8. They are warm blooded.
9. They breathe using lungs.
10. They lay eggs with a hard, waterproof shell.

## TOPIC: Biodiversity

### MAMMALS

1. Mammals can be found in almost all ecosystems across the world.
2. Some live on land, like humans and zebras, some live in water, like dolphins and whales.
3. Their bodies are covered with skin that may have hair or fur covering.
4. The limbs of mammals are adapted to their lifestyle. Examples are:
  - a. Bats have wings.
  - b. Zebras have four legs.
  - c. Dolphins have fins and a tail for swimming.
  - d. Humans walk on two legs.
5. Mammals have a skeleton made of bones.
6. They are warm blooded.
7. They breathe using lungs.
8. They give birth to live young and feed the young with milk that the mother produces.

2. Read through the information written on the board with the learners.
3. Explain this to the learners as follows:
  - a. Both birds and mammals are warm-blooded.
  - b. A warm-blooded animal keeps its own body temperature constant using energy.
  - c. Birds are warm-blooded and are found all over the world.
  - d. It is believed that there are about 10 000 bird species on Earth.
  - e. Birds are covered in feathers, have a beak and wings.
  - f. Even though all birds have wings, not all can fly.
4. Ask the learners if they can think of a bird, other than an ostrich, that cannot fly?  
(Answer: penguins)
5. Tell the learners:
  - a. Birds breathe using lungs.
  - b. Birds lay eggs with a hard, waterproof shell.
  - c. A bird's bones are lightweight and sometimes hollow.
6. Ask the learners why a bird's bones need to be lightweight?  
(Answer: Because birds fly they can't be too heavy.)
7. Now explain:
  - a. Humans belong to the class of vertebrates known as mammals.
  - b. Mammals are warm-blooded and are found in many ecosystems.
  - c. We find mammals like polar bears in the coldest places, the hottest places (like camels) and even under water (like dolphins).
  - d. Bats are mammals, too. We find bats in the atmosphere as well.



## TOPIC: Biodiversity

- e. Mammals breathe using lungs, have some hair or fur covering.
- f. Mammals have live babies that are fed with milk produced by the mother.
8. Ask the learners if they have any questions.
9. Tell the learners to copy the information written on the chalkboard into their workbooks.
10. Give the learners some time to complete this task.

### **Checkpoint 1**

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

- a. What does warm-blooded mean?
- b. Do all mammals have legs?

Answers to the checkpoint questions are as follows:

- a. Warm-blooded means that an animal keeps its own body temperature level. They do this by burning energy.
- b. No. Some, like whales and dolphins do not have legs.

## **E**

### **CONCEPTUAL DEVELOPMENT**

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

#### COMPARING BIRDS AND MAMMALS

	BIRDS	MAMMALS
FOUND?		
WARM-/COLD-BLOODED?		
BODY COVERING?		
HOW DO THEY MOVE?		
HOW DO THEY BREATHE?		
SKELETON?		
REPRODUCTION?		
EXAMPLES		

## TOPIC: Biodiversity

2. Tell the learners to draw the table on the chalkboard into their workbooks.
3. Tell them that each row should be at least five lines wide to give them enough space to write.
4. Explain the following to the learners:
  - a. Using what you have learnt about birds and mammals, fill in information on the table in your workbooks.
  - b. Try and be as detailed as possible.
5. Ask the learners if they have any questions.
6. Give the learners time to complete the activity in their workbooks.
7. Write a model answer with the learners' ideas on the chalkboard (it may look something like this):

### COMPARING BIRDS AND MAMMALS

	<i>BIRDS</i>	<i>MAMMALS</i>
<i>FOUND?</i>	<ul style="list-style-type: none"> <li>• <i>In almost all ecosystems</i></li> </ul>	<ul style="list-style-type: none"> <li>• <i>All over the Earth</i></li> <li>• <i>In hot and cold climates</i></li> <li>• <i>In the air, on land, under water</i></li> </ul>
<i>WARM-/COLD-BLOODED?</i>	<i>Warm-blooded</i>	<i>Warm-blooded</i>
<i>BODY COVERING?</i>	<i>Feathers on body and scales on legs</i>	<i>Skin with some or lots of hair or fur</i>
<i>HOW DO THEY MOVE?</i>	<ul style="list-style-type: none"> <li>• <i>Most have wings that allow them to fly.</i></li> <li>• <i>Ostriches and penguins cannot fly.</i></li> <li>• <i>Penguins can swim.</i></li> </ul>	<i>Some walk on four legs like dogs.</i> <i>Some walk on two legs like humans.</i> <i>Some swim like whales.</i> <i>Some fly like bats.</i>
<i>HOW DO THEY BREATHE?</i>	<i>Lungs</i>	<i>Lungs</i>
<i>SKELETON?</i>	<i>Lightweight or hollow bones</i>	<i>A skeleton made of bones</i>
<i>REPRODUCTION?</i>	<i>Lay eggs with a hard, waterproof shell</i>	<ul style="list-style-type: none"> <li>• <i>Give live birth to young</i></li> <li>• <i>Mothers make milk to feed their babies.</i></li> </ul>
<i>EXAMPLES</i>	<i>Ostrich, penguin, pigeon, vulture</i>	<i>Human, dog, cow, bat, dolphin, lion, goat</i>

## TOPIC: Biodiversity

8. Read through the model answers with the learners and have them do any corrections.

### **Checkpoint 2**

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

- a. How do birds and mammals breathe?
- b. Name two birds that cannot fly?

Answers to the checkpoint questions are as follows:

- a. Lungs
- b. Ostriches and penguins.

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
Oxford Successful	Vertebrates	27
Via Afrika	Vertebrates	23
Platinum	Vertebrates	16-17
Spot On	Vertebrates	14-15
Step-by-Step	Vertebrates	25-26
Pelican	Vertebrates	29-35
Solutions for All Natural Sciences	Vertebrates	38-39
Shuters Top Class Natural Sciences	Vertebrates	21-22
Sasol Inzalo Bk A	Vertebrates	49-54

## **G** ADDITIONAL ACTIVITIES/ READING

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

1. <https://www.youtube.com/watch?v=c7M686pXr6M> (5min 17sec) [Emperor penguins in Antarctica]
2. <https://www.youtube.com/watch?v=kLTZ9uZKU0g> (5min 01sec) [Unusual mammals]

## TOPIC: Biodiversity

# 3 B

**Term 1, Week 3, Lesson B**

**Lesson Title: Diversity of animals**

**Time for lesson: 1 hour**

### A POLICY AND OUTCOMES

<b>Sub-Topic</b>	Invertebrates: Molluscs		
<b>CAPS Page Number</b>	18		
<b>Lesson Objectives</b>			
By the end of the lesson, learners will be able to:			
<ul style="list-style-type: none"> <li>• define invertebrates</li> <li>• name two of the Phyla in the invertebrate group</li> <li>• list the characteristics of land snails.</li> </ul>			
Specific Aims	1. DOING SCIENCE		✓
	2. KNOWING THE SUBJECT CONTENT & MAKING CONNECTIONS		✓
	3. UNDERSTANDING THE USES OF SCIENCES & INDIGENOUS KNOWLEDGE		

### SCIENCE PROCESS SKILLS

1. Accessing & Recalling Information		6. Identifying Problems & Issues		11. Doing Investigations	✓
2. Observing	✓	7. Raising Questions		12. Recording Information	✓
3. Comparing		8. Predicting	✓	13. Interpreting Information	
4. Measuring		9. Hypothesizing		14. Communicating	
5. Sorting & Classifying	✓	10. Planning Investigations		15. Scientific Process	

## TOPIC: Biodiversity

### B POSSIBLE RESOURCES

For this lesson, you will need:

IDEAL RESOURCES	IMPROVISED RESOURCES
Computer with internet connection	Resource 8:Snail
Garden snail collected from the environment	
Magnifying glass	
A leaf / lettuce / plant that the snail will eat	

### 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 vertebrate?

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.

*An animal with a backbone.*

### D ACCESSING INFORMATION

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

#### INVERTEBRATES

1. Invertebrates are animals with no backbone.
2. There are many different Phyla in the invertebrate group, two of which are Arthropods and Molluscs.

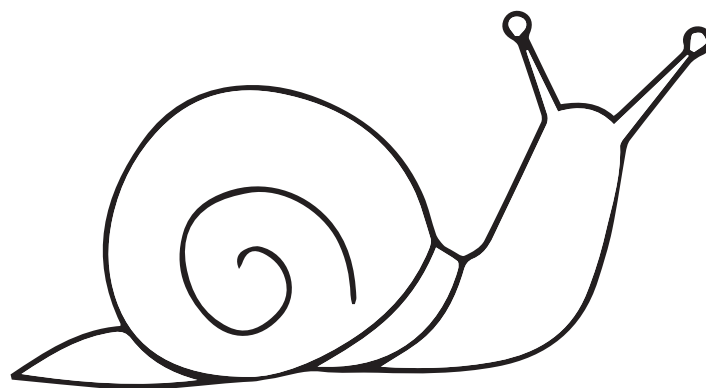
#### MOLLUSCS

1. Examples of molluscs are snails, slugs, oysters and octopuses.
2. Molluscs are invertebrates that have soft bodies.
3. Some molluscs have a hard, outer shell for protection.
4. Although snails live on land, most molluscs live in the sea.

## TOPIC: Biodiversity

5. All molluscs have:
  - a. Soft bodies
  - b. A muscular foot and/or tentacles
  - c. A radula which is a toothed structure in the mouth that is used for graTING food

### THE LAND SNAIL



1. They like to live in damp, shady places where there are plants to eat.
  2. They are herbivores.
  3. Their internal organs (inside body parts) are protected by a shell.
  4. Their internal organs are known as the visceral hump.
  5. The head of the snail has two tentacles with simple eyes on top and two antennae that are sensitive to touch.
  6. The snail eats using a mouth called a radula.
  7. The snail moves using the muscular foot under the shell.
- 
2. Read through the information written on the board with the learners.
    - a. Explain this to the learners as follows:
    - b. Invertebrates are animals without a backbone.
    - c. There are many different Phyla in the Invertebrate group but we are only going to be looking at two: Arthropods and Molluscs.
    - d. Today we are going to look at molluscs in general and then at the garden snail specifically.
    - e. Molluscs are soft-bodied animals that are sometimes found on land, but mostly live in the sea.
    - f. Molluscs have soft bodies that consist of a head, a visceral mass and a mantle.

## TOPIC: Biodiversity

- g. Some molluscs have a shell.
  - h. Most molluscs have eyes and sensory organs called tentacles.
  - i. Examples of molluscs are snails, octopuses, mussels, oysters and slugs.
4. Ask the learners if they have ever seen garden snails? Discuss and lead the discussion.  
(Possible discussion points: Snails are often seen after rain. Snails are found under bushes and leaves.)
  5. Tell the learners:
    - a. The land snail has three body parts: the head, the muscular foot and the visceral hump.
    - b. The head has two tentacles with simple eyes on top and two tentacles that are sensitive to touch.
    - c. The mouth is called the radula and the snail uses this to eat leaves.
    - d. The snail moves using the muscular foot at the bottom of the shell.
    - e. The shell contains the visceral hump.
  6. Ask the learners if they have any questions.
  7. Tell the learners to copy the information written on the chalkboard into their workbooks.
  8. Give the learners some time to complete this task.

### **Checkpoint 1**

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

- a. Where are most molluscs found?
- b. Why do you think molluscs like water habitats or damp conditions?

Answers to the checkpoint questions are as follows:

- a. In the sea.
- b. Because their soft bodies will be sensitive to heat and sunlight.

## TOPIC: Biodiversity

### E CONCEPTUAL DEVELOPMENT

1. This activity should be done using snails collected from the environment.
2. If this is not possible, use Resource 8 and guide the activity as a discussion.
3. Write the following on the chalkboard: (always try to do this before the lesson starts):

#### ACTIVITY: LOOKING AT A GARDEN SNAIL

You will need: land snail found outside, a flat plate or surface, some water, some leaves, and a magnifying glass (if possible).

#### INSTRUCTIONS:

1. Place the snail on the plate.
2. Place the leaves near the snail.
3. Drip a few drops of water on the snail. The snail should come out of its shell.
4. Use the magnifying glass to look at the snail closely.
5. Identify the following parts of the snail:
  - a. The head
  - b. The tentacles
  - c. The eyes
  - d. The mouth
  - e. The visceral hump protected by the shell
  - f. The muscular foot
6. Touch the snail's foot and its shell.
7. Take the snail back to the garden.

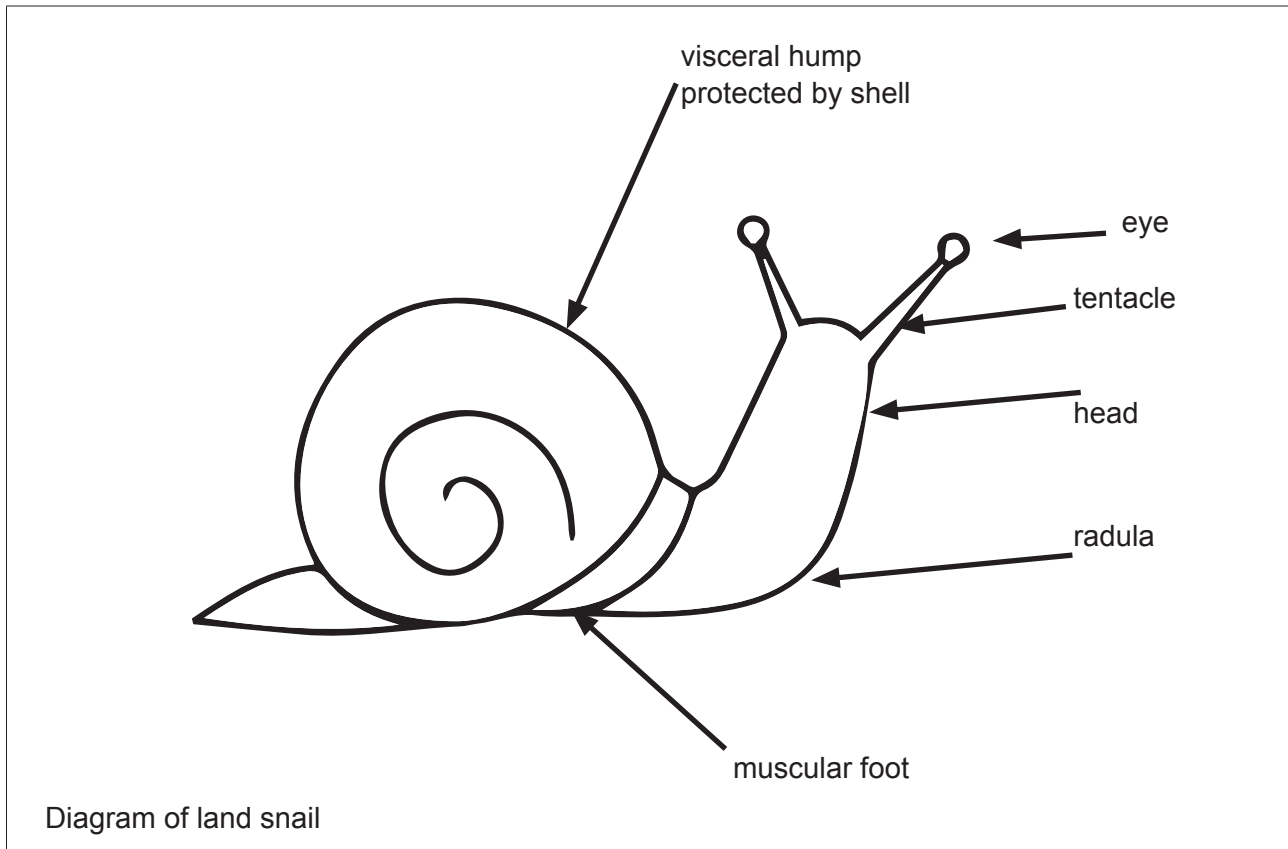
#### TO DO:

1. Draw a diagram of the snail in your workbooks.
2. Include the following labels:
  - a. Head
  - b. Tentacles
  - c. Eyes
  - d. Radula (mouth)
  - e. Muscular foot
  - f. Visceral hump protected by shell
3. Label your diagram 'Diagram of a land snail'.



## TOPIC: Biodiversity

4. Read through the activity with the learners
5. Guide the learners through the activity.
6. Ask the learners if they have any questions.
7. Allow learners enough time to complete the diagram in their workbooks.
8. Draw and label the model answer on the chalkboard (it may look something like this):



9. Read through the model answers with the learners and have them do any corrections.

### **Checkpoint 2**

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

- a. How do land snails move?
- b. What is protected by the shell of a land snail?

Answers to the checkpoint questions are as follows:

- a. Using its muscular foot
- b. The visceral hump which are the soft internal organs of the land snail.

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

## TOPIC: Biodiversity

### 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
Oxford Successful	Molluscs	28-29
Via Afrika	Molluscs	24-25
Platinum	Molluscs	18-19
Spot On	Molluscs	18-19
Step-by-Step	Molluscs	25-26
Pelican	Molluscs	32
Solutions for All Natural Sciences	Molluscs	42-43
Shuters Top Class Natural Sciences	Molluscs	31-32
Sasol Inzalo Bk A	Molluscs	58-61

### 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.shapeoflife.org/video/molluscs-survival-game> (15min 08sec) [Shape of life]
2. <https://www.youtube.com/watch?v=AGv56trMOAY> (2min 20sec) [Garden snail]

## TOPIC: Biodiversity

# 3 C

**Term 1, Week 3, Lesson C**

**Lesson Title: Diversity of animals**

**Time for lesson: 1 hour**

### **A POLICY AND OUTCOMES**

<b>Sub-Topic</b>	Invertebrates: Arthropods - the locust		
<b>CAPS Page Number</b>	18		
<b>Lesson Objectives</b>			
By the end of the lesson, learners will be able to:			
<ul style="list-style-type: none"> <li>• define arthropods</li> <li>• name the three main classes of arthropods</li> <li>• name the common characteristics of insects</li> <li>• list the characteristics of locusts.</li> </ul>			
Specific Aims	1. DOING SCIENCE		✓
	2. KNOWING THE SUBJECT CONTENT & MAKING CONNECTIONS		✓
	3. UNDERSTANDING THE USES OF SCIENCES & INDIGENOUS KNOWLEDGE		

### **SCIENCE PROCESS SKILLS**

1. Accessing & Recalling Information	✓	6. Identifying Problems & Issues		11. Doing Investigations	✓
2. Observing	✓	7. Raising Questions		12. Recording Information	
3. Comparing		8. Predicting		13. Interpreting Information	✓
4. Measuring		9. Hypothesizing		14. Communicating	
5. Sorting & Classifying		10. Planning Investigations		15. Scientific Process	

## TOPIC: Biodiversity

### B POSSIBLE RESOURCES

For this lesson, you will need:

IDEAL RESOURCES	IMPROVISED RESOURCES
Computer with internet connection	
Resource 9: The locust	

### 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 an invertebrate?

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.

*An animal with no backbone*

### D ACCESSING INFORMATION

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

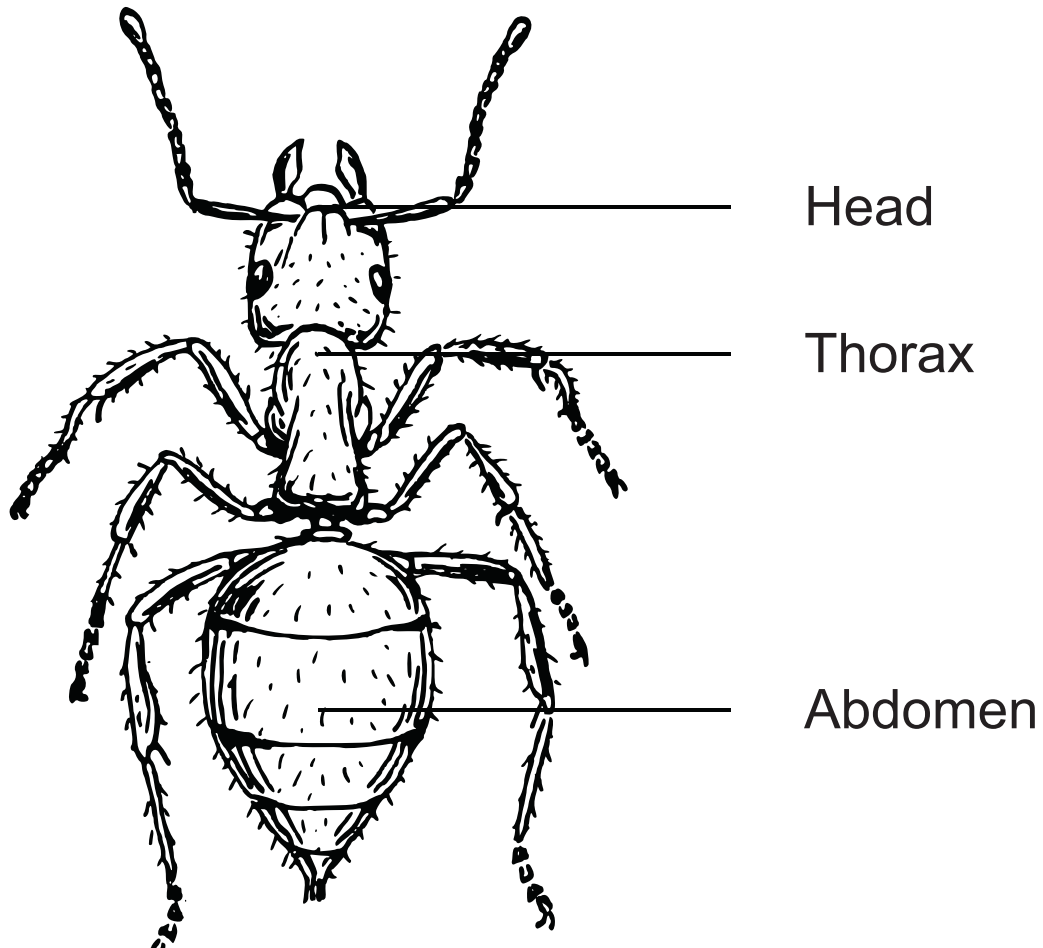
#### ARTHROPODS

1. Arthropods are the most common animals on the planet.
2. They are invertebrates.
3. They have a hard **exoskeleton**.
4. They have **jointed legs**.
5. The body is divided into sections called **segments**.
6. Three classes of Arthropods are:
  - Insects
  - Arachnids
  - Crustaceans.

## TOPIC: Biodiversity

### INSECTS

1. All insects have:
  - a. A body that is made up of three parts: the head, the thorax and the abdomen.



- b. Three pairs of jointed legs (six legs altogether).
  - c. At least one pair of compound eyes.
  - d. One pair of antennae that are used to sense the environment.
2. Most adult insects have two pairs of wings and can fly.

2. Read through the information written on the board with the learners.
3. Explain this to the learners as follows:
  - a. Arthropods are in the same Phyla as Molluscs.
  - b. This Phyla is called Invertebrates.
  - c. Invertebrates, as you have learnt, are animals with no backbone.
  - d. Instead of a backbone, arthropods have a hard **exoskeleton**.
  - e. This exoskeleton protects the soft, inside parts of the arthropod's body.
  - f. Arthropods have jointed legs.

## TOPIC: Biodiversity

4. Ask the learners to bend their fingers. Then tell them to bend their arms.
5. Tell the learners to stand up and bend their legs.
6. Tell the learners that the places where they can bend their fingers, arms and legs are called joints.
7. Continue explaining to the learners:
  - a. The bodies of arthropods are divided into **segments**.
  - b. When you peel an orange, and break it into the smaller parts inside, those smaller parts are called segments.
  - c. A segment is a smaller section.
  - d. We are going to be looking at three classes of arthropods: insects, arachnids and crustaceans.
  - e. Today we are going to look at insects.
8. Ask the learners if they can think of examples of insects.  
*(Possible answers: fly, grasshopper, beetle, mosquito, cockroach, locust, butterfly, moth)*
9. Explain to the learners:
  - a. More than a million different species of insects have been identified on Earth.
  - b. All insects have the following things in common:
    - Their bodies are divided into three segments or parts, that are joined together. These parts are the head, thorax and abdomen. (Point out the sections on the diagram on the chalkboard.)
    - At least one compound eye. This eye is used to help the insect see movement. Insects can have many eyes.
    - One pair of antennae or feelers. This helps them to sense their environment. Remember a pair of something equals two.
    - Three pairs of jointed legs.
10. Ask the learners how many legs in total are three pairs?  
*(Answer: Three pairs of legs equal six legs in total)*
11. Ask the learners if they have any questions.
12. Tell the learners to copy the information written on the chalkboard into their workbooks.
13. Give the learners some time to complete this task.

## TOPIC: Biodiversity

### Checkpoint 1

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

- a. What is the hard, outside covering of arthropods called?
- b. What kind of legs do arthropods have?

Answers to the checkpoint questions are as follows:

- a. Exoskeleton.
- b. Three pairs of jointed legs.

## E

### CONCEPTUAL DEVELOPMENT

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

#### THE LOCUST

1. What kind of an animal is a locust?
2. How many legs does a locust have?
3. To which part of the body are the legs attached?
4. Look for the spiracles on the diagram. What do you think these are used for?
5. Can a locust fly? How do you know?
6. How can we tell from the picture that locusts are good at jumping?

2. Put Resource 9 on the chalkboard.
3. Tell the learners that this is a diagram of a locust which is a common insect in Africa.
4. Read through the questions that are written on the chalkboard.
5. Tell the learners to write the questions into their workbooks.
6. Tell the learners to answer the questions in their workbooks by looking at the picture on the chalkboard.
7. Ask the learners if they have any questions.
8. Allow learners enough time to complete the activity.
9. Complete the model answer on the chalkboard with input from the learners:.

1. *An insect*
2. *Six legs (three pairs)*
3. *The thorax*
4. *For breathing*
5. *They can fly. They have wings.*
6. *They have highly developed back legs.*

10. Read through the model answers with the learners and have them do any corrections.

## TOPIC: Biodiversity

### Checkpoint 2

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

- a. What are the three segments of an insect's body called?
- b. What do locusts have that help them jump?

Answers to the checkpoint questions are as follows:

- a. Head, thorax and abdomen.
- b. Very long and strong back legs.

11. 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
Oxford Successful	Arthropods	28-29
Via Afrika	Arthropods	24-25
Platinum	Arthropods	17-19
Spot On	Arthropods	16-17
Step-by-Step	Arthropods	29-30
Pelican	Arthropods	31-32
Solutions for All Natural Sciences	Arthropods	40-41
Shuters Top Class Natural Sciences	Arthropods	22-23
Sasol Inzalo Bk A	Arthropods	55-57

## **G** ADDITIONAL ACTIVITIES/ READING

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

1. [https://www.youtube.com/watch?v=GEON\\_3roBTA](https://www.youtube.com/watch?v=GEON_3roBTA) (6min 31sec) [Most bizarre insects]
2. [https://www.ted.com/playlists/5/insects\\_are\\_awesome](https://www.ted.com/playlists/5/insects_are_awesome) (15min 57sec) [Why bees are disappearing]
3. [https://www.ted.com/playlists/5/insects\\_are\\_awesome](https://www.ted.com/playlists/5/insects_are_awesome) (13min 10sec) [Insects are awesome]



## TOPIC: Biodiversity

# 4 A

**Term 1, Week 4, Lesson A**

**Lesson Title: Diversity of animals**

**Time for lesson: 1 hour**

### A POLICY AND OUTCOMES

<b>Sub-Topic</b>	Invertebrates: Arthropods - spiders and crabs	
<b>CAPS Page Number</b>	18	
<b>Lesson Objectives</b>		
By the end of the lesson, learners will be able to:		
<ul style="list-style-type: none"> <li>• list the characteristics of spiders</li> <li>• list the characteristics of crabs</li> <li>• name the differences between spiders and crabs.</li> </ul>		
Specific Aims	1. DOING SCIENCE	✓
	2. KNOWING THE SUBJECT CONTENT & MAKING CONNECTIONS	✓
	3. UNDERSTANDING THE USES OF SCIENCES & INDIGENOUS KNOWLEDGE	

### SCIENCE PROCESS SKILLS

1. Accessing & Recalling Information	✓	6. Identifying Problems & Issues		11. Doing Investigations	
2. Observing	✓	7. Raising Questions		12. Recording Information	✓
3. Comparing	✓	8. Predicting		13. Interpreting Information	
4. Measuring		9. Hypothesizing		14. Communicating	
5. Sorting & Classifying		10. Planning Investigations		15. Scientific Process	

## TOPIC: Biodiversity

### B POSSIBLE RESOURCES

For this lesson, you will need:

IDEAL RESOURCES	IMPROVISED RESOURCES
Computer with internet connection	
Resource 10: Spider and crab	

### 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 do we call the hard, outer covering of the body that insects have?

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.

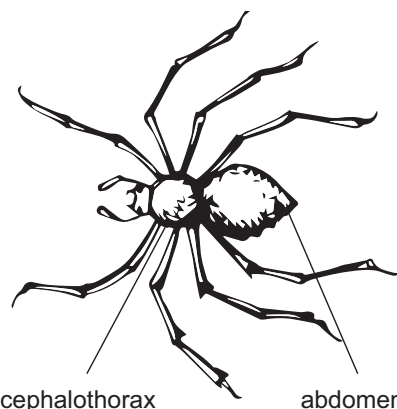
*Exoskeleton*

### D ACCESSING INFORMATION

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

#### ARACHNIDS

1. Examples of arachnids are spiders, ticks and scorpions.
2. Arachnids are invertebrates.
3. Arachnids belong to the Phyla: Arthropoda.
4. The body of an arachnid is divided into two parts: a cephalothorax and an abdomen



5. They have four pairs of jointed legs (eight legs altogether).
6. Arachnids do not have antennae or wings.
7. They have eight eyes.

## TOPIC: Biodiversity

8. Spiders can make silk threads for spinning webs.
9. Arachnids are mostly carnivores.

### CRUSTACEANS

1. Examples of crustaceans are crabs and prawns.
2. Crustaceans are invertebrates.
3. They belong to the Phyla: Arthropoda.
4. The body of crustaceans is divided into two parts: a cephalothorax and an abdomen.
5. They have five pairs of jointed legs (ten legs altogether).
6. The front pair of legs is adapted to form pincers for catching food.
7. They have antennae.
8. They have one pair of compound eyes on stalks.
9. They spend most of their time in water.
10. Some crustaceans hunt for food, while others are scavengers.
11. Scavengers are animals that eat animals that are already dead.

2. Read through the information written on the board with the learners.
3. Explain this to the learners as follows:
  - a. Arachnids and crustaceans are two more classes of arthropods.
  - b. We learnt about insects in the last lesson. They are also arthropods.
  - c. Like insects, arachnids and crustaceans are invertebrates.
4. Ask the learners what an invertebrate is.  
(*Answer: An invertebrate is an animal with no backbone.*)
5. Continue to explain to the learners:
  - a. Examples of arachnids are spiders, scorpions and ticks.
  - b. The body of an arachnid is divided into two parts: a cephalothorax and an abdomen.
  - c. Arachnids have four pairs of jointed legs.
6. Ask the learners how many legs arachnids have in total.  
(*Answer: eight*)
7. Explain to the learners:
  - a. Arachnids do not have antennae or wings.
  - b. They have eight eyes.
  - c. Arachnids are mostly carnivores which means they are meat eaters.
  - d. Spiders are able to make a silky thread which they use to spin webs.
8. Ask the learners if they can think of what a web is used for?  
(*Answer: To trap or catch food*)

## TOPIC: Biodiversity

9. Explain to the learners:
  - a. An example of a crustacean is a crab. (*Show learners the picture of the crab in Resource 10*)
  - b. A crustacean's body is also divided into two parts: a cephalothorax and an abdomen.
  - c. They have five pairs of jointed legs.
  - d. The front pair of legs has been adapted to be able to catch food.
10. Ask the learners how many legs crustaceans have in total.  
(*Answer: ten*)
11. Continue explaining to the learners:
  - a. Crustaceans have antennae.
  - b. They have a pair of compound eyes that are on the end of stalks.
  - c. They spend most of their time in water.
  - d. Some crustaceans, like crabs, hunt for food.
  - e. Other crustaceans are scavengers.
  - f. A scavenger is an animal that eats other animals that are already dead.
12. Ask the learners if they have any questions.
13. Tell the learners to copy the information written on the chalkboard into their workbooks.
14. Give the learners some time to complete this task.

### **Checkpoint 1**

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

- a. Do insects, arachnids and crustaceans all have the same number of legs?
- b. What is a scavenger?

Answers to the checkpoint questions are as follows:

- a. No. Insects have six, arachnids have eight and crustaceans have ten legs.
- b. A scavenger is an animal that eats other animals that are already dead.

# TOPIC: Biodiversity

## E CONCEPTUAL DEVELOPMENT

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

	ARACHNIDS	CRUSTACEANS
An example		
Body division		
Legs		
Eyes		
Wings and antennae		
Eats		
An interesTING fact		

2. Put Resource 10 on the chalkboard.
3. Tell the learners to draw the table into their workbooks.
4. Tell the learners to complete the table using the information they have written into their workbooks and the resource picture on the chalkboard.
5. Ask the learners if they have any questions.
6. Allow learners enough time to complete the activity.
7. Complete the model answer on the chalkboard with input from the learners:

	ARACHNIDS	CRUSTACEANS
An example	Spider, scorpion, tick	Crab, prawn
Body division	Two parts: cephalothorax and abdomen	Two parts: cephalothorax and abdomen
Legs	Four pairs of jointed legs= eight legs	Five pairs of jointed legs= ten legs
Eyes	Eight eyes	Two compound eyes on stalks
Wings and antennae	No wings No antennae	No wings Has antennae
Eats	Carnivore	Some hunt Some are scavengers
An interesTING fact	Can make silky threads to spin a web	Lives mostly in water

8. Read through the model answers with the learners and have them do any corrections.

## TOPIC: Biodiversity

### **Checkpoint 2**

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

- a. What are the two segments of an arachnid's body called?
- b. What is a carnivore?

Answers to the checkpoint questions are as follows:

- a. Cephalothorax and abdomen.
- b. An animal that eats other animals.

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
Oxford Successful	Arthropods	28-29
Via Afrika	Arthropods	24-25
Platinum	Arthropods	17-18
Spot On	Arthropods	17
Step-by-Step	Arthropods	29
Pelican	Arthropods	31-32
Solutions for All Natural Sciences	Arthropods	41-42
Shuters Top Class Natural Sciences	Arthropods	23-24
Sasol Inzalo Bk A	Arthropods	55-58

## **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://study.com/academy/lesson/what-is-an-arachnid-definition-characteristics-anatomy.html> (4min 32sec) [What is an arachnid?]
2. <http://study.com/academy/lesson/what-is-a-crustacean-definition-characteristics-types.html> (5min 25) [What is a crustacean?]

## TOPIC: Biodiversity

# 4 B

**Term 1, Week 4, Lesson B**

**Lesson Title: Diversity of plants**

**Time for lesson: 1 hour**

### A POLICY AND OUTCOMES

<b>Sub-Topic</b>	Classifying plants	
<b>CAPS Page Number</b>	18	
<b>Lesson Objectives</b>		
By the end of the lesson, learners will be able to:		
<ul style="list-style-type: none"> <li>• explain how plants are classified</li> <li>• classify seed producing plants into angiosperms and gymnosperms</li> <li>• define angiosperms</li> <li>• define gymnosperms.</li> </ul>		
<b>Specific Aims</b>	1. DOING SCIENCE	✓
	2. KNOWING THE SUBJECT CONTENT & MAKING CONNECTIONS	✓
	3. UNDERSTANDING THE USES OF SCIENCES & INDIGENOUS KNOWLEDGE	

### SCIENCE PROCESS SKILLS

1. Accessing & Recalling Information	✓	6. Identifying Problems & Issues		11. Doing Investigations	
2. Observing		7. Raising Questions		12. Recording Information	✓
3. Comparing	✓	8. Predicting		13. Interpreting Information	
4. Measuring		9. Hypothesizing		14. Communicating	
5. Sorting & Classifying	✓	10. Planning Investigations		15. Scientific Process	

## TOPIC: Biodiversity

### B POSSIBLE RESOURCES

For this lesson, you will need:

IDEAL RESOURCES	IMPROVISED RESOURCES
Computer with internet connection	
A pine cone	

### C CLASSROOM MANAGEMENT

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

Name an example of an arachnid?

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.

*Spider, scorpion, tick.*

### D ACCESSING INFORMATION

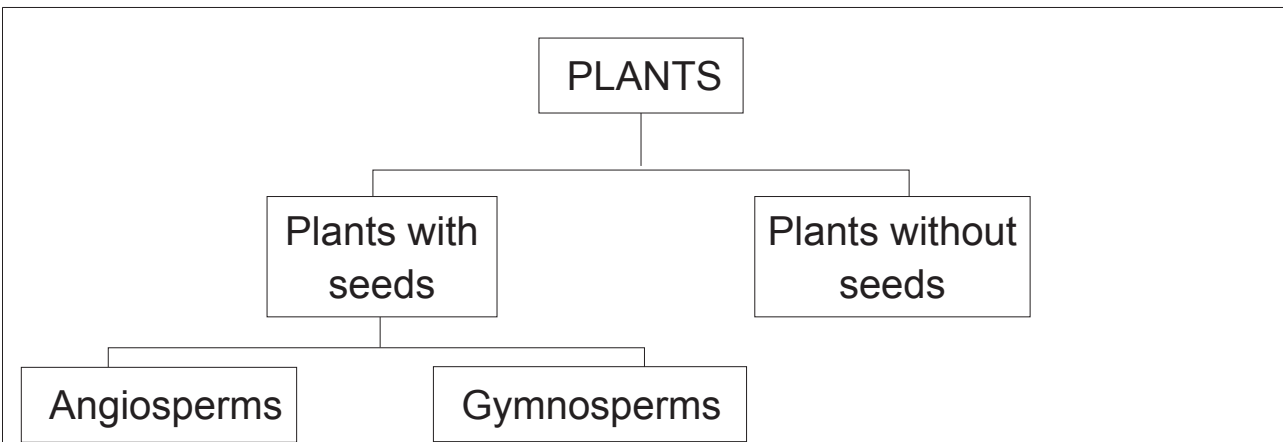
1. Write and draw the following information on the chalkboard (always try and do this before the lesson starts):

#### PLANTS

1. The plant Kingdom includes all plants on Earth.
2. This includes plants that live on land, like trees, and those that live under water, like seaweed.
3. Most plants are green because they contain chlorophyll.
4. Chlorophyll is what plants use to make their own food.
5. This is called photosynthesis.
6. Plants are classified according to whether they have seeds or not.



## TOPIC: Biodiversity



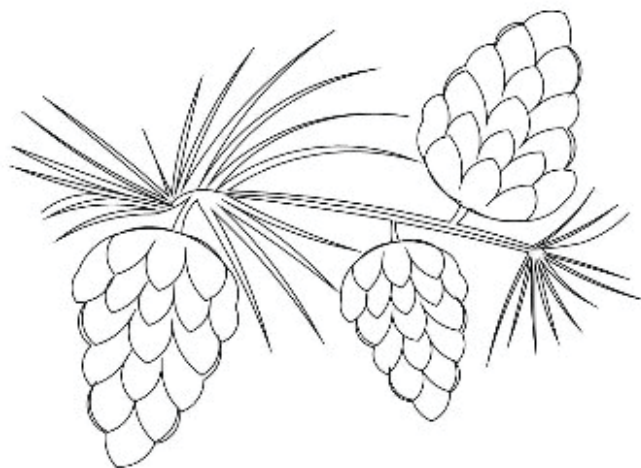
7. Plants with seeds are classified into two groups: Angiosperms and Gymnosperms

### ANGIOSPERMS

1. This is the largest group in the plant Kingdom.
2. All angiosperms reproduce using flowers.
3. Seeds grow inside the flowers once they have been fertilised.
4. Examples of angiosperms are roses and proteas.

### GYMNOSPERMS

1. Gymnosperms do not have flowers.
2. They have male and female cones.
3. Cones are made up of overlapping scales and look like this:



4. Seeds are formed on the top of the scales of the female cone.
5. An example is a pine tree.

## TOPIC: Biodiversity

2. Read through the information written on the board with the learners.
3. Explain this to the learners as follows:
  - a. The plant Kingdom includes all plants on Earth.
  - b. This includes plants that live on land like trees, bushes and grass, as well as plants that live in or under water, like water grasses and seaweed.
4. Ask the learners what colour most plants are.  
*(Answer: green)*
5. Continue explaining to the learners:
  - a. Most plants are green because they contain something called chlorophyll.
  - b. Plants use chlorophyll to make their own food using energy from the Sun.
  - c. This is called photosynthesis.
  - d. Plants are classified according to whether they have seeds or not.
  - e. Examples of plants without seeds are ferns and algae.
  - f. Algae is the green slime you sometimes see in rivers or dams.
  - g. We are only going to look at plants with seeds this year.
6. Ask the learners if they have eaten any fruits or vegetables which have pips or seeds.  
*(Possible answers: pumpkin, tomato, orange, avocado, apple)*
7. Explain to the learners:
  - a. Plants with seeds are divided into two groups: angiosperms and gymnosperms.
  - b. Angiosperms make up the biggest part of the plant Kingdom.
  - c. All angiosperms reproduce using flowers.
  - d. Seeds grow inside flowers after they have been fertilised.
  - e. You will learn more about this later in the term.
8. Ask the learners if they can think of examples of flowering plants.  
*(Answer: roses, proteas, acacia trees, aloes)*
9. Explain to the learners:
  - a. Gymnosperms also produce seeds but not in flowers.
  - b. Gymnosperms are plants that produce cones.  
*(if you have an example of a cone, show the learners now. Otherwise show the learners the drawing on the chalkboard.)*
  - c. The cones form the seeds.
  - d. An example of a gymnosperm is a pine tree.
10. Ask the learners if they have any questions.
11. Tell the learners to copy the information written on the chalkboard into their workbooks.
12. Give the learners some time to complete this task.

## TOPIC: Biodiversity

### Checkpoint 1

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

- a. The plant Kingdom is divided into two groups. What are they?
- b. Seed producing plants are divided into two groups. What are they called?

Answers to the checkpoint questions are as follows:

- a. Plants with seeds and plants without seeds
- b. Angiosperms and gymnosperms.

## E

### CONCEPTUAL DEVELOPMENT

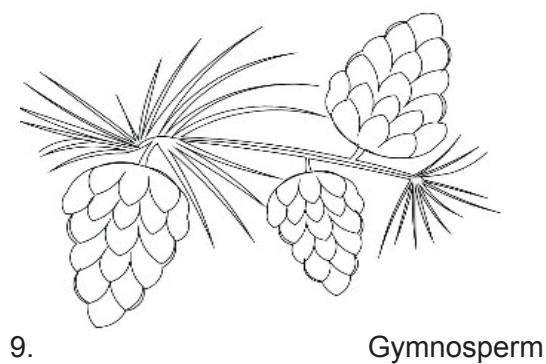
1. Write the following on the chalkboard (always try to do this before the lesson starts):

1. Which plants belong to the plant Kingdom?
2. What makes plants green?
3. What does this green material allow plants to do?
4. Into which two groups are plants divided?
5. Into which two groups are plants with seeds divided?
6. Where do angiosperms produce seeds?
7. Where do gymnosperms produce seeds?
8. Draw a simple example of any angiosperm.
9. Draw a simple example of any gymnosperm.

2. Read through the questions on the chalkboard with the learners.
3. Tell the learners to write the questions down in their workbooks.
4. Tell the learners to answer the questions in their workbooks.
5. Ask the learners if they have any questions.
6. Allow learners enough time to complete the activity.
7. Complete the model answer on the chalkboard with input from the learners:

1. All plants on Earth belong to the plant Kingdom; plants on the land, in water and under water.
2. Chlorophyll.
3. Make their own food using the Sun's energy through a process called photosynthesis.
4. Plants with seeds and plants without seeds.
5. Angiosperms and gymnosperms.
6. In flowers.
7. In cones.

## TOPIC: Biodiversity



8. Read through the model answers with the learners and ask them to do any corrections.

### **Checkpoint 2**

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

- Where do angiosperms produce seeds?
- Where do gymnosperms produce seeds?

Answers to the checkpoint questions are as follows:

- Flowers.
- Cones.

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

## TOPIC: Biodiversity

### 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
Oxford Successful	Diversity of plants	31-34
Via Afrika	Diversity of plants	25-27
Platinum	Diversity of plants	22-23
Spot On	Diversity of plants	20-22
Step-by-Step	Diversity of plants	33-37
Pelican	Diversity of plants	35-37
Solutions for All Natural Sciences	Diversity of plants	47-50
Shuters Top Class Natural Sciences	Diversity of plants	28-29
Sasol Inzalo Bk A	Diversity of plants	62-67

### 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://study.com/academy/lesson/kingdom-plantae-facts-characteristics-examples.html> (5min 28sec) [Kingdom Plantae: Characteristics and Examples]
2. <https://www.youtube.com/watch?v=WTIzGiL4kxM> (2min 01sec) [Top 10. Unusual flowers and plants]

## TOPIC: Biodiversity

# 4 C

**Term 1, Week 4, Lesson C**

**Lesson Title: Seed production**

**Time for lesson: 1 hour**

### A POLICY AND OUTCOMES

<b>Sub-Topic</b>	Seeds and fruits		
<b>CAPS Page Number</b>	19		
<b>Lesson Objectives</b>			
By the end of the lesson, learners will be able to:			
<ul style="list-style-type: none"> <li>• define 'seed' and 'fruit'</li> <li>• explain the difference between naked seeds and covered seeds</li> <li>• list the things that seeds need to germinate.</li> </ul>			
Specific Aims	1. DOING SCIENCE		✓
	2. KNOWING THE SUBJECT CONTENT & MAKING CONNECTIONS		✓
	3. UNDERSTANDING THE USES OF SCIENCES & INDIGENOUS KNOWLEDGE		

### SCIENCE PROCESS SKILLS

1. Accessing & Recalling Information	✓	6. Identifying Problems & Issues		11. Doing Investigations	✓
2. Observing		7. Raising Questions		12. Recording Information	✓
3. Comparing		8. Predicting		13. Interpreting Information	
4. Measuring		9. Hypothesizing		14. Communicating	
5. Sorting & Classifying	✓	10. Planning Investigations	✓	15. Scientific Process	

## TOPIC: Biodiversity

### B POSSIBLE RESOURCES

For this lesson, you will need:

IDEAL RESOURCES	IMPROVISED RESOURCES
Bean seeds	
A pinecone	
Examples of fruits or vegetables with seeds inside	
Resource 11: Seed pods and fruits	
Resource 12: Seed collection	
Resource 13: Germination of seeds	
Glass jar/ plastic coke bottle cut to make a 'jar' with paper peeled off	
Soil	
Bean seeds (or similar)	
A few bean seeds soaked in water overnight	

### 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 do we call plants that produce seeds in cones?

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.

*Gymnosperms*

### D ACCESSING INFORMATION

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

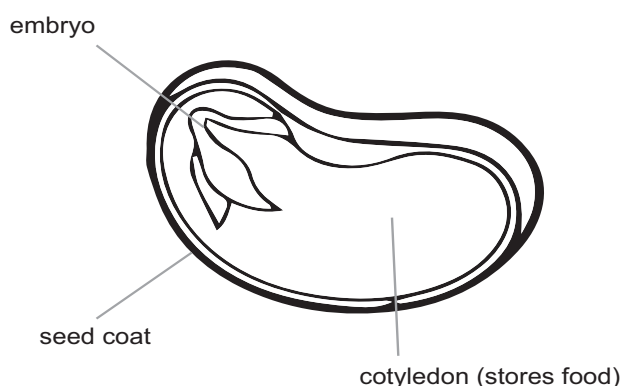
#### SEEDS AND FRUITS

1. Angiosperms and gymnosperms reproduce using seeds.
2. Angiosperms reproduce using flowers.
3. Seeds grow inside flowers after they have been fertilised.

## TOPIC: Biodiversity

4. Angiosperms produce 'covered seeds' because the seeds are inside a fleshy covering like a fruit or inside a seed pod.
5. Gymnosperms form their seeds in cones instead of flowers.
6. The seeds of a gymnosperm are not covered by a fleshy covering or a seed pod.
7. Seeds that are not covered by a fleshy covering, like a fruit, are called 'naked seeds'.
8. Seeds come in many different shapes and sizes but all have the same basic parts:

### Parts of a Bean Seed



9. A seed is made up of:
  - A seed coat
  - An embryo (that when fertilized will start to grow)
  - Stored food (called nutrients).
10. If a seed is given soil, water and the sunlight it needs, it will start to grow.
11. We say the seed has germinated.

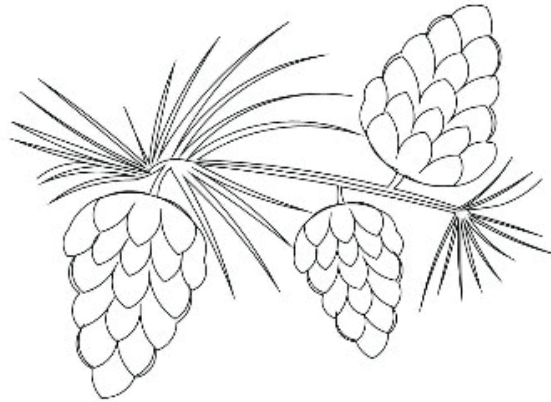
2. Read through the information written on the board with the learners.
3. Ask the learners if they can name some foods that they eat that have pips or seeds.  
(Possible answers: mielie, pumpkin, apple, tomato, orange, avocado)
4. Explain this to the learners as follows:
  - a. In the last lesson, we learnt that angiosperms and gymnosperms reproduce using seeds.
  - b. Angiosperms reproduce using flowers.
  - c. Seeds grow inside flowers once they have been fertilised.
  - d. Part of the flower develops into a fruit or a seed pod which surrounds or covers the seed.
  - e. We say these seeds are covered.  
(Show the learners real examples of fruits and or vegetables with seeds inside and discuss. Show learners Resource 11: Seed pods and fruits, and point out fruits and seed pods.)



## TOPIC: Biodiversity

5. Continue to explain to the learners:

(Have your pinecone from the previous lesson available to show the learners or redraw this image on the chalkboard:)



- a. Gymnosperms are cone-bearing plants.
- b. Gymnosperms produce their seeds on the tops of the scales of the cones.
- c. The seeds do not have a fleshy covering or a seed pod.
- d. We call these seeds, naked seeds.

*(Put Resource 12: Seed collection, on the chalkboard and if possible, give the learners a bean seed.)*

6. Explain to the learners:

- a. Seeds come in many different shapes, colours and sizes. *(Point out the different seeds on Resource 12: Seed collection.)*
- b. Even though we get so many kinds of seeds, they all have the same basic structure inside.
- c. Ask the learners to look at the diagram on the chalkboard.
- d. All seeds have an outside covering called a seed coat.
- e. Inside the seed we find the embryo, which in the right conditions, will grow into a new plant.
- f. We also find the stored food for the new plant, called nutrients.

7. Ask the learners to say what three things plants need to grow.

*Answer: Soil, water and sunlight, or energy from the sun.*

8. Explain to the learners:

- a. If a seed is given soil, water and the correct amount of sunlight, it will start to grow.
- b. We say that the seed has started to germinate.

## TOPIC: Biodiversity

9. Ask the learners if they have any questions.
10. Tell the learners to copy the information written on the chalkboard into their workbooks.
11. Give the learners some time to complete this task.

### **Checkpoint 1**

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

- a. What is a covered seed?
- b. What are the three things a seed needs in order to start germinating or growing?

Answers to the checkpoint questions are as follows:

- a. A seed that is in a fruit or a seed pod.
- b. Soil, water and the correct amount of sunlight/energy from the Sun.

## **E** CONCEPTUAL DEVELOPMENT

1. Do the following activity with the learners: (This can be done as a demonstration, or if possible and resources allow, in groups.)

1. Fill the coke bottle or jar halfway with soil.
2. Press the seeds into the soil against the side of the jar or bottle.
3. The seed should be in the soil but still visible from the outside.
4. Water the seed.
5. Place the container in a sunny spot.
6. Water it regularly.
7. Look at the container each Natural Sciences lesson and note any changes in the table.  
The learners will then draw the table in their books for the following activity.

2. Write and draw the following on the chalkboard (always try to this before the lesson starts):

### GERMINATION OF A SEED

Date							
Noted changes							

## TOPIC: Biodiversity

3. Tell the learners to copy the table from the chalkboard into their workbooks.
4. Tell the learners they are going to observe their bean seed for the next few weeks and see how it changes as it germinates and grows into a plant.
5. Show the learners Resource 13: Germination of a seed.
6. Tell the learners that this could likely be what they observe over the next few weeks.

### GERMINATION OF A SEED

Date	15/10	21/10	30/10	15/11			
Noted changes							

### **Checkpoint 2**

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

- a. What is a naked seed?
- b. What is the part inside a seed that will grow into a new plant under the right circumstances?

Answers to the checkpoint questions are as follows:

- a. A seed without a fleshy covering like a fruit or a seed pod
- b. Embryo

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

## TOPIC: Biodiversity

### 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
Oxford Successful	Diversity of plants	31-34
Via Afrika	Diversity of plants	25-26
Platinum	Diversity of plants	23-24
Spot On	Diversity of plants	21-22
Step-by-Step	Diversity of plants	35-39
Pelican	Diversity of plants	35-38
Solutions for All Natural Sciences	Diversity of plants	49-50
Shuters Top Class Natural Sciences	Diversity of plants	28-30
Sasol Inzalo Bk A	Diversity of plants	60-69

### G ADDITIONAL ACTIVITIES/ READING

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

1. <https://www.youtube.com/watch?v=oYzXToyEzBU> (4min 26sec) [Seed parts, seed dispersal, seed germination for kids]
2. <http://study.com/academy/lesson/what-is-seed-germination-definition-process-steps-factors.html> (4min 40sec) [What is seed germination?]

## TOPIC: Biodiversity

# 5 A

**Term 1, Week 5, Lesson A**

**Lesson Title: Classifying angiosperms**

**Time for lesson: 1 hour**

### **A** POLICY AND OUTCOMES

<b>Sub-Topic</b>	Monocotyledons and dicotyledons	
<b>CAPS Page Number</b>	19	
<b>Lesson Objectives</b>		
By the end of the lesson, learners will be able to:		
<ul style="list-style-type: none"> <li>• explain what a cotyledon is</li> <li>• define monocotyledon</li> <li>• define dicotyledon</li> <li>• list the differences between monocotyledons and dicotyledons.</li> </ul>		
Specific Aims	1. DOING SCIENCE	✓
	2. KNOWING THE SUBJECT CONTENT & MAKING CONNECTIONS	✓
	3. UNDERSTANDING THE USES OF SCIENCES & INDIGENOUS KNOWLEDGE	

### SCIENCE PROCESS SKILLS

1. Accessing & Recalling Information	✓	6. Identifying Problems & Issues		11. Doing Investigations	
2. Observing	✓	7. Raising Questions		12. Recording Information	
3. Comparing	✓	8. Predicting		13. Interpreting Information	
4. Measuring		9. Hypothesizing		14. Communicating	
5. Sorting & Classifying	✓	10. Planning Investigations		15. Scientific Process	

## TOPIC: Biodiversity

### B POSSIBLE RESOURCES

For this lesson, you will need:

IDEAL RESOURCES	IMPROVISED RESOURCES
Computer with internet connection	
Mielie seeds	
Bean seeds	
Examples of leaves	
Resource 14: Monocotyledon and dicotyledon seeds	
Resource 15: Monocotyledons	
Resource 16: Dicotyledons	

### 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 do we call flowering plants that produce seeds?

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.

*Angiosperms*

### D ACCESSING INFORMATION

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

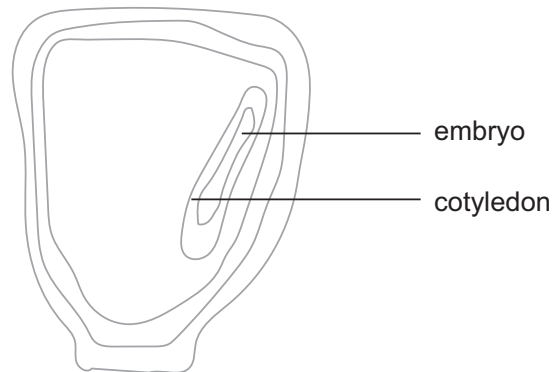
#### MONOCOTYLEDONS AND DICOTYLEDONS

1. Angiosperms are flowering plants that produce seeds.
2. Angiosperms are divided into two groups based on the number of cotyledons they have in their seeds.
3. A cotyledon is the part of the seed that stores food or nutrients for the embryo.
4. The embryo is what will grow into a plant in the right conditions.

## TOPIC: Biodiversity

### MONOCOTYLEDONS

1. Monocotyledons are plants that have one cotyledon.
2. Examples of plants that are monocotyledons are: grasses, mielies, onions and garlic.

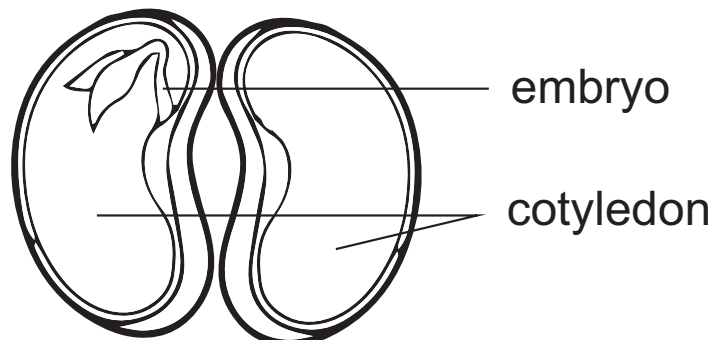


maize seed

3. Monocotyledons have the following things in common:
  - The parts of the flower are arranged in threes or multiples of three.
  - The plants have narrow leaves with parallel veins.
  - Leaves are attached to the stem by a leaf sheath that wraps around the stem.
  - The stem stays green and flexible whilst the plant is alive.
  - The root ball is fibrous with many short roots.

### DICOTYLEDONS

1. Dicotyledons are plants that have two cotyledons.
2. Examples of plants that are dicotyledons are: beans, tomatoes, acacia trees and proteas.



**Bean seed**

## TOPIC: Biodiversity

### 3. Dicotyledons have the following things in common:

- The parts of the flower are arranged in fours or fives or multiples of four or five.
- The plants have different shaped leaves with veins in a branch-like pattern.
- The leaves are attached to the main stem with a shorter stem called a petiole.
- The stem starts off soft and green but gets hard and woody as the plant gets older.
- The root system is a long tap root with smaller roots coming off the side of the main root.

### 2. Read through the information written on the board with the learners.

*(Put Resource 14: Monocotyledon and dicotyledon seeds, on the board.)*

### 3. Explain this to the learners as follows:

- a. In the last lesson, we learnt that angiosperms are plants that reproduce using flowers.
- b. Angiosperms are divided into two groups.
- c. These groups are based on what their seeds look like when we examine the number of cotyledons they have.
- d. The cotyledon is the part of the seed that stores food or nutrients for the embryo that is inside the seed.

### 4. Point out the differences between the two seeds to the learners using Resource 14.

### 5. Ask the learners if they have any questions.

### 6. Give the learners actual maize and bean seeds to examine.

*(Put Resource 15: Monocotyledons and Resource 16: Dicotyledons, up on the chalkboard.)*

### 7. Continue to explain to the learners whilst referring to the two resources on the board:

- a. Monocotyledons and dicotyledons have more differences than just the number of cotyledons in their seeds.
- b. Although they are both flowering plants there are differences in the numbers of flowering parts.
- c. In monocotyledons, the flowering parts are arranged in threes or multiples of three.
- d. In dicotyledons, the flowering parts are arranged in fours or fives or multiples of fours or fives.

### 8. Ask the learners to count in multiples of three up to 21.

*(Answer: 3, 6, 9, 12, 15, 18, 21.)*

### 9. Continue to explain to the learners:

- a. Monocotyledons have long leaves with veins that run parallel.
- b. By parallel, we mean that they run in straight lines next to each other.
- c. Dicotyledons have leaves that come in many different shapes with veins that are in a branch-like pattern.



## TOPIC: Biodiversity

10. Show the learners the examples of leaves you have brought to the class. See if they can identify whether the leaves come from a monocotyledon or a dicotyledon by looking at the veins in the leaves.
11. Continue to explain to the learners:
  - a. The leaves of a monocotyledon are attached directly onto the main stem of the plant by a leaf sheath that wraps around the plant.
  - b. The leaves of a dicotyledon are attached to the main stem with a shorter stem called a petiole.
  - c. The stem of a monocotyledon continues to stay soft even as the plant gets old.
  - d. The stem of a dicotyledon starts off soft, and then gets harder as the plant gets older.
  - e. The roots of a monocotyledon are made up of many short roots attached to the main stem.
  - f. Dicotyledons have a long, main root called a tap root, with shorter roots coming off the side.
12. Ask the learners if they have any questions.
13. Tell the learners to copy the information written on the chalkboard into their workbooks.
14. Give the learners some time to complete this task.

### **Checkpoint 1**

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

- a. What is a cotyledon?
- b. How many cotyledons does a monocotyledon have?

Answers to the checkpoint questions are as follows:

- a. The cotyledon is the part of the seed that stores food or nutrients for the embryo of the seed to grow.
- b. One.

# TOPIC: Biodiversity

## E

### CONCEPTUAL DEVELOPMENT

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

1. COMPARING MONOCOTYLEDONS AND DICOTYLEDONS

STRUCTURE	MONOCOTYLEDONS	DOCOTYLEDONS
Seed		
Flowers		
Leaves		
Stems		
Roots		

2. DRAW A SIMPLE DIAGRAM OF A MONOCOTYLEDON AND A DICOTYLEDON SHOWING:

- Flower parts
- Leaves
- Veins
- Leaf sheath/petiole
- Root system

2. Tell the learners to copy the table from the chalkboard into their workbooks.
3. Tell them they should complete the table and the diagrams using the information they have written in their workbooks and the information on Resource 15: Monocotyledons and Resource 16: Dicotyledons.
4. Allow the learners some time to complete this activity.
5. Write the model answer on the chalkboard:

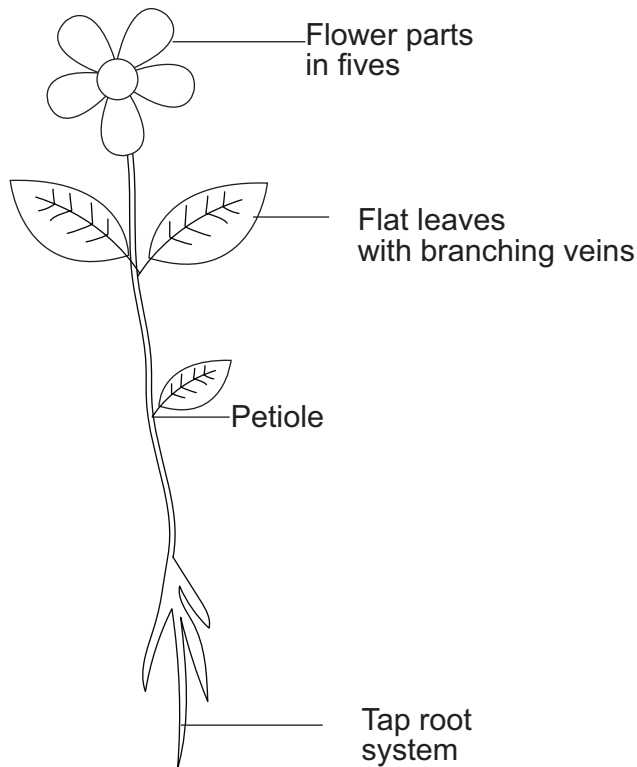
# TOPIC: Biodiversity

## 1. COMPARING MONOCOTYLEDONS AND DICOTYLEDONS

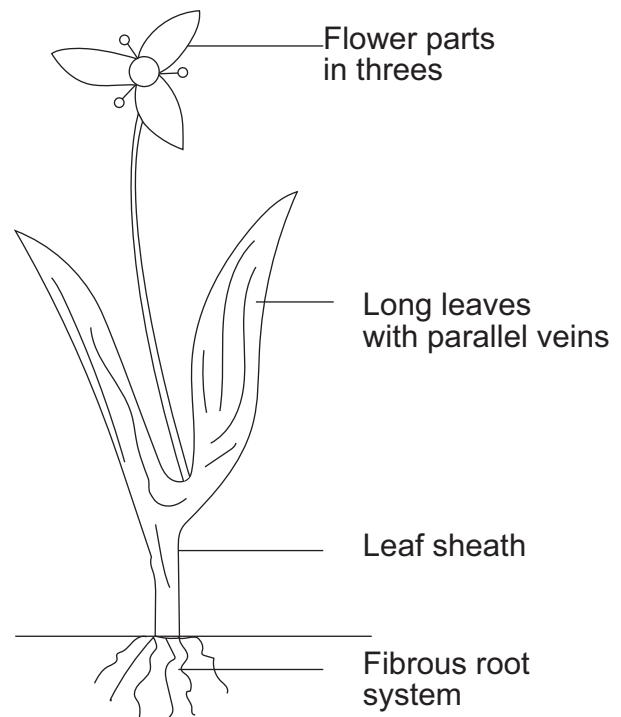
STRUCTURE	MONOCOTYLEDONS	DOCOTYLEDONS
<b>Seed</b>	One cotyledon	Two cotyledons
<b>Flowers</b>	Flower parts in threes or multiples of threes	Flower parts in fours or fives, or multiples of fours or fives
<b>Leaves</b>	Long, strap-like leaves with parallel veins	Leaves come in many shapes and have branches like veins
<b>Stems</b>	Soft stems that stay soft as the plant ages	Soft stems that hardens as the plant ages
<b>Roots</b>	Fibrous root system of many short roots	Long main root called a tap root, with shorter roots coming out the side

## 2. DIAGRAM OF A MONOCOTYLEDON AND A DICOTYLEDON SHOWING:

### Dicotyledon



### Monocotyledon



## TOPIC: Biodiversity

### Checkpoint 2

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

- a. What kind of veins do monocotyledons have?
- b. What do we call the root system of a dicotyledon?

Answers to the checkpoint questions are as follows:

- a. Parallel veins
- b. Tap root system

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
Oxford Successful	Diversity of plants	31-34
Via Afrika	Diversity of plants	25-27
Platinum	Diversity of plants	23-28
Spot On	Diversity of plants	23
Step-by-Step	Diversity of plants	37-39
Pelican	Diversity of plants	37-38
Solutions for All Natural Sciences	Diversity of plants	51-53
Shuters Top Class Natural Sciences	Diversity of plants	29-32
Sasol Inzalo Bk A	Diversity of plants	67-72

## **G** ADDITIONAL ACTIVITIES/ READING

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

1. <https://www.youtube.com/watch?v=xDeei76ii5E> (4min 37sec) [Monocot and dicot plants]
2. <http://study.com/academy/lesson/monocotyledon-plants-examples-definition-pictures.html> (3min 20sec) [Monocotyledon plants]

# TOPIC OVERVIEW:

## Sexual reproduction

### Term 1, Weeks 5B – 8C

#### A. TOPIC OVERVIEW

##### Term 1, Weeks 5b – 8c

- This topic runs for 3½ weeks.
- It is presented over 11 lessons.
- This topic's position in the term is as follows:

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

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

#### B. SEQUENTIAL TABLE

GRADE 7	GRADE 7	GRADE 8
<b>LOOKING BACK</b>	<b>CURRENT</b>	<b>LOOKING FORWARD</b>
<ul style="list-style-type: none"> <li>• Nutrition: nutrients in food; healthy diets</li> </ul>	<ul style="list-style-type: none"> <li>• Sexual reproduction in angiosperms: flowers; pollination; fertilisation; fruit and seed dispersal</li> <li>• Human reproduction: puberty; reproductive organs; fertilisation; pregnancy; sexually transmitted diseases</li> </ul>	<ul style="list-style-type: none"> <li>• Respiration</li> </ul>

## C. SCIENTIFIC AND TECHNOLOGICAL VOCABULARY

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

	TERM	EXPLANATION
1.	ovule	The female sex cell of a plant
2.	pollen grain	The male sex cell of a plant
3.	bisexual flowers	Flowers that have both the male and female sex organs in the same flower
4.	pollination	When pollen is carried from the male part of the flower to the female part of the flower
5.	fertilisation	Fertilisation happens when the male sex cell fuses with the female egg cell
6.	pollinator	The animal or method that moves pollen from one plant to another
7.	carpel/pistil	The female parts of a flower
8.	stamen	The male parts of the flower
9.	nectar	A sugary liquid made by flowers to attract insects and birds
10.	puberty	When young boys and girls reach an age where their sexual organs are fully mature
11.	sperm	Human male sex cell
12.	ovum	Human female sex cell
13.	contraception	Any method that is used to prevent pregnancy

## D. UNDERSTANDING THE USES / VALUE OF SCIENCE

Reproduction is the basis of the continuation of all life on Earth. This is true in both the plant and animal kingdoms. Changes occur in the learners' bodies at puberty and they become more aware of their sexuality. Many myths and much misinformation surrounds human sexuality. To ensure safe and responsible sexual practices, learners should be equipped with information and knowledge.

## E. PERSONAL REFLECTION

Reflect on your teaching at the end of each topic:

Date completed:

Lesson successes:

Lesson challenges:

Notes for future improvement:

## TOPIC: Sexual reproduction

# 5 B

**Term 1, Week 5, Lesson B**

**Lesson Title: Sexual reproduction in angiosperms**

**Time for lesson: 1 hour**

### A POLICY AND OUTCOMES

<b>Sub-Topic</b>	The sexual organs of flowers	
<b>CAPS Page Number</b>	19	
<b>Lesson Objectives</b>		
By the end of the lesson, learners will be able to:		
<ul style="list-style-type: none"> <li>• identify where seeds are made</li> <li>• name the male parts of the flower</li> <li>• name the female parts of the flower</li> <li>• explain the function each part performs.</li> </ul>		
Specific Aims	1. DOING SCIENCE	✓
	2. KNOWING THE SUBJECT CONTENT & MAKING CONNECTIONS	✓
	3. UNDERSTANDING THE USES OF SCIENCES & INDIGENOUS KNOWLEDGE	

### SCIENCE PROCESS SKILLS

1. Accessing & Recalling Information	✓	6. Identifying Problems & Issues		11. Doing Investigations	✓
2. Observing	✓	7. Raising Questions		12. Recording Information	✓
3. Comparing		8. Predicting	✓	13. Interpreting Information	
4. Measuring		9. Hypothesizing		14. Communicating	
5. Sorting & Classifying	✓	10. Planning Investigations		15. Scientific Process	



## TOPIC: Sexual reproduction

### B POSSIBLE RESOURCES

For this lesson, you will need:

IDEAL RESOURCES	IMPROVISED RESOURCES
Resource 17: Structure of the flower	
Flower examples such as plumbago, petunia, hibiscus or agapanthus	
Magnifying glass	
CutTING blade	

### 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 the two major groups of angiosperms?

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.

*Monocotyledons and dicotyledons*

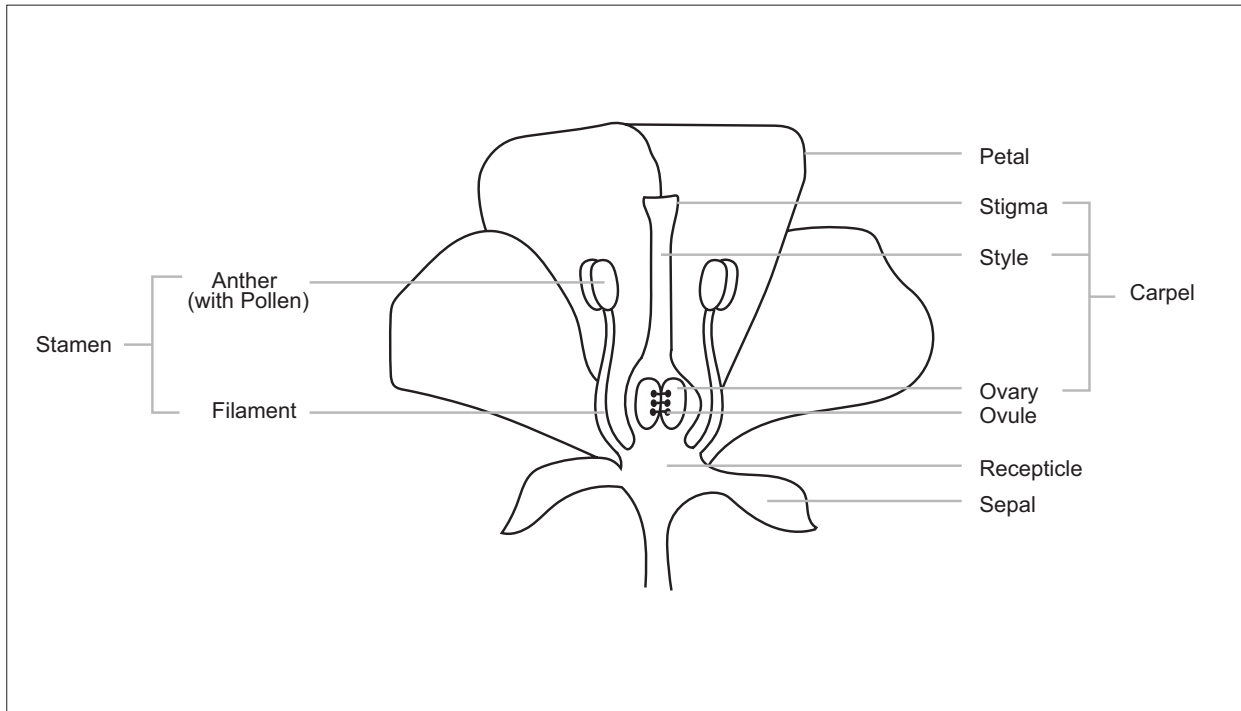
# TOPIC: Sexual reproduction

## D

### ACCESSING INFORMATION

1. Draw the following picture on the chalkboard (or use Resource 17: The structure of the flower) and write the following information on the chalkboard (always try to do this before the lesson starts):

#### REPRODUCTION IN FLOWERING PLANTS



1. Flowering plants reproduce by sexual reproduction.
2. Sexual reproduction means that both male and females are needed to reproduce.
3. The sex organs of plants are found in flowers.
4. In most plants, the flower holds both the male and female sex organs.
5. Seeds are made during this process of reproduction.

#### PARTS OF THE FLOWER

A flower is usually made up of:

1. Stamens:
  - The male parts of the flower
  - Made up of an anther and filament
  - The anther produces the pollen grains that contain the male sex cells
  - The filaments are the stalks that hold the anthers

## TOPIC: Sexual reproduction

2. Carpel (also called the pistil):
  - The female part of the flower
  - Made up of the stigma, style and ovary
  - The stigma is sticky so that the pollen will stick to it.
  - The style is a hollow tube which carries the pollen to the ovary.
  - Inside the ovary are the ovules which will form into seeds when they have been fertilised.
3. Petals:
  - Can be white or coloured to attract pollinators like insects and birds.
4. Sepals:
  - They are usually green and look like leaves.
  - They cover the petals to protect the flower when it is closed.

1. Explain this to the learners as follows:
  - a. Angiosperms (or flowering plants) reproduce by sexual reproduction.
  - b. When we say something has reproduced sexually, we mean that it needs both male and female sex cells to reproduce.
  - c. The sex organs of plants are found in flowers.
  - d. In most plants, the flower holds both the male and female sex organs.
  - e. We can say that these plants are **bisexual**.
2. Ask the learners if they can remember what flowers produce during reproduction.  
*(Correct answer: Seeds)*  
*(Either refer to the diagram you have drawn on the chalkboard or use Resource 17: 'The structure of the flower', whilst teaching the following:)*
3. Continue to explain as follows:
  - a. The four main parts of the flower are the **stamens**, the **carpel** (sometimes called the pistil), the petals and the sepals.
  - b. The stamens are the male part of the flower.
  - c. They are made up of an anther and a filament.
  - d. The anther makes the **pollen grains** that holds the male sex cells.
  - e. The filaments are the stalks that hold the anthers.
4. Ask the learners how many stamens the flower, drawn on the chalkboard, has?  
*(Answer: 4)*

## TOPIC: Sexual reproduction

5. Explain to the learners:
  - a. The carpel, (sometimes called the pistil), is the female part of the flower.
  - b. It is made up of a stigma, a style and an ovary.
  - c. The stigma is sticky so that the pollen from the anther will stick to it.
  - d. The style is a hollow tube that leads from the stigma to the ovary.
  - e. The pollen travels down this tube.
  - f. Inside the ovary are the **ovules** that will form into seeds after **fertilization**.
  - g. The petals can be brightly coloured to attract **pollinators** like insects and birds.
  - h. The sepals at the bottom of the petals protect the petals when the flower closes.
6. Ask the learners if they have any questions.
7. Tell the learners to copy the drawing and information written on the chalkboard into their workbooks.
8. Give the learners some time to complete this task.

### **Checkpoint 1**

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

- a. Why is the tip of the stigma sticky?
- b. What are the male parts of the flower called?

Answers to the checkpoint questions are as follows:

- a. So that the pollen will stick to it
- b. The stamens

## TOPIC: Sexual reproduction

### E

### CONCEPTUAL DEVELOPMENT

1. If possible, do the following activity with the learners using some flowers you have collected. (*This can be done as a demonstration, or in groups, if enough material is available.*)
2. If the whole class is doing the activity, write the activity on the chalkboard:

#### PRACTICAL ACTIVITY

Aim: Dissect a flower and study the reproductive parts.

You will need:

- A large flower
- A scalpel or cutTING blade
- A magnifying glass.

Method:

1. Look at the flower. See if you can identify:
    - The petals
    - Sepals
    - Anther
    - Filament
    - Stigma
    - Style
    - Ovary.
  2. Touch the tip of the flower. Is it sticky?
  3. Carefully cut the flower in half, through the stem.
  4. Look at the inside of the ovary using the magnifying glass.
  5. You should be able to see a number of round small objects. These are called ovules.
3. Write and draw the following on the chalkboard (always try to do this before the lesson starts):

## TOPIC: Sexual reproduction

FLOWER PART	FUNCTION
Anther	
Filament	
Stigma	
Style	
Ovary	
Petals	
Sepals	

4. Explain to the learners the activity as follows:
  - a. Draw the table into your workbook.
  - b. Fill in the function of each part of the flower on the right-hand side of the table.
5. Allow the learners some time to complete this task.
6. With the learners' input, complete the model answer on the chalkboard:

FLOWER PART	FUNCTION
Anther	Makes the pollen grains that hold the male sex cells.
Filament	The stalk that holds the anther
Stigma	The sticky tip of the female part that receives the pollen
Style	The hollow tube that leads from the stigma to the ovary. Pollen goes down this tube.
Ovary	The ovary holds the ovules which are the female sex cells.
Petals	The petals attract pollinators like insects and birds.
Sepals	The sepals protect the petals when the flower is closed.

7. Discuss the answers with the learners.

## TOPIC: Sexual reproduction

### Checkpoint 2

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

- a. Where is pollen formed?
- b. What is formed in the ovary of the flower after fertilisation?

Answers to the checkpoint questions are as follows:

- a. In the anther
- b. Seeds

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

## F

### REFERENCE POINTS FOR FURTHER DEVELOPMENT

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

NAME OF TEXTBOOK	TOPIC	PAGE NUMBER
Oxford Successful	The biosphere	35-36
Via Afrika	The biosphere	30-31
Platinum	The biosphere	29-31
Spot On	The biosphere	25-29
Step-by-Step	The biosphere	40-44
Pelican	The biosphere	43-46
Solutions for All Natural Sciences	The biosphere	58-62
Shuters Top Class Natural Sciences	The biosphere	33-34
Sasol Inzalo Bk A	The biosphere	78-86

## G

### ADDITIONAL ACTIVITIES/ READING

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

1. <https://www.youtube.com/watch?v=oEnQRWkuQ5c> (1min 36sec) [Parts of a flower]
2. [https://www.youtube.com/watch?v=DQ2P0ifmS\\_s](https://www.youtube.com/watch?v=DQ2P0ifmS_s) (2min 06sec) [Parts of a flower]

## TOPIC: Sexual reproduction

# 5 C

**Term 1, Week 5, Lesson C**

**Lesson Title: Pollination and fertilization**

**Time for lesson: 1 hour**

### **A POLICY AND OUTCOMES**

<b>Sub-Topic</b>	Pollination and fertilization	
<b>CAPS Page Number</b>	19	
<b>Lesson Objectives</b>		
By the end of the lesson, learners will be able to:		
<ul style="list-style-type: none"> <li>• define pollination</li> <li>• explain the process of fertilization</li> <li>• explain the role that pollinators play.</li> </ul>		
<b>Specific Aims</b>	1. DOING SCIENCE	✓
	2. KNOWING THE SUBJECT CONTENT & MAKING CONNECTIONS	✓
	3. UNDERSTANDING THE USES OF SCIENCES & INDIGENOUS KNOWLEDGE	

### **SCIENCE PROCESS SKILLS**

1. Accessing & Recalling Information	✓	6. Identifying Problems & Issues		11. Doing Investigations	
2. Observing		7. Raising Questions	✓	12. Recording Information	
3. Comparing		8. Predicting		13. Interpreting Information	
4. Measuring		9. Hypothesizing	✓	14. Communicating	
5. Sorting & Classifying		10. Planning Investigations		15. Scientific Process	



## TOPIC: Sexual reproduction

### B POSSIBLE RESOURCES

For this lesson, you will need:

IDEAL RESOURCES	IMPROVISED RESOURCES
Computer with internet connection	
Resource 17: Structure of the flower	
Resource 18: Pollination diagram	

### C CLASSROOM MANAGEMENT

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

What is the female part of the flower called?

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

*The carpel. It is also sometimes called the pistil.*

### D ACCESSING INFORMATION

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

#### POLLINATION AND FERTILISATION

##### POLLINATION

1. Flowers can only make seeds or fruits once fertilization has taken place.
2. Fertilization can only happen if pollination has happened first.
3. Fertilization is when the male sex cell and the female sex cell fuse or join.
4. In plants, the male sex cells are in the pollen and the female sex cells are in the ovary of the flower.
5. The process of getting the pollen from the anther, to the stigma, on a plant of the same species, is called pollination.
6. Pollination can happen through wind, water or pollinators.
7. Pollinators are living organisms that can carry pollen from one plant to another, like bees.
8. When the flower is pollinated, pollen sticks to the stigma.
9. Once a plant has been pollinated, fertilization can happen.

## TOPIC: Sexual reproduction

### FERTILIZATION

1. Once the pollen is on the stigma, it needs to reach the egg in the ovary of the plant.
2. A thin tube starts growing out of the pollen grain.
3. This tube grows down the style to the ovary and into the ovule.
4. The male sex cells move down this tube and fuse or join with the female egg or ovule.
5. Fertilization has now happened.
6. This fertilized egg will now form into a seed.

*(Put Resource 17: 'Structure of the flower', and Resource 18: 'Pollination diagram', on the board.)*

2. Explain this to the learners as follows: *(Refer to the diagrams as you explain, poinTING out the parts of the flower as you explain.)*
  - a. Flowers can only make seeds and fruits if **fertilization** has taken place.
  - b. Fertilization can only happen if **pollination** has happened.
  - c. Fertilization is when the male sex cell fuses or joins with a female sex cell.
3. Ask the learners if the following questions:
  - a. Where do we find the male sex cells in flowers?  
*(Answer: In pollen grains)*
  - b. Where do we find the female sex cells in flowers?  
*(Answer: The ovary)*
  - c. Where is pollen made in flowers?  
*(Answer: The anther)*
4. Continue explaining as follows:
  - a. The process of getting pollen from the anther to the stigma of a plant, of the same species, is called pollination.
  - b. There are many ways pollination can happen.
  - c. Pollination can happen by wind, water or by something we call 'pollinators'.
  - d. Pollinators are living organisms that move from one plant to another.
5. Ask the learners if they can think of any living creatures they have seen on or around flowers?  
*(Possible answers: Bees, butterflies, birds, animals)*
6. Continue to explain to the learners whilst referring to the two resources on the board:
  - a. When a flower is pollinated, the pollen is stuck to the stigma.
  - b. Now that the plant has been pollinated, fertilization can happen.
  - c. Once the pollen is on the stigma, it needs to get to the ovary of the flower.
  - d. In the ovary of the flower are the ovules.
  - e. These are the female sex cells.
  - f. A thin tube starts to grow from the pollen grain, down through the style into the ovary.

## TOPIC: Sexual reproduction

- g. The male sex cell now moves down this tube to join with the female sex cell.
  - h. Once the two cells have joined (or fused) together, fertilization will have happened.
  - i. Seeds and fruits will now form.
7. Ask the learners if they have any questions.
  8. Tell the learners to copy the information written on the chalkboard into their workbooks.
  9. Give the learners some time to complete this task.

### Checkpoint 1

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

- a. What is the process of getting pollen from the anther to the stigma called?
- b. What forms in the flower after fertilization?

Answers to the checkpoint questions are as follows:

- a. Pollination
- b. Seeds and fruits.

## **E** CONCEPTUAL DEVELOPMENT

### TASK

1. Write the following on the chalkboard:

Pollinators, fertilization, pollination, ovules, fruit

1. \_\_\_\_\_ needs to take place in a flower, before fertilization is possible.
  2. Living organisms that transfer pollen from one flower to another are called \_\_\_\_\_.
  3. When a male sex cell fuses with a female sex cell, it is called \_\_\_\_\_.
  4. Once fertilization has taken place, a flower will produce a seed or a \_\_\_\_\_.
  5. The female sex cells found inside the ovary of a flower are called the \_\_\_\_\_.
  6. If plants were not able to reproduce, we would run out of some of our favourite foods. Mine are green apples and pumpkin. What are yours?
2. Tell the learners to copy the questions from the chalkboard into their workbooks.
  3. Tell the learners they must then complete the answers using the clue words given.
  4. Allow the learners some time to complete this activity.
  5. Write the model answer on the chalkboard:

## TOPIC: Sexual reproduction

Pollinators, fertilization, pollination, ovules, fruit

1. Pollination needs to take place in a flower, before fertilization is possible.
2. Living organisms that transfer pollen from one flower to another are called pollinators.
3. When a male sex cell fuses with a female sex cell, it is called fertilization.
4. Once fertilization has taken place, a flower will produce a seed or a fruit.
5. The female sex cells found inside the ovary of a flower are called the ovules.

(Answers will vary)

### **Checkpoint 2**

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

- a. What is a pollinator?
- b. Can you name one example of a pollinator?

Answers to the checkpoint questions are as follows:

- a. A pollinator is a living organism that moves from one plant to another.
- b. Insects, birds and animals are examples of pollinators.

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

## TOPIC: Sexual reproduction

### 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
Oxford Successful	Sexual reproduction in angiosperms	36-40
Via Afrika	Sexual reproduction in angiosperms	30-34
Platinum	Sexual reproduction in angiosperms	30-35
Spot On	Sexual reproduction in angiosperms	30-34
Step-by-Step	Sexual reproduction in angiosperms	45-50
Pelican	Sexual reproduction in angiosperms	44-55
Solutions for All Natural Sciences	Sexual reproduction in angiosperms	63-73
Shuters Top Class Natural Sciences	Sexual reproduction in angiosperms	33-38
Sasol Inzalo Bk A	Sexual reproduction in angiosperms	78-99

### G ADDITIONAL ACTIVITIES/ READING

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

1. <https://www.youtube.com/watch?v=jWC2NfXpbTQ> (7min 0sec) [Flowers and pollination]
2. <http://study.com/academy/lesson/what-is-pollination-in-plants-definition-types-quiz.html> (5min 17sec) [What is pollination in plants?]

## TOPIC: Sexual reproduction

# 6 A

**Term 1, Week 6, Lesson A**

**Lesson Title: Flower adaptations and pollinators**

**Time for lesson: 1 hour**

### A POLICY AND OUTCOMES

<b>Sub-Topic</b>	Flower adaptations and pollinators	
<b>CAPS Page Number</b>	19	
<b>Lesson Objectives</b>		
By the end of the lesson, learners will be able to:		
<ul style="list-style-type: none"> <li>• name the different pollinators</li> <li>• explain the importance of pollinators</li> <li>• list the adaptations in flowers that promote pollination</li> <li>• explain the difference between self-pollination and cross-pollination.</li> </ul>		
Specific Aims	1. DOING SCIENCE	✓
	2. KNOWING THE SUBJECT CONTENT & MAKING CONNECTIONS	✓
	3. UNDERSTANDING THE USES OF SCIENCES & INDIGENOUS KNOWLEDGE	

### SCIENCE PROCESS SKILLS

1. Accessing & Recalling Information	✓	6. Identifying Problems & Issues	✓	11. Doing Investigations	
2. Observing	✓	7. Raising Questions		12. Recording Information	
3. Comparing		8. Predicting		13. Interpreting Information	
4. Measuring		9. Hypothesizing	✓	14. Communicating	
5. Sorting & Classifying		10. Planning Investigations		15. Scientific Process	

## TOPIC: Sexual reproduction

### B POSSIBLE RESOURCES

For this lesson, you will need:

IDEAL RESOURCES	IMPROVISED RESOURCES
Computer with internet connection	
Resource 19: Mielie plant	
Resource 20: The sunbird	

### 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 pollen?

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 male sex cells of a flowering plant are found inside pollen.*

### D ACCESSING INFORMATION

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

#### POLLINATION

1. Pollination is the transfer of pollen from the anther in a flower to the stigma in a flower.
2. Seeds can only form if a flower has been pollinated and fertilization has taken place.
3. Pollination can happen in two ways:
  - Self-pollination: Pollen is transferred from the anther to the stigma of the same flower.
  - Cross-pollination: Pollen is transferred from the anther of one flower to the stigma of another flower.
4. Pollination can take place by wind, water or through pollinators like birds, insects and animals.

#### FLOWERS ARE ADAPTED TO DIFFERENT POLLINATORS

1. Flowers are adapted to their method of pollination.
2. Wind pollinated flowers:
  - a. Examples are mielies and grasses.

## TOPIC: Sexual reproduction

- b. They make large amounts of dry pollen that is blown by the wind from one plant to another.
    - c. The stigmas of these plants are large, feathery and sticky to catch any pollen blowing by.
  3. Insect and bird pollinated flowers:
    - a. These flowers are adapted to attract birds or insects.
    - b. They have colourful petals.
    - c. They often have a sweet smell or sweet nectar.
    - d. The pollen grains stick to the bodies of the insects or birds.
    - e. The pollen is then transferred to the sticky stigmas of the flower when they land or brush past.
    - f. Some birds visit flowers to look for nectar because they use this nectar as food.
    - g. These plants have long flowers shaped like a tube for a bird's beak to fit into.
2. Read through the information written on the chalkboard with the learners.
3. Explain this to the learners as follows:
  - a. We learnt in the last lesson that pollination is the transfer of pollen from the anther of a flower to the stigma of a flower.
  - b. Flowers can only make seeds and fruits if fertilization has taken place.
  - c. Fertilization can only happen if pollination has happened.
  - d. Pollination can happen in two ways:
    - If pollen is transferred from the anther of a flower to the stigma inside the SAME flower, we call this self-pollination.
    - If pollen is transferred from the anther of a flower to the stigma of a DIFFERENT flower of the same species, we call this cross-pollination.
  - e. Pollination can take place with the help of wind, water or pollinators like birds, insects or animals.

*(Put up Resource 19: Mielie plant)*
4. Ask the learners if they can identify this plant.

*(Answer: It is a mielie or maize plant)*
5. Continue explaining as follows:
  - a. Mielie plants are an example of plants that are pollinated by wind.
  - b. These plants make large amounts of dry pollen that is blown from one plant to another.
  - c. You can see in the picture that the plant also has large feathery stigmas to catch the pollen as it blows past.
6. Ask the learners for examples of insects they may have seen around flowers?

*(Possible answers: Bees, butterflies)*



## TOPIC: Sexual reproduction

7. Continue to explain to the learners whilst referring to the two resources on the board:
  - a. Flowers are adapted to attract insects and birds.
  - b. When insects and birds visit a flower, they get some of the sticky pollen from the anthers on their bodies, which they transfer to the stigma of the flower when they brush past it.
8. Ask the learners if they can think of any ways in which flowers attract insects and birds?  
(Answer: *Bright colours, nice smell*)
9. Explain as follows:
  - a. Flowers often have brightly coloured petals and a nice smell to attract insects and birds.
  - b. Some flowers make large amounts of **nectar** to attract birds.
  - c. Nectar is a sugary liquid made by the flower.
  - d. Some birds, like the sunbird, use this nectar as food.  
(Show the learners Resource 20: 'The sunbird'.)
  - e. You can see that the flower on this aloe has a long, thin shape which enables the beak to fit inside.
10. Ask the learners if they have any questions.
11. Tell the learners to copy the information written on the chalkboard into their workbooks.
12. Give the learners some time to complete this task.

### **Checkpoint 1**

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

- a. What is self-pollination?
- b. What is cross-pollination?

Answers to the checkpoint questions are as follows:

- a. Self-pollination occurs when pollen is transferred from the anther to the stigma in the **SAME** flower.
- b. Cross-pollination occurs when pollen is transferred from the anther in one flower to the stigma of **ANOTHER** flower of the same species.

## TOPIC: Sexual reproduction

### E

### CONCEPTUAL DEVELOPMENT

1. Write the following information on the chalkboard. Always try to do this before the lesson starts.

Pollinators are very important for food production. Pollination needs to happen before a plant can make seeds and fruits which we use for food. Insects like bees, butterflies, moths, beetles and other insects pollinate about one third of the world's food crops. These crops include fruit and vegetables. Since the early 1990s, farmers all over the world have noticed a big drop in the number of pollinators. Scientists have shown that this has occurred because of diseases, loss of habitats and the use of poisons. Some farmers now need to build special beehives on their farms to help pollinate their crops.

2. Read through the information written on the chalkboard with the learners.
3. Divide the learners into groups of four or five.
4. Write the following questions on the chalkboard. Always try to do this before the lesson starts.

1. What is a food crop?
2. Can you name six examples of food crops?
3. What has caused a drop in the number of pollinators worldwide?
4. Why do you think there has been a loss of habitats for pollinators?
5. What would happen if all the pollinators suddenly disappeared?
6. How are farmers trying to deal with this drop in the numbers of pollinators?
7. What do you think can be done to solve the problem of the drop in pollinator numbers?

5. Tell the learners they are going to discuss these answers in their groups.
6. Allow the learners some time to complete this activity.
7. Once the learners have had some time to discuss the answers, lead a class discussion on this topic by asking the questions and requestING answers.
8. Some possible answers could be:

1. *A food crop is a plant that is planted for eating.*
2. *Tomatoes, apples, potatoes, beans, pumpkins, oranges*
3. *Diseases, loss of habitats and the use of poisons*
4. *People are cutTING down forests. Pollution and damage to the environment*
5. *There could be a shortage of food for humans to eat.*
6. *Bees are important pollinators, so they are building special bee hives on their farms.*
7. *More research into pollinator diseases. Less use of poisons. More care for the environment*

## TOPIC: Sexual reproduction

### **Checkpoint 2**

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

- a. Name three ways in which plants can be pollinated?
- b. What is the sugary liquid that some flowers make, called?

Answers to the checkpoint questions are as follows:

- c. Wind, water and pollinators like insects and birds
- d. Nectar

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
Oxford Successful	Sexual reproduction in angiosperms	36-40
Via Afrika	Sexual reproduction in angiosperms	31-34
Platinum	Sexual reproduction in angiosperms	32-35
Spot On	Sexual reproduction in angiosperms	30-33
Step-by-Step	Sexual reproduction in angiosperms	45-50
Pelican	Sexual reproduction in angiosperms	47-50
Solutions for All Natural Sciences	Sexual reproduction in angiosperms	63-70
Shuters Top Class Natural Sciences	Sexual reproduction in angiosperms	35-43
Sasol Inzalo Bk A	Sexual reproduction in angiosperms	87-98

## **G** ADDITIONAL ACTIVITIES/ READING

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

1. <https://www.youtube.com/watch?v=pSfmbb6zeUk> (3min 40 sec) [Where have all the bees gone?]
2. <https://www.youtube.com/watch?v=-iw3fjKzmGk> (15min 58 sec) [Where have all the bees gone?]

## TOPIC: Sexual reproduction

# 6 B

**Term 1, Week 6, Lesson B**

**Lesson Title: Seeds and Fruits**

**Time for lesson: 1 hour**

### A POLICY AND OUTCOMES

<b>Sub-Topic</b>	Seeds and Fruits		
<b>CAPS Page Number</b>	19		
<b>Lesson Objectives</b>			
By the end of the lesson, learners will be able to:			
<ul style="list-style-type: none"> <li>• explain where seeds are found</li> <li>• explain why seeds need to be dispersed</li> <li>• list the different ways in which seeds are dispersed.</li> </ul>			
<b>Specific Aims</b>	1. DOING SCIENCE		✓
	2. KNOWING THE SUBJECT CONTENT & MAKING CONNECTIONS		✓
	3. UNDERSTANDING THE USES OF SCIENCES & INDIGENOUS KNOWLEDGE		

### SCIENCE PROCESS SKILLS

1. Accessing & Recalling Information	✓	6. Identifying Problems & Issues		11. Doing Investigations	
2. Observing	✓	7. Raising Questions		12. Recording Information	
3. Comparing		8. Predicting		13. Interpreting Information	✓
4. Measuring		9. Hypothesizing		14. Communicating	
5. Sorting & Classifying	✓	10. Planning Investigations		15. Scientific Process	

## TOPIC: Sexual reproduction

### B POSSIBLE RESOURCES

For this lesson, you will need:

IDEAL RESOURCES	IMPROVISED RESOURCES
Computer with internet connection	
Resource 21: Ways seeds are dispersed	
Resource 22: The dandelion	
Real examples of seeds, blackjack plants, dandelions, 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:

Name the ways in which pollination can happen?

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.

*Wind, water and through pollinators like birds, insects and animals*

### D ACCESSING INFORMATION

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

#### SEED DISPERSAL

1. Seeds need to spread away from each other to stop overcrowding.
2. If all the seeds of the parent plant landed next to the parent plant, they would all be trying to fight for the same resources to survive.
3. These resources are water, soil and light.
4. Fruits and seeds are spread (we say dispersed) in different ways.
5. They can be carried by wind, water or animals.
6. Some are popped or exploded out by the plant itself.

#### Ways in which seeds are dispersed:

Seeds can have:

1. Wings to help the wind carry them.
2. Hair-like growths to help the wind carry them, like a dandelion.

## TOPIC: Sexual reproduction

3. Hooks or thorns that get caught in an animal's fur as it walks past.
4. A seed pod that bursts or pops open, shootING the seeds away.
5. A sweet taste so that animals will eat them and pass the seeds in their droppings.
6. A waterproof covering so they can float away in water.

2. Read through the information written on the chalkboard with the learners.
3. Explain this to the learners as follows:
  - a. Once a plant has made a seed, it needs to spread that seed to a new place to grow.
  - b. If all the seeds a plant made landed right next to the mother plant, they would all be fightING for the same resources.
  - c. These resources are water, soil and light.
  - d. Plants have developed many different ways to spread their seeds.
  - e. The spreading of seeds is called seed dispersal.  
*(Put Resource 22: 'The dandelion', on the chalkboard.)*
4. Ask the learners:
  - a. Have you ever seen this plant growing in a garden or in the veld?
  - b. Does anyone know what it is called?  
*(Answer: A dandelion)*
  - c. By looking at the picture, can you tell how the seeds of the dandelion are spread or dispersed?  
*(Answer: They are blown in the wind.)*  
*(Put Resource 21: 'Ways seeds are dispersed', on the chalkboard. Refer to the pictures as you explain the following:)*
5. Continue explaining as follows:
  - a. Seeds can be spread or dispersed in many different ways.
  - b. Some seeds have special wings that help the wind to carry them away.
  - c. Animals sometimes eat the fruits of plants and pass the seeds out in their droppings.
  - d. Seeds can float, can fall into water and be carried away.
  - e. Sometimes plants have pods that pop or explode sending the seeds flying through the air.
  - f. Seeds can even have hooks or thorns that can get stuck onto an animal and be carried away.
6. Ask the learners if they have ever found bits of a plant stuck to their clothing? Can they name any of these plants?  
*(Possible answers: Blackjacks, grass seeds)*
7. Ask the learners if they have any questions.
8. Tell the learners to copy the information written on the chalkboard into their workbooks.
9. Give the learners some time to complete this task.

## TOPIC: Sexual reproduction

### Checkpoint 1

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

- a. What resources do plants need to survive?
- b. What is the correct scientific word for the spreading of seeds?

Answers to the checkpoint questions are as follows:

- a. Water, soil and light
- b. Dispersal.

## E

### CONCEPTUAL DEVELOPMENT

1. Draw and write the following information on the chalkboard:

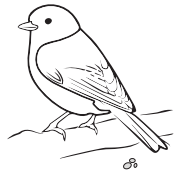
#### SEED DISPERSAL

Animal droppings	Water	Wings in the wind
Exploding pods	Hooks and thorns on animals or people	Light and feathery, blowing in the wind

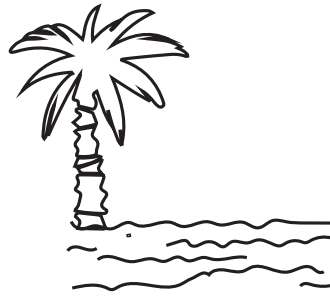
2. Tell the learners to draw the above table with labels into their workbooks.
3. Tell the learners to draw an example of each of these dispersal methods on the table.
4. Allow the learners some time to complete this activity.
5. Draw a model answer on the chalkboard:

## TOPIC: Sexual reproduction

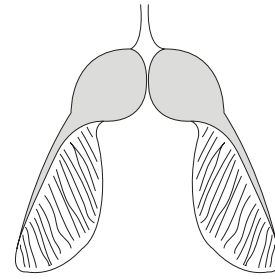
### SEED DISPERSAL



Animal Droppings



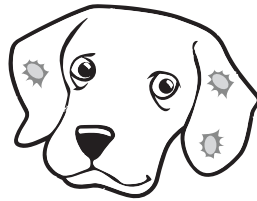
water



Wings in the wind



Exploding Pods



Hooks and Thorns  
on animals



Light and feathery  
blowing in the wind

### **Checkpoint 2**

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

- Can you name three ways in which seeds can be dispersed?
- How are seeds that are dispersed by animals specially adapted?

Answers to the checkpoint questions are as follows:

- Wind, water, exploding or by animals
- They have hooks or thorns to attach to the fur of the animal.

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



## TOPIC: Sexual reproduction

### 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
Oxford Successful	Sexual reproduction in angiosperms	41-42
Via Afrika	Sexual reproduction in angiosperms	35
Platinum	Sexual reproduction in angiosperms	36-37
Spot On	Sexual reproduction in angiosperms	30-33
Step-by-Step	Sexual reproduction in angiosperms	52
Pelican	Sexual reproduction in angiosperms	55-56
Solutions for All Natural Sciences	Sexual reproduction in angiosperms	71-72
Shuters Top Class Natural Sciences	Sexual reproduction in angiosperms	43-45
Sasol Inzalo Bk A	Sexual reproduction in angiosperms	102-103

### G ADDITIONAL ACTIVITIES/ READING

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

1. [https://www.youtube.com/watch?v=OB0P3mx\\_lxY](https://www.youtube.com/watch?v=OB0P3mx_lxY) (1min 53 sec) [Seed dispersal by explosion]
2. <https://www.youtube.com/watch?v=xY4JFOSuqvY> (12min 51 sec) [Seed dispersal -the great escape]

## TOPIC: Sexual reproduction

# 6 C

**Term 1, Week 6, Lesson C**

**Lesson Title: Human reproduction**

**Time for lesson: 1 hour**

### **A POLICY AND OUTCOMES**

<b>Sub-Topic</b>	Puberty	
<b>CAPS Page Number</b>	20	
<b>Lesson Objectives</b>		
By the end of the lesson, learners will be able to:		
<ul style="list-style-type: none"> <li>• explain the purpose of reproduction</li> <li>• explain what puberty is</li> <li>• describe the physical changes that take place during puberty</li> <li>• describe the emotional changes that take place during puberty.</li> </ul>		
<b>Specific Aims</b>	1. DOING SCIENCE	✓
	2. KNOWING THE SUBJECT CONTENT & MAKING CONNECTIONS	✓
	3. UNDERSTANDING THE USES OF SCIENCES & INDIGENOUS KNOWLEDGE	

### **SCIENCE PROCESS SKILLS**

1. Accessing & Recalling Information	✓	6. Identifying Problems & Issues		11. Doing Investigations	
2. Observing		7. Raising Questions	✓	12. Recording Information	
3. Comparing		8. Predicting		13. Interpreting Information	
4. Measuring		9. Hypothesizing		14. Communicating	
5. Sorting & Classifying		10. Planning Investigations		15. Scientific Process	

## TOPIC: Sexual reproduction

### B POSSIBLE RESOURCES

For this lesson, you will need:

IDEAL RESOURCES	IMPROVISED RESOURCES
Computer with internet connection	

### 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 needed for sexual reproduction?

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.

*Male and female sex cells*

### D ACCESSING INFORMATION

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

#### REPRODUCTION IN HUMANS

1. Reproduction in humans happens when the male sex cell and the female sex cell combine to produce a baby.
2. The male sex cell is called a sperm and the female sex cell is called an ovum (egg).
3. For an ovum to be fertilized, sperm must enter the female body.
4. Reproduction can only take place when the human body is mature enough to make sperm or eggs.
5. Sperm and eggs are made in the reproductive organs.

#### PUBERTY

1. As we get older, our bodies change.
2. The stage when our sexual organs start to mature is called puberty.
3. Puberty happens at different times in boys and girls.
4. It can start anywhere from the age of 10 in girls and 12 in boys.
5. Puberty can be a difficult time with both changes in your body and difficulties with emotions.

## TOPIC: Sexual reproduction

6. The physical changes that girls will experience are:

- a. Breasts develop
- b. Hair grows around the vagina
- c. Hair grows under the arms
- d. Skin becomes oily
- e. Hips become wider
- f. Menstruation begins with periods each month.

7. The physical changes that boys will experience are:

- a. Hair grows around the penis and scrotum
- b. Hair grows under the arms
- c. Facial hair starts to grow
- d. Skin becomes oily
- e. Voice becomes deeper
- f. Penis becomes larger
- g. Increase in sweating
- h. Sperm is produced.

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

3. Explain this to the learners as follows:

- a. As we get older our bodies change.
- b. From about the age of 10 in girls, and 12 in boys, big physical changes start taking place.
- c. This time of a human's life is called puberty.
- d. During puberty, our sexual organs mature.
- e. This can also be a time of confusing feelings.
- f. Reproduction in humans can only happen when the human body is mature enough to make sperm (in males) and eggs (in females).

4. Ask the learners:

- a. What is the purpose of human reproduction?

*(Answer: To make babies)*

5. Continue to explain as follows:

- a. Both girls and boys experience some similar changes at puberty.
- b. These similar changes are oily skin, underarm hair, and hair on the genital area.
- c. The changes that happen to girls are the start of menstruation, breasts start to grow bigger and hips widen.
- d. The changes that happen to boys are that their voices deepen, the penis becomes bigger and sperm is now made by the body.
- e. Boys also start getting facial hair and sweat more.

## TOPIC: Sexual reproduction

6. Ask the learners if they have any questions.
7. Tell the learners to copy the information written on the chalkboard into their workbooks.
8. Give the learners some time to complete this task.

### **Checkpoint 1**

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

- a. What are the male sex cells in humans called?
- b. What is the female sex cell in humans called?

Answers to the checkpoint questions are as follows:

- a. Sperm
- b. Ovum

## **E** CONCEPTUAL DEVELOPMENT

1. Explain the following to the learners:
  - a. The changes that happen during puberty are controlled by special chemicals made by the body called hormones.
  - b. In boys, this hormone is called testosterone and in girls, oestrogen.
  - c. These hormones can also affect our moods and emotions.
4. Ask the learners about what kinds of emotions or feelings they might be experiencing as they enter puberty.  
*(Possible answers: shyness about changing body, easily embarrassed, irritated by parents, developing crushes on others, wanTING to be left alone, feeling sad for no reason, getting angry easily)*
5. Explain to the learners that these feelings are normal and happen to everyone.
6. Write the following on the chalkboard. Always try to do this before the lesson starts.

1. What is puberty?
2. If you are a girl, list all the changes you can expect during puberty.
3. If you are a boy, list all the changes you can expect during puberty.
4. Which of these changes have you noticed in your own body?
5. What is the hormone called that causes these changes in girls?
6. What is the hormone called that causes these changes in boys?
7. What changes have you experienced in your emotions, your feelings, your relationship with your parents and friends.

## TOPIC: Sexual reproduction

5. Tell the learners to write the questions on the chalkboard into their workbooks.
6. Tell the learners to answer the questions in their workbooks.
7. Allow the learners some time to complete this activity.
8. Write the model answer on the chalkboard:

1. Puberty is the time during which a human's sex organs mature and they are then able to reproduce.
2. Girl:
  - Hair grows under arms and on pubic area.
  - Skin becomes oily.
  - Breasts grow.
  - Hips get wider.
  - Menstruation starts.
3. Boy:
  - Hair grows under arms, on pubic area and on face.
  - Skin becomes oily.
  - Penis grows bigger.
  - Voice gets deeper.
  - Sperm is produced.
4. (Answers will vary)
5. The hormone that causes these changes in girls is oestrogen.
6. The hormone that causes these changes in boys is testosterone.
7. (Answers will vary)

### **Checkpoint 2**

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

- a. What is the hormone called that causes changes during puberty in boys?
- b. What is the hormone called that causes changes during puberty in girls?

Answers to the checkpoint questions are as follows:

- a. Testosterone
- b. Oestrogen

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

## TOPIC: Sexual reproduction

### 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
Oxford Successful	Sexual reproduction in humans	43-45
Via Afrika	Sexual reproduction in humans	40-41
Platinum	Sexual reproduction in humans	40-41
Spot On	Sexual reproduction in humans	37-39
Step-by-Step	Sexual reproduction in humans	53-55
Pelican	Sexual reproduction in humans	59-60
Solutions for All Natural Sciences	Sexual reproduction in humans	76-79
Shuters Top Class Natural Sciences	Sexual reproduction in humans	49-52
Sasol Inzalo Bk A	Sexual reproduction in humans	104-109

### G ADDITIONAL ACTIVITIES/ READING

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

1. [https://www.youtube.com/watch?v=j\\_mFJ2d0qxQ](https://www.youtube.com/watch?v=j_mFJ2d0qxQ) (4min 30sec) [What is puberty? Decoding puberty in girls]
2. <https://www.youtube.com/watch?v=Yvw7QGytgNQ> (5min 01sec) [All about boys' puberty]

## TOPIC: Sexual reproduction

# 7 A

**Term 1, Week 7, Lesson A**

**Lesson Title: Human reproduction**

**Time for lesson: 1 hour**

### **A POLICY AND OUTCOMES**

<b>Sub-Topic</b>	Human reproduction: Female reproductive organs	
<b>CAPS Page Number</b>	20	
<b>Lesson Objectives</b>		
By the end of the lesson, learners will be able to:		
<ul style="list-style-type: none"> <li>• name the female reproductive organs</li> <li>• describe the purpose of each of the reproductive organs.</li> </ul>		
<b>Specific Aims</b>	1. DOING SCIENCE	
	2. KNOWING THE SUBJECT CONTENT & MAKING CONNECTIONS	✓
	3. UNDERSTANDING THE USES OF SCIENCES & INDIGENOUS KNOWLEDGE	

### **SCIENCE PROCESS SKILLS**

1. Accessing & Recalling Information	✓	6. Identifying Problems & Issues		11. Doing Investigations	
2. Observing	✓	7. Raising Questions	✓	12. Recording Information	
3. Comparing		8. Predicting		13. Interpreting Information	✓
4. Measuring		9. Hypothesizing		14. Communicating	✓
5. Sorting & Classifying		10. Planning Investigations		15. Scientific Process	



## TOPIC: Sexual reproduction

### B POSSIBLE RESOURCES

For this lesson, you will need:

IDEAL RESOURCES	IMPROVISED RESOURCES
Computer with internet connection	
Resource 23: The female reproductive system	

### 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 puberty?

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.

*Puberty is when the human body has reached sexual maturity.*

### D ACCESSING INFORMATION

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

#### THE FEMALE REPRODUCTIVE ORGANS

1. The female reproductive system is made up of three main parts:
  - a. The ovaries
  - b. The uterus
  - c. The vagina.
2. The ovaries are the part of the reproductive system where the egg cells are stored.
3. These egg cells are called ova (one is called an ovum).
4. A female is born with all the eggs (ova) she will have.
5. The number of eggs will be different in every female.
6. From puberty, the ovaries release an unfertilized egg (ovum) regularly.
7. This usually happens every 28 days.
8. The uterus (or womb) is the space inside the body where a baby grows.
9. A baby grows from a fertilized ovum.
10. The vagina (also known as the birth canal) is the opening that receives the sperm from the male penis.
11. During natural birth, the baby is born through this opening.

## TOPIC: Sexual reproduction

2. Read through the information written on the chalkboard with the learners.
3. Explain this to the learners as follows:
  - a. Talking about sexual reproduction and the body parts that are required can be embarrassing for some of us.
  - b. We need to be respectful and try and learn as much as we can.
  - c. Being informed helps us make good decisions for our own bodies.
4. Ask the learners if they can remember the name of the hormone that causes changes in the female body during puberty.  
(Answer: Oestrogen)  
(Put Resource 23: 'Female reproductive system' on the chalkboard. Refer to this diagram as you explain the next part.)
5. Continue to explain as follows:
  - a. The female reproductive system is made up of three main parts.
  - b. These parts are the vagina, the uterus and the ovaries.
  - c. The ovaries are the part of the reproductive system where the egg cells are stored.
  - d. These eggs are called ova. One ovum, many ova.
  - e. A female is born with all the eggs she will have in her lifetime.
  - f. Each woman will have a different number of ova.
6. Ask the learners if they have any questions.
7. Explain to the learners:
  - a. After puberty, the ovaries release one ovum every 28 days.
  - b. This ovum travels down tubes to the uterus.
  - c. The uterus is the space in which a baby can grow if the ovum (or egg) is fertilized.
  - d. To fertilize the ovum (or egg), sperm is received from the penis through the opening, called the vagina.
  - e. If a baby is delivered (or birthed) naturally, the baby will come out of the vagina.
8. Ask the learners if they have any questions.
9. Tell the learners to copy the information written on the chalkboard into their workbooks.
10. Give the learners some time to complete this task

### **Checkpoint 1**

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

- a. What do we call the human female egg?
- b. Where are these eggs stored?

Answers to the checkpoint questions are as follows:

- a. An ovum (many ova)
- b. In the ovaries.

## TOPIC: Sexual reproduction

### E

### CONCEPTUAL DEVELOPMENT

1. Write the following questions on the chalkboard. Always try to do this before the lesson starts.

1. What are the three main parts of the female reproductive system?
2. What are stored in the ovaries?
3. How many ova are females born with?
4. What is the function of the uterus?
5. If a baby is delivered naturally, how does it leave the woman's body?

2. Read through the questions on the chalkboard with the learners.
3. Tell the learners to write the questions on the chalkboard into their workbooks.
4. Tell the learners to answer the questions in their workbooks.
5. Allow the learners some time to complete this activity.
6. Write the model answer on the chalkboard:

1. The ovaries, uterus and vagina.
2. The female sex cells which are called ova.
3. It is different in every woman.
4. It is the space in which a fertilized ovum can grow into a baby.
5. Through the opening called the vagina

#### **Checkpoint 2**

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

- a. What is the scientific name for the female egg cell?
- b. What is the space called where a baby can grow inside a woman's body?

Answers to the checkpoint questions are as follows:

- a. Ovum.
- b. Uterus.

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

## TOPIC: Sexual reproduction

### 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
Oxford Successful	Sexual reproduction in humans	45-46
Via Afrika	Sexual reproduction in humans	42-44
Platinum	Sexual reproduction in humans	42-43
Spot On	Sexual reproduction in humans	41
Step-by-Step	Sexual reproduction in humans	56-58
Pelican	Sexual reproduction in humans	58-59
Solutions for All Natural Sciences	Sexual reproduction in humans	80-81
Shuters Top Class Natural Sciences	Sexual reproduction in humans	53-54
Sasol Inzalo Bk A	Sexual reproduction in humans	104-109

### G

#### ADDITIONAL ACTIVITIES/ READING

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

1. <https://www.youtube.com/watch?v=RFDatCchpus> (10min 14 sec) [Reproductive System Part 1]

## TOPIC: Sexual reproduction

# 7 B

**Term 1, Week 7, Lesson B**

**Lesson Title: Human reproduction**

**Time for lesson: 1 hour**

### **A POLICY AND OUTCOMES**

<b>Sub-Topic</b>	Human reproduction: Male reproductive organs		
<b>CAPS Page Number</b>	20		
<b>Lesson Objectives</b>			
By the end of the lesson, learners will be able to:			
<ul style="list-style-type: none"> <li>• name the male reproductive organs</li> <li>• describe the purpose of each of the reproductive organs</li> </ul>			
<b>Specific Aims</b>	1. DOING SCIENCE		
	2. KNOWING THE SUBJECT CONTENT & MAKING CONNECTIONS		✓
	3. UNDERSTANDING THE USES OF SCIENCES & INDIGENOUS KNOWLEDGE		

### **SCIENCE PROCESS SKILLS**

1. Accessing & Recalling Information	✓	6. Identifying Problems & Issues		11. Doing Investigations	
2. Observing		7. Raising Questions		12. Recording Information	✓
3. Comparing		8. Predicting		13. Interpreting Information	
4. Measuring		9. Hypothesizing		14. Communicating	✓
5. Sorting & Classifying		10. Planning Investigations		15. Scientific Process	

## TOPIC: Sexual reproduction

### B POSSIBLE RESOURCES

For this lesson, you will need:

IDEAL RESOURCES	IMPROVISED RESOURCES
Computer with internet connection	
Resource 23: The male reproductive system	

### C CLASSROOM MANAGEMENT

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

Where are the female egg cells or ova stored?

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

*In the ovaries.*

### D ACCESSING INFORMATION

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

#### THE MALE REPRODUCTIVE ORGANS

1. The purpose of the male reproductive organs is to make sperm and to transport it into the woman's reproductive organs.
2. The sperm are made in the testes.
3. The testes are held in a bag of skin outside the body, called the scrotum.
4. The testes are connected to the penis by a long, thin tube.
5. The sperm leaves the male's body through the penis during sexual intercourse.
6. To make it easier for the penis to enter the vagina, it needs to become hard.
7. The cells in the penis fill with blood and the penis swells.
8. We say the penis has become erect.

## TOPIC: Sexual reproduction

2. Read through the information written on the chalkboard with the learners.
3. Explain this to the learners as follows:
  - a. Talking about sexual reproduction and the body parts needed can be embarrassing for some of us.
  - b. We need to be respectful and try and learn as much as we can.
  - c. Information helps us make good decisions for our own bodies.
4. Ask the learners if they can remember the name of the hormone that causes changes in the male body during puberty?  
(Answer: Testosterone)  
(Put Resource 24: Male reproductive system, on the chalkboard. Refer to this diagram as you explain the next part.)
5. Continue to explain as follows:
  - a. The purpose of the male reproductive system is to make sperm and deliver this sperm into the female's reproductive system.
  - b. The sperm are made in the testes.
  - c. The testes are two oval-shaped bodies that hang outside the male's body.
  - d. They are held in a bag of skin called the scrotum.
6. Ask the learners if they have any questions.
7. Explain to the learners:
  - a. The sperm leave the male body through the penis during sexual intercourse.
  - b. The sperm travel from the testes to the penis through long, thin tubes called sperm tubes.
  - c. To make it easier for the penis to enter the vagina, it needs to become hard.
  - d. The penis fills with blood and becomes swollen.
  - e. We say the penis has become erect.
8. Ask the learners if they have any questions.
9. Tell the learners to copy the information written on the chalkboard into their workbooks.
10. Give the learners some time to complete this task.

### **Checkpoint 1**

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

- a. What do we call the human male sex cell?
- b. Where are these cells made?

Answers to the checkpoint questions are as follows:

- a. Sperm.
- b. In the testes.

## TOPIC: Sexual reproduction

### E

### CONCEPTUAL DEVELOPMENT

1. Write the following questions on the chalkboard:

1. What is the main purpose of the male reproductive system?
2. Where are sperm made?
3. Why does the penis need to become erect before it can enter the vagina?
4. How does the sperm get from the testes to the female's reproductive organs?

2. Read through the questions on the chalkboard with the learners.
3. Tell the learners to write the questions on the chalkboard into their workbooks.
4. Tell the learners to answer the questions in their workbooks.
5. Allow the learners some time to complete this activity.
6. Write the model answer on the chalkboard:

1. The main purpose is to make sperm and deliver it to the female's reproductive organs.
2. Sperm are made in the testes.
3. If the penis was soft, it would be difficult to enter the vagina.
4. The sperm travel from the testes down long, thin tubes through the penis during sexual intercourse.

#### **Checkpoint 2**

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

- a. What is the scientific name for the female egg cell?
- b. What is the space called where a baby can grow inside a woman's body?

Answers to the checkpoint questions are as follows:

- a. Ovum.
- b. Uterus.

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



## TOPIC: Sexual reproduction

### 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
Oxford Successful	Sexual reproduction in humans	45-46
Via Afrika	Sexual reproduction in humans	42-44
Platinum	Sexual reproduction in humans	42-43
Spot On	Sexual reproduction in humans	40
Step-by-Step	Sexual reproduction in humans	58
Pelican	Sexual reproduction in humans	57-58
Solutions for All Natural Sciences	Sexual reproduction in humans	80-81
Shuters Top Class Natural Sciences	Sexual reproduction in humans	52-53
Sasol Inzalo Bk A	Sexual reproduction in humans	104-109

### G ADDITIONAL ACTIVITIES/ READING

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

1. <https://www.youtube.com/watch?v=oFIUqgYqt1A> (3min 56sec) [Male reproductive system: Functions, organs and anatomy]
2. <http://study.com/academy/lesson/male-reproductive-system-functions-organs-anatomy.html> 97min 34sec) [Male reproductive organs: Functions, organs and system]

## TOPIC: Sexual reproduction

# 7 C

**Term 1, Week 7, Lesson C**

**Lesson Title: Human reproduction**

**Time for lesson: 1 hour**

### **A** POLICY AND OUTCOMES

<b>Sub-Topic</b>	Fertilisation		
<b>CAPS Page Number</b>	20		
<b>Lesson Objectives</b>			
By the end of the lesson, learners will be able to:			
<ul style="list-style-type: none"> <li>• define human fertilisation</li> <li>• explain how fertilisation occurs</li> <li>• name the consequence of fertilisation.</li> </ul>			
<b>Specific Aims</b>	1. DOING SCIENCE		
	2. KNOWING THE SUBJECT CONTENT & MAKING CONNECTIONS		✓
	3. UNDERSTANDING THE USES OF SCIENCES & INDIGENOUS KNOWLEDGE		

### SCIENCE PROCESS SKILLS

1. Accessing & Recalling Information	✓	6. Identifying Problems & Issues		11. Doing Investigations	
2. Observing	✓	7. Raising Questions		12. Recording Information	
3. Comparing		8. Predicting		13. Interpreting Information	✓
4. Measuring		9. Hypothesizing		14. Communicating	✓
5. Sorting & Classifying		10. Planning Investigations		15. Scientific Process	

## TOPIC: Sexual reproduction

### B POSSIBLE RESOURCES

For this lesson, you will need:

IDEAL RESOURCES	IMPROVISED RESOURCES
Computer with internet connection	
Resource 23: The female reproductive system	
Resource 24: Fusing of sperm and egg	
Resource 25: Fertilisation	

### C CLASSROOM MANAGEMENT

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

Where are sperm made?

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

*In the testes*

### D ACCESSING INFORMATION

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

#### FERTILISATION

1. Fertilisation is when the sperm cell of a male and the ovum (egg) of a female fuse (join) together.
2. During sexual intercourse sperm shoots out of the penis into the vagina, near the cervix.
3. The cervix is the opening to the vagina.
4. The sperm swim up through the cervix, through the uterus and into the **fallopian tubes**.
5. If there is an ovum in one of the tubes, the ovum and a sperm will fuse together.
6. This fusing of the ovum and sperm is called fertilisation.
7. This fertilised egg now attaches itself to the wall of the uterus.
8. The wall of the uterus has a thick lining of blood.
9. The woman is now pregnant.

## TOPIC: Sexual reproduction

(Put Resource 23: 'Female reproductive system' and Resource 25: 'Fusing of sperm and egg', on the chalkboard. Refer to these diagrams as you explain the next part.)

2. Explain to the learners as follows:
  - a. Fertilisation is when the sperm cell of the male and the ovum (or egg cell) of the female join.
  - b. We say they have fused together.
  - c. During sexual intercourse, sperm shoots into the vagina from the penis and lands at the cervix.
  - d. The cervix is the opening to the uterus.
3. Tell the learners that the sperm needs to travel quite some distance to reach the ovum or egg.
4. Ask the learners how they think the sperm does this? (Clue: Look at the picture of the sperm cell. It has a tail.)

(Answer: It swims, using its tail to move.)
5. Explain to the learners:
  - a. The sperm swim up through the uterus to the fallopian tubes.
  - b. If the sperm finds an ovum in one of these tubes, they will fuse together.
6. Ask the learners what we call this fusing of the sperm and ovum?

(Answer: Fertilisation)
7. Continue to explain:
  - a. This fertilised egg now travels to the uterus where it attaches itself to the uterus wall.
  - b. The uterus wall has a thick lining of blood to hold the egg.
  - c. The woman is now pregnant.
  - d. This egg should not fall out unless something goes wrong with the pregnancy.
8. Ask the learners if they have any questions.
9. Tell the learners to copy the information written on the chalkboard into their workbooks.
10. Give the learners some time to complete this task.

### **Checkpoint 1**

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

- a. What do we call the fusing of sperm and ovum?
- b. Where does the fusing of the sperm and the ovum take place?

Answers to the checkpoint questions are as follows:

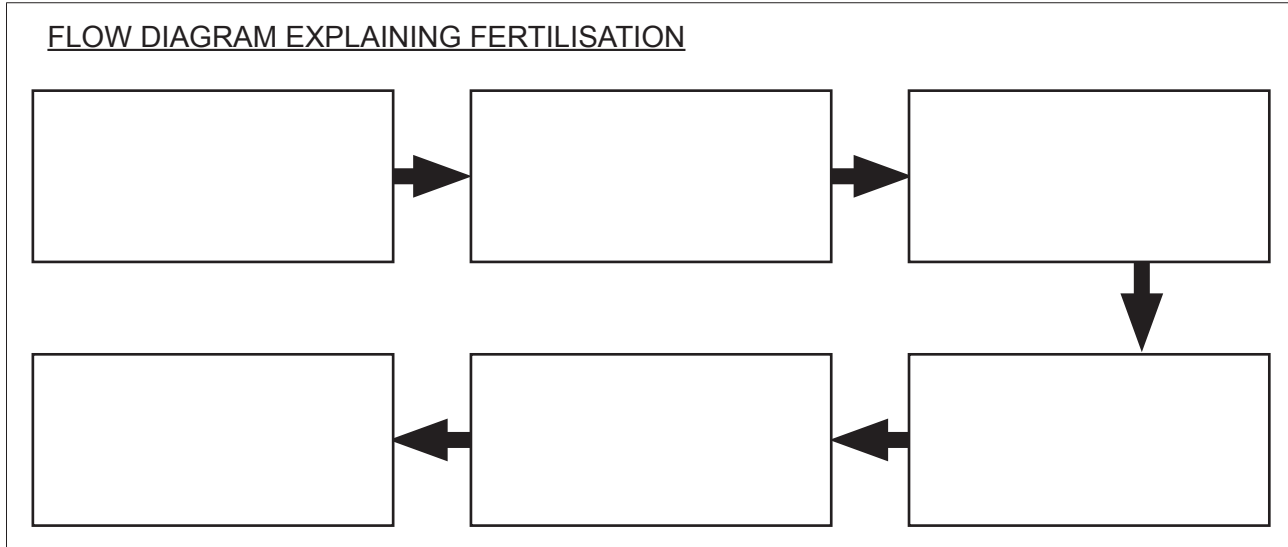
- a. Fertilisation
- b. In the fallopian tubes

# TOPIC: Sexual reproduction

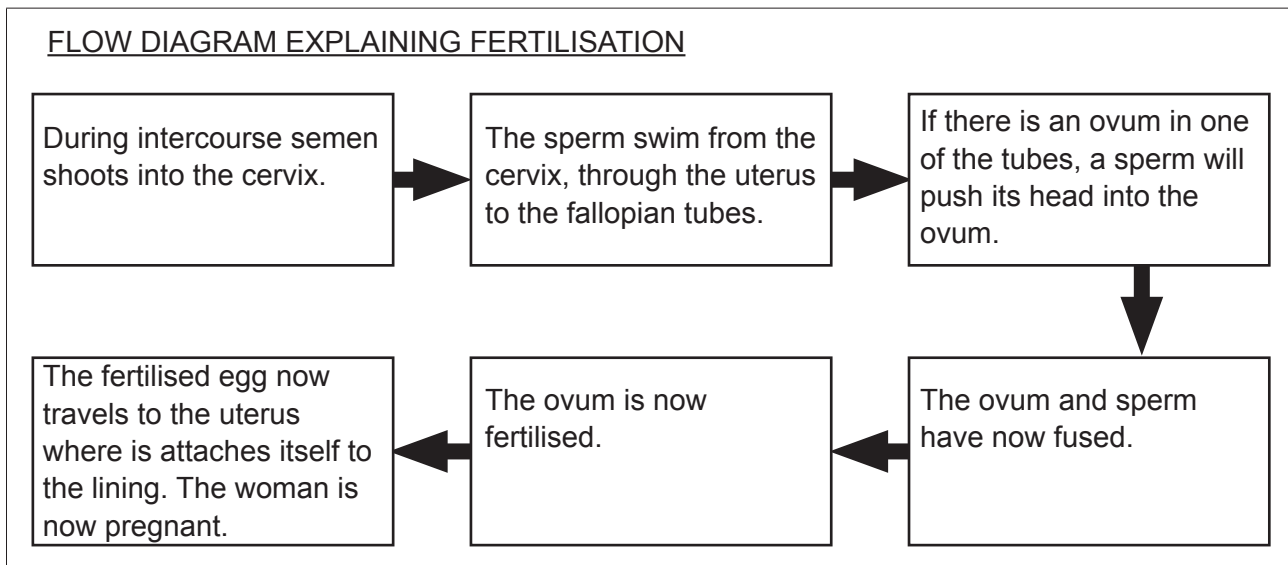
## E CONCEPTUAL DEVELOPMENT

(Put Resource 26: 'Fertilisation', on the chalkboard.)

1. Ask the learners to draw the following diagram in their workbooks (always try to do this before the lesson starts):



2. Read through the information on Resource 26: 'Fertilisation', with the learners.
3. Tell the learners that using this information and the information they have written in their workbooks, they are required to draw a flow diagram explaining the process of fertilisation.
4. Tell the learners to copy the flow diagram from the chalkboard into their workbooks.
5. Allow the learners some time to complete this activity.
6. Write the model answer on the chalkboard:



## TOPIC: Sexual reproduction

### **Checkpoint 2**

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

- a. What is the opening of the uterus called?
- b. How many sperm are needed to fertilise an ovum?

Answers to the checkpoint questions are as follows:

- a. Cervix
- b. One

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
Oxford Successful	Sexual reproduction in humans	47
Via Afrika	Sexual reproduction in humans	43
Platinum	Sexual reproduction in humans	46-47
Spot On	Sexual reproduction in humans	42
Step-by-Step	Sexual reproduction in humans	59
Pelican	Sexual reproduction in humans	61
Solutions for All Natural Sciences	Sexual reproduction in humans	82-83
Shuters Top Class Natural Sciences	Sexual reproduction in humans	53-54
Sasol Inzalo Bk A	Sexual reproduction in humans	104-109

## **G** ADDITIONAL ACTIVITIES/ READING

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

1. <https://www.youtube.com/watch?v=aBxzHqpl0YQ> (11min 50sec) [Sperm and egg fertilization video]
2. <https://www.youtube.com/watch?v=vXNaTRs83hE> (4min 20sec) [Human fertilization]

## TOPIC: Sexual reproduction

# 8 A

**Term 1, Week 8, Lesson A**

**Lesson Title: Human reproduction**

**Time for lesson: 1 hour**

### A POLICY AND OUTCOMES

<b>Sub-Topic</b>	Pregnancy		
<b>CAPS Page Number</b>	20		
<b>Lesson Objectives</b>			
By the end of the lesson, learners will be able to:			
<ul style="list-style-type: none"> <li>• explain what happens during pregnancy</li> <li>• define contraception</li> <li>• name contraceptive methods.</li> </ul>			
<b>Specific Aims</b>	1. DOING SCIENCE		
	2. KNOWING THE SUBJECT CONTENT & MAKING CONNECTIONS		✓
	3. UNDERSTANDING THE USES OF SCIENCES & INDIGENOUS KNOWLEDGE		

### SCIENCE PROCESS SKILLS

1. Accessing & Recalling Information	✓	6. Identifying Problems & Issues		11. Doing Investigations	
2. Observing	✓	7. Raising Questions		12. Recording Information	
3. Comparing		8. Predicting		13. Interpreting Information	✓
4. Measuring		9. Hypothesizing		14. Communicating	✓
5. Sorting & Classifying		10. Planning Investigations		15. Scientific Process	

## TOPIC: Sexual reproduction

### B POSSIBLE RESOURCES

For this lesson, you will need:

IDEAL RESOURCES	IMPROVISED RESOURCES
Computer with internet connection	
Resource 27: Pregnancy	
Examples of contraceptives, e.g.: condoms, contraceptive pills	

### C CLASSROOM MANAGEMENT

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

Where does the fertilised ovum attach itself in the woman's body?

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

*To the wall of the uterus which has a lining of blood*

### D ACCESSING INFORMATION

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

#### PREGNANCY

1. If the fertilised egg attaches itself to the blood lining of the uterus, the woman is now pregnant.
2. Pregnancy means that there is a baby growing inside the mother's body.
3. Pregnancy usually lasts 40 weeks or nine months.
4. During this time, the single cell that it started out as, continues to divide over and over again, to form a baby.
5. We call the developing baby an embryo for the first two months.
6. For the last seven months it is called a foetus.
7. During this time the baby gets all its food and oxygen from the mother.
8. Towards the end of the pregnancy, the baby turns itself so that the head is just above the cervix.
9. When it is time for the baby to be born, the strong muscles in the uterus start to push the baby out through the vagina.
10. This is called labour.



## TOPIC: Sexual reproduction

11. Sometimes it is not possible for a mother to have the baby naturally.
12. When this happens, a special operation called a Caesarian section, is done to take the baby out.
13. Choosing not to have sex or using contraceptives are the only ways to avoid pregnancy once you have reached puberty.
14. Examples of contraception are condoms and the contraceptive pill.

*(Put Resource 27: 'Pregnancy', on the chalkboard. Refer to this diagram as you explain the next part.)*

2. Ask the learners when a woman is considered to be pregnant?

*(Answer: When the fertilised ovum (egg) has attached itself to the bloody lining of the uterus.)*

3. Explain to the learners as follows:

- a. Pregnancy is the time when the fertilised egg cell (or ovum) divides over and over again until it forms a full-sized baby.
- b. This usually takes 40 weeks or nine months.
- c. During the first two months we call this developing baby an embryo.
- d. During the last seven months we call it a foetus.

4. Ask the learners where they think the baby gets its food and oxygen from whilst it is in the mother's uterus?

*(Answer: From the mother. Some learners may know that the baby is attached to the mother with a cord called the umbilical cord.)*

5. Explain to the learners:

- a. During the nine months of pregnancy, the baby gets its food and oxygen from the mother through a cord that is attached to the mother.
- b. This cord is called the umbilical cord.
- c. Towards the end of the pregnancy, the baby turns itself around so that its head is pointed towards the cervix.
- d. When it is time for the baby to be born, the strong muscles in the uterus start pushing the baby out through the vagina.
- e. This is called labour.
- f. It is also called a natural birth.
- g. If the mother is unable to have a natural birth, a doctor may do a special operation to take the baby out.
- h. This operation is called a Caesarian section.

6. Ask the learners if it is possible to fall pregnant the first time you have sexual intercourse?

*(Answer: Yes, it is possible to fall pregnant the first time you have sexual intercourse. Even if you have never had your period, your first ovum is ready for fertilisation 14 days before your very first menstruation period.)*

## TOPIC: Sexual reproduction

7. Explain to the learners:
  - a. The only way to be sure of not getting pregnant is by not having sexual intercourse.
  - b. Items called contraceptives can be used to try and avoid pregnancy.
  - c. Examples of contraceptives are condoms and the contraceptive pill.
8. Ask the learners if they have any questions.
9. Tell the learners to copy the information written on the chalkboard into their workbooks.
10. Give the learners some time to complete this task.

### **Checkpoint 1**

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

- a. How long does pregnancy usually last?
- b. What do we call the developing baby for the first two months?

Answers to the checkpoint questions are as follows:

- a. 40 weeks or nine months
- b. An embryo

## **E**

### **CONCEPTUAL DEVELOPMENT**

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

EXPLAIN WHAT THE FOLLOWING WORDS MEAN:

1. pregnant:
2. embryo:
3. foetus:
4. labour:
5. Caesarian section:
6. Contraception.

2. Tell the learners they should write a short explanation of each of these words in their workbooks
3. Allow the learners some time to complete this activity.
4. Write the model answer on the chalkboard:

## TOPIC: Sexual reproduction

### EXPLAIN WHAT THE FOLLOWING WORDS MEAN:

1. pregnant: *A woman is pregnant when the fertilised ovum has attached itself to the bloody lining of the uterus.*
2. embryo: *For the first two months of pregnancy, the developing baby is called an embryo.*
3. foetus: *For the last seven months of pregnancy, the developing baby is called a foetus.*
4. labour: *When it is time for the baby to be born, the strong muscles in the uterus start to squeeze the baby out. This is called labour.*
5. Caesarian section: *If a mother cannot have a baby naturally, a special operation called a Caesarian section is done, to take the baby out.*
6. contraception: *If you do not want to get pregnant or make someone pregnant, you need to use something called contraception. Examples are condoms and the contraceptive pill.*

5. Read over the model answers with learners and have them make any corrections.

### **Checkpoint 2**

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

- a. What do we call the developing baby in the last seven months of pregnancy?
- b. When a baby is born naturally, does it come out head first or feet first?

Answers to the checkpoint questions are as follows:

- a. Foetus
- b. Head first

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

## TOPIC: Sexual reproduction

### 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
Oxford Successful	Sexual reproduction in humans	47-49
Via Afrika	Sexual reproduction in humans	43-46
Platinum	Sexual reproduction in humans	47-49
Spot On	Sexual reproduction in humans	42-44
Step-by-Step	Sexual reproduction in humans	56-60
Pelican	Sexual reproduction in humans	61-62
Solutions for All Natural Sciences	Sexual reproduction in humans	82-84
Shuters Top Class Natural Sciences	Sexual reproduction in humans	54-56
Sasol Inzalo Bk A	Sexual reproduction in humans	110-117

### G ADDITIONAL ACTIVITIES/ READING

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

1. [https://www.babycenter.com/2\\_inside-pregnancy-weeks-1-to-9\\_10302602.bc](https://www.babycenter.com/2_inside-pregnancy-weeks-1-to-9_10302602.bc) (1min 57sec) [Inside pregnancy]
2. [https://www.youtube.com/watch?v=h82ltr84\\_Yg](https://www.youtube.com/watch?v=h82ltr84_Yg) (4min 17sec) [How a baby grows through pregnancy]

## TOPIC: Sexual reproduction

# 8 B

**Term 1, Week 8, Lesson B**

**Lesson Title: Human reproduction**

**Time for lesson: 1 hour**

### **A** POLICY AND OUTCOMES

<b>Sub-Topic</b>	Menstruation	
<b>CAPS Page Number</b>	20	
<b>Lesson Objectives</b>		
By the end of the lesson, learners will be able to:		
<ul style="list-style-type: none"> <li>• explain why menstruation happens</li> <li>• describe what menstruation is</li> <li>• list some of the myths surrounding menstruation.</li> </ul>		
<b>Specific Aims</b>	1. DOING SCIENCE	✓
	2. KNOWING THE SUBJECT CONTENT & MAKING CONNECTIONS	✓
	3. UNDERSTANDING THE USES OF SCIENCES & INDIGENOUS KNOWLEDGE	✓

### SCIENCE PROCESS SKILLS

1. Accessing & Recalling Information	✓	6. Identifying Problems & Issues	✓	11. Doing Investigations	
2. Observing		7. Raising Questions	✓	12. Recording Information	
3. Comparing		8. Predicting		13. Interpreting Information	
4. Measuring		9. Hypothesizing		14. Communicating	✓
5. Sorting & Classifying		10. Planning Investigations		15. Scientific Process	

## TOPIC: Sexual reproduction

### B POSSIBLE RESOURCES

For this lesson, you will need:

IDEAL RESOURCES	IMPROVISED RESOURCES
Computer with internet connection	
Examples of sanitary items: sanitary towels and tampons	

### C CLASSROOM MANAGEMENT

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

How long does a human pregnancy last?

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.

*About 40 weeks or nine months*

### D ACCESSING INFORMATION

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

#### MENSTRUATION

1. During puberty a girl will start menstruation.
2. Menstruation is the medical word for having a period.
3. Once a girl starts having her period, she is able to have a baby.
4. When a woman has a period, blood comes out of her vagina.
5. This blood comes from the uterus.
6. The blood is from the blood-rich lining that is needed for a fertilised egg to attach itself to during pregnancy.
7. This thick lining presents a good supply of food for the fertilised egg or ovum.
8. If pregnancy does not happen, the strong muscles in the uterus will squeeze to break this lining down.
9. This can cause some pain or cramping.
10. This lining then comes out in the form of blood.
11. Part of what comes out of the vagina is the unfertilised egg.
12. A woman menstruates for between 4-7 days, every 28 days.
13. Sanitary pads or tampons are used to absorb this blood.
14. A woman does not have her period when she is pregnant.

## TOPIC: Sexual reproduction

2. Read through the information on the chalkboard with the learners.
3. Explain to the learners as follows:
  - a. Menstruation is the medical word for a girl having her period.
  - b. A girl's period is that time of the month when she bleeds from her vagina.
  - c. Talking about periods or menstruation can be embarrassing for some.
  - d. Having a period is a sign of a healthy reproductive system.
  - e. For the rest of the lesson we are going to be talking about menstruation. Let's be respectful and mature.
4. Ask the learners at what stage of life a girl will have her first period.  
*(Answer: When a girl reaches puberty, she will have her first period.)*
5. Explain to the learners:
  - a. For the fertilised ovum to grow into a baby, it needs the perfect place to grow.
  - b. Once in puberty, a young woman's body starts to make a blood-rich lining, in the uterus, for a fertilised ovum to attach itself to.
  - c. This blood-rich lining is a good source of food for the fertilized egg or ovum.
  - d. The ovaries release an egg on day 14 of every 28-day cycle.
  - e. Whether the egg gets fertilised or not, it will eventually travel to the uterus.
  - f. If the egg or ovum is unfertilised, the young woman's body will get rid of this blood lining and the unfertilised egg through a period or menstruation.
  - g. If the egg is fertilised, it will stay attached to the lining and the woman will be pregnant.
6. Ask the learners if pregnant women have periods?  
*(Answer: No. The uterus stays in place to feed the developing ovum.)*
7. Explain to the learners:
  - a. Because the uterus is squeezing its muscles to get rid of the lining and unfertilised egg, periods can be painful.
  - b. It is important to keep very clean during this time to avoid smelling bad and getting infections.
  - c. Tampons and sanitary pads are used to soak up the blood.
  - d. A period can last anything from 4-7 days.
8. Ask the learners if they have any questions.
9. Tell the learners to copy the information written on the chalkboard into their workbooks.
10. Give the learners some time to complete this task.

## TOPIC: Sexual reproduction

### Checkpoint 1

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

- a. At what stage of life does a girl/young woman get her first period?
- b. What is one of the signs that a woman has that she may be pregnant?

Answers to the checkpoint questions are as follows:

- a. Puberty
- b. She misses a period or menstruation cycle.

## E

### CONCEPTUAL DEVELOPMENT

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

1. A girl cannot fall pregnant the first time she has sexual intercourse.
2. A period/ menstrual cycle runs for EXACTLY 28 days.
3. If I use contraception, I cannot fall pregnant.
4. Birth control pills cause cancer.
5. A woman is unclean when she is menstruaTING.
6. Washing or having a bath after sex will prevent pregnancy.

2. Read through the statements written on the chalkboard with the learners.
3. Divide the learners into groups of 4 or 5.
4. Tell the learners that they must discuss the above statements in their groups and decide if they are true or not.
5. Tell the learners they will be expected to report back to the class.
6. Allow the learners some time to discuss these statements.
7. Call the learners to attention and have a class discussion on these statements.
8. All of the statements are UNTRUE.
9. Answers for discussion are as follows:

1. If a girl has started puberty, she can get pregnant the first time she has intercourse, even if she has not had her first period, it is possible. The first ovum will be released from the ovaries about 10 days before her first period. She can fall pregnant during this time.
2. The length of a period will be different in each girl. It can be longer or shorter. The number of days you will bleed will be different in each girl. The amount of bleeding will also be different.
3. Contraception can fail. End of story!



## TOPIC: Sexual reproduction

4. There is no proven research that shows that contraceptive pills cause cancer in young woman. Unprotected sex can, however, cause pregnancy and other problems that we will discuss in a later lesson.
5. Having a period is completely normal and not unclean. It is nothing mysterious or unusual. Young girls can use sanitary towels or tampons to soak up the blood and keep themselves dry and blood free.
6. Having a bath or shower after sexual intercourse will not stop a pregnancy. Fertilisation happens deep inside the woman's body. No amount of water or soap can wash a fertilised ovum away.

10. Have a discussion with the learners about these questions.

### **Checkpoint 2**

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

- a. Can contraception fail?
- b. What is the ONLY way not to fall pregnant/ not get someone pregnant?

Answers to the checkpoint questions are as follows:

- a. Yes.
- b. Do not have sexual intercourse.

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

## TOPIC: Sexual reproduction

### 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
Oxford Successful	Sexual reproduction in humans	46
Via Afrika	Sexual reproduction in humans	43-49
Platinum	Sexual reproduction in humans	44-49
Spot On	Sexual reproduction in humans	43-46
Step-by-Step	Sexual reproduction in humans	60-61
Pelican	Sexual reproduction in humans	60-61
Solutions for All Natural Sciences	Sexual reproduction in humans	82-85
Shuters Top Class Natural Sciences	Sexual reproduction in humans	54-58
Sasol Inzalo Bk A	Sexual reproduction in humans	110-117

### G

#### ADDITIONAL ACTIVITIES/ READING

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

1. [https://www.youtube.com/watch?v=vXrQ\\_FhZmos](https://www.youtube.com/watch?v=vXrQ_FhZmos) (2min 06sec) [The menstrual cycle]
2. <https://www.youtube.com/watch?v=UJm6xlvd3sM> (2min 41sec) [Menstrual cycle: animation]

## TOPIC: Sexual reproduction

# 8 C

**Term 1, Week 8, Lesson C**

**Lesson Title: Human reproduction**

**Time for lesson: 1 hour**

### **A** POLICY AND OUTCOMES

<b>Sub-Topic</b>	Sexual health and HIV		
<b>CAPS Page Number</b>	20		
<b>Lesson Objectives</b>			
By the end of the lesson, learners will be able to:			
<ul style="list-style-type: none"> <li>• identify the consequences of sexual activity</li> <li>• define what an STD is</li> <li>• list the facts and myths about HIV/Aids.</li> </ul>			
Specific Aims	1. DOING SCIENCE		
	2. KNOWING THE SUBJECT CONTENT & MAKING CONNECTIONS		✓
	3. UNDERSTANDING THE USES OF SCIENCES & INDIGENOUS KNOWLEDGE		✓

### SCIENCE PROCESS SKILLS

1. Accessing & Recalling Information	✓	6. Identifying Problems & Issues	✓	11. Doing Investigations	
2. Observing		7. Raising Questions	✓	12. Recording Information	✓
3. Comparing		8. Predicting		13. Interpreting Information	
4. Measuring		9. Hypothesizing		14. Communicating	✓
5. Sorting & Classifying		10. Planning Investigations		15. Scientific Process	

## TOPIC: Sexual reproduction

### B POSSIBLE RESOURCES

For this lesson, you will need:

IDEAL RESOURCES	IMPROVISED RESOURCES
Computer with internet connection	

### 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 women menstruate during pregnancy?

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.

*Women do not menstruate during pregnancy.*

### D ACCESSING INFORMATION

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

#### RESPONSIBLE SEXUAL BEHAVIOUR

1. An unwanted pregnancy is not the only consequence of unprotected sex.
2. Another danger is the risk of getting a sexually transmitted disease (STD).
3. STDs are very serious and can even cause death.
4. STDs are spread by having sex without a condom.
5. Common STDs are thrush, gonorrhoea, syphilis and HIV infection.
6. The germs that cause these diseases pass from one person to another by sperm, vaginal fluids or blood.
7. You cannot usually tell that someone has a STD by just looking at them.

#### HIV AND AIDS

1. Acquired Immune Deficiency Syndrome (AIDS) is a serious illness caused by a virus.
2. This virus is called the Human Immunodeficiency Virus (HIV).
3. This virus attacks a person's immune system.
4. Your immune system is what helps your body fight off illness and infection.
5. When the number of immune system cells drops below a certain level, the infected person will have difficulty in fighting off infections.
6. This person will then be diagnosed with AIDS.

## TOPIC: Sexual reproduction

7. The main way HIV is transmitted is through bodily fluids during sex.
8. HIV can also be transmitted from mother to child during birth and breastfeeding.
9. There is no cure for HIV and AIDS.
10. Medicines called antiretrovirals can lengthen the time between HIV infection and the development of AIDS.

2. Read through the information on the chalkboard with the learners.
3. Explain to the learners as follows:
  - a. Deciding to become sexually active can affect the rest of your life.
  - b. Pregnancy is a real risk and can have serious consequences for both partners.
  - c. Another serious consequence is the chance of getting a sexually transmitted disease or STD.
  - d. Sexually transmitted diseases are caused by germs that spread from one person to another through semen, vaginal fluids and blood.
4. Ask the learners if they know the names of any sexually transmitted diseases?  
*(Possible answers: thrush, syphilis, gonorrhoea, HIV infection)*
5. Explain to the learners:
  - a. STDs can be very serious and can even cause death.
  - b. You cannot usually tell if someone has an STD just by looking at them.
  - c. Should you decide to become sexually active, it is important that you protect yourself from disease.
6. Ask the learners, other than not having sex, what should you do to protect yourself from STDs?  
*(Answer: Use a condom.)*
7. Explain to the learners:
  - a. AIDS stands for Acquired Immune Deficiency Syndrome. It is a sexually transmitted disease caused by a virus.
  - b. This virus is known as HIV.
  - c. HIV stands for Human Immunodeficiency Virus.
  - d. HIV attacks the immune system in the human body.
  - e. The immune system is the system in our body that fights off disease.
  - f. If you contract HIV, it will begin to attack your immune system.
  - g. Once your immune system cells get below a certain level, you will be diagnosed with AIDS.
8. Ask the learners how we get HIV.  
*(Answer: By having unprotected sex with an infected person.)*

## TOPIC: Sexual reproduction

9. Continue to explain:
  - a. An HIV positive mother can also pass the virus onto her baby during childbirth or breastfeeding.
  - b. There is no cure for HIV.
  - c. Medicines, called antiretrovirals, can lengthen the time between HIV infection and the development of AIDS.
  - d. You cannot get HIV from:
    - Sweat, tears or vomit
    - Touching someone with HIV
    - Mosquitoes
    - Kissing and hugging
    - Sharing knives and forks and bathrooms.
10. Ask the learners if they have any questions.
11. Tell the learners to copy the information written on the chalkboard into their workbooks.
12. Give the learners some time to complete this task.

### **Checkpoint 1**

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

- a. What does STD stand for?
- b. How can we protect ourselves from getting an STD?

Answers to the checkpoint questions are as follows:

- a. Sexually transmitted disease
- b. By not having sex or by using condoms

## **E** CONCEPTUAL DEVELOPMENT

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

1. You can get HIV from kissing.
2. You can't tell if someone has an STD just by looking at them.
3. There is no cure for AIDS.
4. Mosquitoes spread HIV.
5. Having sex with a virgin (a person that has not had sex before) can cure HIV and AIDS.
6. Not having sex is the best way to avoid getting an STD.
7. There is NO WAY you can get an STD if you use a condom.
8. HIV attacks the immune system.
9. HIV can be transmitted by vomit.
10. HIV can be transmitted by blood.

## TOPIC: Sexual reproduction

2. Read through the statements written on the chalkboard with the learners.
3. Divide the learners into groups of 4 or 5.
4. Tell the learners that they must discuss the above statements in their groups and decide if they are true or not.
5. Write the following on the chalkboard:

<u>FACTS ABOUT HIV / AIDS</u>	
TRUE	FALSE

6. Tell the learners to copy the table from the chalkboard into their workbooks.
7. Tell them to take the statements written on the chalkboard and write them in the correct block of the table according to whether they are true or false.
8. Allow the learners some time to complete the activity.
9. Write the model answer on the chalkboard:

<u>FACTS ABOUT HIV / AIDS</u>	
TRUE	FALSE
<ul style="list-style-type: none"> <li>• You can't tell someone has an STD just by looking at them.</li> <li>• There is no cure for AIDS.</li> <li>• Not having sex is the best way to avoid getting an STD.</li> <li>• HIV attacks the immune system.</li> <li>• HIV can be transmitted by blood.</li> </ul>	<ul style="list-style-type: none"> <li>• You can get HIV from kissing.</li> <li>• Mosquitos spread HIV.</li> <li>• Having sex with a virgin (a person that has not had sex before) can cure HIV/AIDS.</li> <li>• There is NO WAY you can get an STD if you use a condom.</li> <li>• HIV can be transmitted by vomit.</li> </ul>

### Checkpoint 2

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

- a. Can you get HIV from touching and kissing someone with HIV?
- b. Which body fluids carry HIV?

Answers to the checkpoint questions are as follows:

- a. No
- b. Semen, vaginal fluid, blood and mother's milk (if the mother is HIV positive)

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

## TOPIC: Sexual reproduction

### 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
Oxford Successful	Sexual reproduction in humans	49-50
Via Afrika	Sexual reproduction in humans	45-49
Platinum	Sexual reproduction in humans	52-53
Spot On	Sexual reproduction in humans	44-47
Step-by-Step	Sexual reproduction in humans	60-61
Pelican	Sexual reproduction in humans	62-63
Solutions for All Natural Sciences	Sexual reproduction in humans	85-86
Shuters Top Class Natural Sciences	Sexual reproduction in humans	56-58
Sasol Inzalo Bk A	Sexual reproduction in humans	115-117

### G ADDITIONAL ACTIVITIES/ READING

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

1. <http://study.com/academy/lesson/sexually-transmitted-infections-types-transmission-symptoms-treatments.html> (8min 49sec) [Sexually transmitted infections: Types, transmission, symptoms and treatment]
2. <https://www.healthination.com/health/hiv-myths> (3min 32sec) [5 Dangerous myths about HIV you must stop believing]



# TOPIC OVERVIEW:

## Variation

### Term 1, Weeks 9A – 9C

#### A. TOPIC OVERVIEW

##### Term 1, Weeks 9a – 9c

- This topic runs for 1 weeks.
- It is presented over 3 lessons.
- This topic's position in the term is as follows:

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

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

#### B. SEQUENTIAL TABLE

GRADE 7	GRADE 7	GRADE 8
<b>LOOKING BACK</b>	<b>CURRENT</b>	<b>LOOKING FORWARD</b>
<ul style="list-style-type: none"> <li>• Different ecosystems</li> <li>• Living and non-living things within an ecosystem</li> <li>• Food web: feeding relationships; food web</li> </ul>	<ul style="list-style-type: none"> <li>• Variations exist within a species: what is a species; inheritance</li> <li>• Inherited characteristics</li> <li>• Careers relating to the field of species variation and inheritance</li> </ul>	<ul style="list-style-type: none"> <li>• Adaptions: structural, functional and behavioural characteristics</li> <li>• Survival</li> <li>• Adaptation versus extinction</li> </ul>

## C. SCIENTIFIC AND TECHNOLOGICAL VOCABULARY

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

	TERM	EXPLANATION
1.	species	A group of living things of the same type that can reproduce with one another to make more individuals of the same species. For example, cats are one species and dogs are another species
2.	inherited characteristics	These are personal qualities that have been passed down to you from your parents. They can be things like height, eye colour and freckles
3.	physical characteristics	Things that you can see on a person like eye and hair colour, freckles, dimples and height
4.	gene	Genes are found on something called a chromosome. Chromosomes are found inside the cells of your body. Each cell contains many thousands of genes. Genes carry information about your ancestors and will determine which of these things you will inherit, for example nose shape, eye colour, height. (There are many inheritable characteristics)
5.	diabetes	An illness where the body cannot break down sugar. This can make you very sick. If untreated, it can cause disabilities such as blindness and loss of limbs. In severe cases, you can die
6.	anaemia	A condition where there is a shortage of red blood cells in your system causing tiredness and weakness
7.	genetics	The study of heredity and variation characteristics and how they are passed on from one generation to the next
8.	variations	Differences between organisms of the same species are called variations. An example would be different breeds of dogs

## D. UNDERSTANDING THE USES / VALUE OF SCIENCE

Studying variations within the species helps create a deeper understanding of why we have differences as well as what similarities all organisms within a species have. Inherited characteristics provide insight into family history. Genetics is an interesting and challenging career path offering many opportunities.

## E. PERSONAL REFLECTION

Reflect on your teaching at the end of each topic:

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

## TOPIC: Variation

# 9 A

**Term 1, Week 9, Lesson A**

**Lesson Title: Variations exist within a species**

**Time for lesson: 1 hour**

### **A** POLICY AND OUTCOMES

<b>Sub-Topic</b>	Variations within a species	
<b>CAPS Page Number</b>	21	
<b>Lesson Objectives</b>		
By the end of the lesson, learners will be able to:		
<ul style="list-style-type: none"> <li>• define the word species</li> <li>• give examples of different species</li> <li>• define variation</li> <li>• define inheritance.</li> </ul>		
<b>Specific Aims</b>	1. DOING SCIENCE	
	2. KNOWING THE SUBJECT CONTENT & MAKING CONNECTIONS	✓
	3. UNDERSTANDING THE USES OF SCIENCES & INDIGENOUS KNOWLEDGE	

### SCIENCE PROCESS SKILLS

1. Accessing & Recalling Information	✓	6. Identifying Problems & Issues		11. Doing Investigations	
2. Observing	✓	7. Raising Questions	✓	12. Recording Information	
3. Comparing	✓	8. Predicting		13. Interpreting Information	
4. Measuring		9. Hypothesizing		14. Communicating	✓
5. Sorting & Classifying		10. Planning Investigations		15. Scientific Process	

# TOPIC: Variation

## B POSSIBLE RESOURCES

For this lesson, you will need:

IDEAL RESOURCES	IMPROVISED RESOURCES
Computer with internet access	
Resource 28: Dogs	
Resource 29: People	

## C CLASSROOM MANAGEMENT

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

What is the name of the virus that causes AIDS?

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.

*HIV: Human Immunodeficiency Virus*

## D ACCESSING INFORMATION

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

### VARIATION

1. A species is a group of living things of the same type that can reproduce with one another to make more individuals of the same species.
2. Examples of species groups are humans, dogs, cats and cows.
3. Within the different species there could be different breeds. For example, in dogs you get German Shepherds, Rottweilers, and Poodles.
4. They are all different breeds, but belong to the dog species.
5. All people belong to the species called *Homo sapiens*.
6. Humans have many common characteristics or things that everybody has, for example, two eyes, two ears.
7. Examples of physical characteristics that could be different are: skin colour, eye colour, and nose shape.
8. The differences between living things of the same species is called **variation**.

## TOPIC: Variation

### INHERITANCE

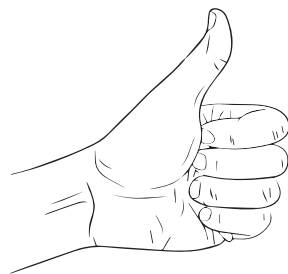
1. Many of the characteristics humans have are inherited from their parents.
2. The information from your parents is carried in your cells in a unit of heredity called a **gene**.
3. This genetic information is in the sperm (from your father) and the ovum (from your mother).
4. Inherited characteristics include:
  - Height
  - Eye colour
  - Freckles
  - Allergies
  - The ability to do certain movements with your body
5. Your family history can also put you at greater risk for getting certain diseases like:
  - Diabetes
  - Anaemia
  - Heart problems
  - Certain cancers are thought to be inherited

*(Put Resource 28: 'Dogs', on the chalkboard.)*

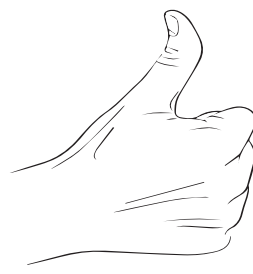
2. Read through the information written on the board with the learners.
3. Referring to Resource 28: 'Dogs', ask the learners what animals these are?  
*(Answer: Dogs)*
4. Explain this to the learners as follows:
  - a. A **species** is a group of living things of the same type that can reproduce to make more individuals of the same species.
  - b. All the humans on planet Earth belong to the species, *Homo sapiens* (Latin for wise man).
  - c. If we think about humans, we all have certain characteristics in common like two eyes and ears.
  - d. If we look at the picture on the board, we will see several dogs.
  - e. They all belong to the dog species.
5. Ask the learners:
  - a. Do all of these dogs look exactly the same?  
*(Answer: No)*
  - b. What differences can you see between them?  
*(Possible answers: size, colouring, patterns, ear shapes)*

## TOPIC: Variation

6. Tell the learners:
  - a. The differences between things of the same species is called variation.
  - b. Humans have differences in variation, too. One example could be eye colour.  
(Put Resource 29: 'Humans', on the chalkboard)
7. Ask the learners what other variations there are amongst humans?  
(Possible answers: height, nose shape, hair colour, skin colour, mouth shape)
8. Now explain:
  - a. Many of these variations in the species are **inherited characteristics**.
  - b. Information about the parents of living organisms, is carried in the cells of living organisms, in something called **genes**.
  - c. This **genetic** information is carried in the sperm and the ovum at the time of fertilization.
  - d. There are many characteristics that are inherited.
  - e. Some inherited characteristics are:
    - Height
    - Eye colour
    - Freckles
    - Allergies
    - The ability to do certain movements with your body like a hitchhiker's thumb or a rolled tongue
9. Ask the learners if any of them can bend their thumbs like this:

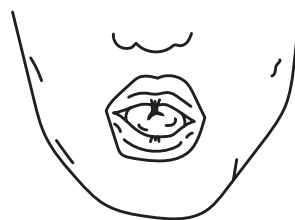


Straight thumb



Hitchhiker's thumb

Or roll their tongues like this:



Rolled Tongue



Inability to Roll Tongue

## TOPIC: Variation

10. Explain to the learners:
  - a. There has also been research done into the inherited risk of contracting certain diseases.
  - b. Some of these diseases are:
    - Diabetes
    - Anaemia
    - Heart problems
    - Certain kinds of cancers
  - c. It can be useful to ask questions about your family's health.
11. Ask the learners if they have any questions.
12. Tell the learners to copy the information written on the chalkboard into their workbooks.
13. Give the learners some time to complete this task.

### **Checkpoint 1**

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

- a. What is a species?
- b. What is a variation in a species?

Answers to the checkpoint questions are as follows:

- a. A species is a group of living things of the same type that can reproduce to make more individuals of the same species.
- b. Differences between living things of the same species is called variation

## **E**

### **CONCEPTUAL DEVELOPMENT**

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

#### ACTIVITY

1. Write definitions of the following words:
  - a. Species
  - b. Variation
  - c. Inherited characteristics
2. Think about yourself and your family.
  - a. What characteristics have you inherited from your mother?
  - b. What characteristics have you inherited from your father?
  - c. Can you think of any characteristics you have inherited from your grandparents?
  - d. If you have any brothers or sisters, write their names down, and list any characteristics you share.

## TOPIC: Variation

2. Read through the activity on the chalkboard with the learners.
3. Explain the activity as follows:
  - a. Answer the questions on the chalkboard in your workbooks.
  - b. For question 2, keep the following in mind:
    - Not all of us know both our moms and dads.
    - Some of us have never met our grandparents.
    - Some of us have no brothers or sisters and some of us have many.
  - c. When you answer question 2, answer what you can.
  - d. If you do not know one or both of your parents, you can imagine which characteristics you inherited and write those down instead.
4. Allow learners some time to complete this task.
5. Write the model answer on the chalkboard: (The learners' answers may vary. This can be discussed.)

1.
  - a. *Species: A species is a group of living things of the same type that can reproduce to make more individuals of the same species.*
  - b. *Variation: Differences between living things of the same species is called variation.*
  - c. *Inherited characteristics: These are physical characteristics that are passed down from your family in the genes in your cells.*
2.
  - a. *(Answers will vary.)*
  - b. *(Answers will vary.)*
  - c. *(Answers will vary.)*
  - d. *(Answers will vary.)*

(Answers here could be skin colour, height, nose shape, freckles, allergies, big ears, etc.)

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

### **Checkpoint 1**

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

- a. What species do humans belong to?
- b. Name one illness that may be inheritable?

Answers to the checkpoint questions are as follows:

- a. Homo sapiens.
- b. Diabetes, anaemia, heart defects and heart disease, some forms of cancer.

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



## TOPIC: Variation

### 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
Oxford Successful	Variation	51-53
Via Afrika	Variation	50-51
Platinum	Variation	56-60
Spot On	Variation	50-51
Step-by-Step	Variation	62-65
Pelican	Variation	67-74
Solutions for All Natural Sciences	Variation	90-100
Shuters Top Class Natural Sciences	Variation	60-64
Sasol Inzalo Bk A	Variation	124-137

### G ADDITIONAL ACTIVITIES/ READING

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

1. <https://www.youtube.com/watch?v=ZIXoQX35Obl> (6min) [Variation in species]
2. <https://www.youtube.com/watch?v=6bWssRDAHW4> (2min 02 sec) [Heredity - why you look the way you do]

## TOPIC: Variation

# 9 B

**Term 1, Week 9, Lesson B**

**Lesson Title: Variations within a species**

**Time for lesson: 1 hour**

### **A** POLICY AND OUTCOMES

<b>Sub-Topic</b>	Inherited characteristics		
<b>CAPS Page Number</b>	21		
<b>Lesson Objectives</b>			
By the end of the lesson, learners will be able to:			
<ul style="list-style-type: none"> <li>• define variations caused by the environment</li> <li>• collect data on tongue rolling</li> <li>• draw a bar graph to present data</li> </ul>			
Specific Aims	1. DOING SCIENCE		
	2. KNOWING THE SUBJECT CONTENT & MAKING CONNECTIONS		✓
	3. UNDERSTANDING THE USES OF SCIENCES & INDIGENOUS KNOWLEDGE		✓

### SCIENCE PROCESS SKILLS

1. Accessing & Recalling Information		6. Identifying Problems & Issues		11. Doing Investigations	✓
2. Observing	✓	7. Raising Questions		12. Recording Information	✓
3. Comparing		8. Predicting		13. Interpreting Information	✓
4. Measuring		9. Hypothesizing		14. Communicating	
5. Sorting & Classifying		10. Planning Investigations	✓	15. Scientific Process	

## TOPIC: Variation

### B POSSIBLE RESOURCES

For this lesson, you will need:

IDEAL RESOURCES	IMPROVISED RESOURCES
Computer with internet connection	

### 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 variation?

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.

*Variation is the difference between individuals of the same species.*

### D ACCESSING INFORMATION

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

#### VARIATION CAUSED BY THE ENVIRONMENT

1. There are some characteristics that cause variation that are not inherited.
2. Some people spend a lot of time building their muscles.
3. Other variations could be:
  - Tattoos
  - Dyed hair
  - Hair extensions or braids
  - Leg that may have been taken off (amputated)
4. There are many more.
5. These variations do not come from their parents.
6. They are characteristics caused by the environment in which the person lives.

2. Read through the information on the chalkboard with the learners.
3. Explain to the learners as follows:
  - a. Sometimes when we see differences between people, these differences or variations are not inherited from their parents.
  - b. Sometimes people make changes to themselves like building muscles, getting a tattoo or braiding their hair.

## TOPIC: Variation

- c. People who spend a lot of time in the sun may have darker skin or get sun damage which causes markings on the skin.
  - d. There are people who have lost arms and/or legs through illness or accidents.
  - e. These variations are not hereditary.
  - f. We say these are variations caused by the environment.
4. Ask the learners if they can think of any other variations like this?  
(Possible answers: piercings, dying hair, shaving hair off.)
  5. Ask the learners if they have any questions.
  6. Tell the learners to copy the information written on the chalkboard into their workbooks.
  7. Give the learners some time to complete this task.

### **Checkpoint 1**

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

- a. What is an environmental variation?
- b. Is eye colour an environmental variation?

Answers to the checkpoint questions are as follows:

- a. These are variations between people that are not inherited e.g.: tattoos.
- b. No.

## **E**

### **CONCEPTUAL DEVELOPMENT**

1. Tell the learners that they are going to be looking at variation caused by the environment as well as inherited characteristics.
2. Tell the learners that the three inherited characteristics they are going to look at are:
  - a. Tongue rolling
  - b. Earlobes that are attached or detached to the head
  - c. A characteristic called “hitchhiker’s thumb”
3. You will now need to demonstrate and explain each of these:
  - a. Demonstrate tongue rolling:



- Have the learners attempt a tongue roll.
- Explain that not all people can roll their tongues. It is an inherited genetic characteristic.

## TOPIC: Variation

- b. Tell the learners that earlobes can be attached (joined to the side of the head) or detached ear lobes.



Detached    Attached

- Identify two different learners to help you explain this difference between detached and attached lobes.
  - Ask the learners to check each others ears and to tell each other if they have attached or detached lobes.
- c. Tell the learners that another inherited characteristic that they will learn about is something called “hitchhiker’s thumb”.



Straight thumb



Hitchhiker’s thumb

- Explain/demonstrate what “hitchhiker’s thumb” is by showing your thumb and explain if it is a straight thumb or a hitchhikers thumb.
  - Ask learners to hold up their thumbs and identify to children to show the difference.
4. Remind the learners that environmental variation is different to inherited variation.
  5. Environmental variation is how we vary by the way we change ourselves. This can include tattoos, piercings and hair styles.
  6. Now divide the learners into groups of about 10.
  7. Write the following onto the chalkboard (always try to do this before the lesson starts):

## TOPIC: Variation

### PRACTICAL TASK

1. This task will be done in groups of about 10.
2. Working in groups, you are going to collect data about the people in your group.
3. You are then going to complete a written task and a bar graph to show your answers.
4. This is an example of a bar graph:



5. Each person in the group must produce their own set of written answers for assessment.
6. Working as a group, work out the following:

How many people in your group:	e.g. 10	How many people in your group:	e.g. 10
Can roll their tongues?		Can't roll their tongues?	
Have attached earlobes?		Have detached earlobes?	
Have "hitchhiker's thumb"?		Have a straight thumb"?	
Have braids?		Do not have braids?	
Have pierced ears?		Do not have pierced ears?	

## TOPIC: Variation

8. Tell the learners that they are going to be collecting data on variation in their groups.
9. Read through the practical task, as written on the board, with the learners.
10. Make sure the learners understand what they have to do.
11. Read over the example of the bar graph with the learners and check that the learners remember how to construct a bar graph.
12. Remind them that the y-axis is the line is on the left and shows the number of learners.
13. Remind them that the x-axis is along the bottom where the data is recorded.
14. Give the learners 10 minutes to work in their groups to collect the data they need.
15. They can record the data as a group on a piece of paper.
16. Now ask the learners to copy the questions for the task into their workbooks.
17. This will need to be written onto the chalkboard:

### Task 1:

Draw a bar graph to show the data you have collected.

- a. The y-axis will be numbered from 0-10 to show the number of learners in the group. (1 mark)
- b. The y-axis must be labelled "Number of learners". (1 mark)
- c. The data collected will be presented on the the x-axis and must be labelled.
- d. Each variation will have two bars, one to show the number of learners that have that variation and the bar next to it showing the number of learners that don't have that variation.
- e. The data should show:
  - Number of learners that can and can't roll their tongues. (2 marks)
  - Number of learners that do and don't have attached earlobes. (2 marks)
  - Number of learners that do and don't have "hitchhiker's thumb". (2 marks)
  - Number of learners that do and don't have braids. (2 marks)
  - Number of learners that do and don't have pierced ears. (2 marks)
- f. The graph must have a suitable title. (1 mark)
- g. The graph must be neatly drawn and accurate. (1 mark)

### Task 2:

Answer the following questions:

- 2.1 Name two INHERITED variances that you have? (2 marks)
- 2.2 Name the two environmental variances that you looked at in this task. (2 marks)
- 2.3 Which variance did the most people in your group have? (1 mark)
- 2.4 Which variance did the least people in your group have? (1 mark)

**TOTAL 20**

14. After the learners have copied down the task, ask them if they have any questions.
15. Explain any terminology they may not understand.
16. Allow learners time to complete the activity.
17. Supervise them and assist whilst they are completing the activity

## TOPIC: Variation

### 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
Oxford Successful	Variation	51-53
Via Afrika	Variation	50-53
Platinum	Variation	58-61
Spot On	Variation	54-56
Step-by-Step	Variation	62-64
Pelican	Variation	72-73
Solutions for All Natural Sciences	Variation	95-99
Shuters Top Class Natural Sciences	Variation	63-67
Sasol Inzalo Bk A	Variation	128-133

### G ADDITIONAL ACTIVITIES/ READING

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

1. <https://www.youtube.com/watch?v=yP27i05-vTg> (1min 33 sec) [Inherited and acquired traits]
2. [https://www.youtube.com/watch?v=UhfK9lgK-\\_g](https://www.youtube.com/watch?v=UhfK9lgK-_g) (2min 52sec) [Introduction to heredity]



## TOPIC: Variation

# 9 C

**Term 1, Week 9, Lesson C**

**Lesson Title: Variations within a species**

**Time for lesson: 1 hour**

### **A** POLICY AND OUTCOMES

<b>Sub-Topic</b>	Working with genes		
<b>CAPS Page Number</b>	21		
<b>Lesson Objectives</b>			
By the end of the lesson, learners will be able to:			
<ul style="list-style-type: none"> <li>• describe a career in pharmacy</li> <li>• describe a career in agricultural and farming genetics</li> <li>• describe a career in chemical engineering.</li> </ul>			
Specific Aims	1. DOING SCIENCE		✓
	2. KNOWING THE SUBJECT CONTENT & MAKING CONNECTIONS		✓
	3. UNDERSTANDING THE USES OF SCIENCES & INDIGENOUS KNOWLEDGE		

### SCIENCE PROCESS SKILLS

1. Accessing & Recalling Information		6. Identifying Problems & Issues		11. Doing Investigations	
2. Observing	✓	7. Raising Questions		12. Recording Information	✓
3. Comparing	✓	8. Predicting	✓	13. Interpreting Information	
4. Measuring		9. Hypothesizing		14. Communicating	✓
5. Sorting & Classifying		10. Planning Investigations		15. Scientific Process	

## TOPIC: Variation

### B POSSIBLE RESOURCES

For this lesson, you will need:

IDEAL RESOURCES	IMPROVISED RESOURCES
Computer with internet connection	

### 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 do we call a characteristic that is passed down from our parents?

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 hereditary characteristic*

### D ACCESSING INFORMATION

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

#### CAREERS INVOLVING SPECIES VARIATION

1. Many careers that have something to do with species variation are concerned with the field of genetics.
2. Genetics is the study of genes.
3. Genes are found in the cells of all living things.
4. Genes are the building blocks of all living things.

#### AGRICULTURAL AND FARMING GENETICS

1. This would be a career working with plants and animals.
2. In the area of plants, an agricultural geneticist might:
  - Work on seeds to produce stronger plants
  - Work on making plants that are resistant to diseases
  - Work on a plant to produce bigger fruit.
3. An animal geneticist might:
  - Manage the inherited characteristics in breeds of cows
  - Do research into reproduction in animals to produce stronger babies.

## TOPIC: Variation

### PHARMACY

1. There are a number of careers in the pharmacy field.
2. Researchers study the causes of genetic diseases.
3. They try to discover or find cures or treatments.
4. They test medicines to see if they work and if they have harmful side-effects.

### CHEMICAL ENGINEERING

1. Chemicals are used for many things that are part of our daily lives.
2. Some chemicals are safe for humans and others are dangerous.
3. Chemical engineers work out how chemicals can be used to solve problems safely.
4. An example might be how to preserve food safely.
5. They also invent new chemicals and do research into improving products.

2. Read through the information on the chalkboard with the learners.
3. Explain to the learners as follows:
  - a. In a few years' time you will need to start thinking about what you would like to do when you leave school.
  - b. There are many careers that are related to species variation.
  - c. Many of these careers involve the study of and working with something called **genetics**.
  - d. Ask the learners if any of them know what genetics is?  
(Answer: Genetics is the study of genes.)
5. Continue to explain:
  - a. Genes are found in the cells of all living things.
  - b. Genes are so small that you can only see them under a powerful microscope.
  - c. They carry information almost like that of a computer.
  - d. This genetic information is inherited and tells the cell what it needs to do.
  - e. These genes are the building blocks of all living things.
6. Ask the learners if they have any questions.
7. Explain to the learners:
  - a. Some jobs that look at genetics and variation in the species are:
    - Agricultural and farming genetics
    - Pharmacy
    - Chemical Engineering.

## TOPIC: Variation

- b. A career in agricultural and farming genetics involves working with animals and plants.
  - c. You might look at ways to make plants and animals stronger and more disease-resistant.
  - d. A career in pharmacy might involve looking for a cure for genetic diseases or testing new medicines.
  - e. Chemicals are a part of our everyday lives. Chemical engineers specialise in how chemicals are made, how they work and what they can be used for.
8. Ask the learners if they have any questions.
  9. Tell the learners to copy the information written on the chalkboard into their workbooks.
  10. Give the learners some time to complete this task.

### **Checkpoint 1**

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

- a. What do we find in the cells of all living things that are the building blocks of life?
- b. What do we call the study of genes?

Answers to the checkpoint questions are as follows:

- a. Genes
- b. Genetics.

## **E**

### **CONCEPTUAL DEVELOPMENT**

1. Write the following on the chalkboard (always try to do this before the lesson starts):
  1. What do careers that involve looking at species variation study?
  2. Where do we find genes?
  3. Give an example of something a plant geneticist would do.
  4. Give an example of something an animal geneticist would do.
  5. Give an example of something a pharmaceutical researcher might do.
  6. What do chemical engineers do?
  7. If you could choose one of these careers, which would it be and why?
8. Read through the questions written on the chalkboard with the learners.
9. Tell the learners to answer the questions in their workbooks.
10. Allow the learners some time to complete the rest of the activity.
11. Write the model answer on the chalkboard (It may look something like this):

## TOPIC: Variation

1. *Genetics/genes*
2. *In every cell of every living thing*
3. *Answers will vary.*
4. *Answers will vary.*
5. *Answers will vary.*
6. *They invent and work with chemicals to solve problems.*
7. *Answers will vary.*

### **Checkpoint 2**

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

- a. If you worked to improve the quality of vegetable seeds, what career would you be following?
- b. If you invented chemicals to solve problems, what career would you be following?

Answers to the checkpoint questions are as follows:

- a. Agricultural/plant geneticist.
- b. Chemical engineer.

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

## TOPIC: Variation

### 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
Oxford Successful	Variation	54
Via Afrika	Variation	-
Platinum	Variation	-
Spot On	Variation	52-53
Step-by-Step	Variation	65
Pelican	Variation	73
Solutions for All Natural Sciences	Variation	-
Shuters Top Class Natural Sciences	Variation	67-68
Sasol Inzalo Bk A	Variation	-

### G ADDITIONAL ACTIVITIES/ READING

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

1. <https://www.youtube.com/watch?v=aJ17r7cWjoE> (5min 05sec) [Genetics of agriculture]
2. [http://study.com/articles/Become\\_a\\_Genetic\\_Engineer\\_Education\\_and\\_Career\\_Roadmap.html](http://study.com/articles/Become_a_Genetic_Engineer_Education_and_Career_Roadmap.html) (4min 42 sec) [Geneticist: Career Information and Education Requirements]

# NATURAL SCIENCES

ASSESSMENT  
GRADE 7 TERM 1



# GRADE 7 ASSESSMENT

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

## CAPS Assessment

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

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

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

- 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 / investigations, project, tests and examinations.

- i. **Tests and Examinations**

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 / investigation tasks**

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

- iii. **Project**

Projects give learners the opportunity to demonstrate knowledge, skills, understanding and application. The project can be given in any term but must be recorded for term 4 assessment.

A minimum mark allocation is prescribed in CAPS for, practical / investigation, projects, tests and examinations for each grade. These are summarised, by grade, in the table below:



# GRADE 7 ASSESSMENT

## Grade 7

### Programme of Formal Assessment

Formal Assessments	TERM 1	TERM 2	TERM 3	TERM 4	TOTAL % FOR THE YEAR
<b>School-based assessments</b>	Test 1 [30 marks]  Practical task/ investigation 1 [20 marks]	Test 2 [30 marks]  Practical task/ investigation 2 [20 marks]	Test 3 [30 marks]  Practical task/ investigation 3 [20 marks]	Practical task/ investigation 4 [20 marks]  Project [20 marks]	40%
<b>Exams [60 minutes]</b>		Exam 1 on work from terms 1 and 2 [60 marks]		Exam 2 on work from terms 3 and 4 [60 marks]	60%
<b>Number of formal assessments</b>	2	3	2	3	Total: 100%

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

# GRADE 7 ASSESSMENT

## PRACTICAL TASK - INTRODUCTION

**NS & TECH**

**GRADE 7**

**PRACTICAL TASK**

**TERM 1**

**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 2B.
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. The learners will need to have 2 small bunches of leaves per group to complete the task. If they are unable to collect these from the school grounds, you will need to provide them.
8. Other equipment required is listed in the outline of the practical task in Section E of Lesson 2B.
9. The learners should complete the drawings with a sharp pencil if possible and the written answers should be completed in pen.

# GRADE 7 ASSESSMENT

## PRACTICAL TASK - MEMORANDUM

NS & TECH  
GRADE 7  
PRACTICAL TASK  
TERM 1

20 MARKS

Topic	Activity	Expected answer/outcome	Marks
	1		
Variation	1	<ul style="list-style-type: none"><li>• The y-axis is numbered 0-10✓</li><li>• The y-axis is labelled "Number of learners"✓</li><li>• Able to roll tongue data is shown and labelled✓</li><li>• Unable to roll tongue data is shown and labelled✓</li><li>• Attached earlobe data is shown and labelled✓</li><li>• Detached earlobe data is shown and labelled✓</li><li>• "Hitchhiker's thumb" data is shown and labelled✓</li><li>• Straight thumb data is shown and labelled✓</li><li>• Braided hair data is shown and labelled✓</li><li>• Not braided hair data is shown and labelled✓</li><li>• Pierced ears data is shown and labelled✓</li><li>• Unpierced ears data is shown and labelled✓</li><li>• Graph is labelled "Graph showing variances"✓ Graph is neatly drawn and accurate ✓</li></ul>	14

## GRADE 7 ASSESSMENT

	2		
Variations	2.1	Any two: Can roll tongue Can't roll tongue Attached earlobes Detached earlobes "Hitchhiker's thumb" Straight thumb ✓✓	<b>2</b>
Variations	2.2	Hair braids✓ Ear piercing✓	<b>2</b>
Variations	2.3	Answers will vary	<b>1</b>
Variations	2.4	Answers will vary	<b>1</b>
		<b>TOTAL</b>	<b>20</b>

# GRADE 7 ASSESSMENT

## TERM TEST

**NS & TECH  
GRADE 7  
TEST  
TERM 1**

**60 MARKS  
60 MINUTES**

### NOTE TO THE TEACHER:

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

### INSTRUCTIONS TO 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. What do we call the process when plants make their own food ?
- A. energy
  - B. photosynthesis
  - C. symbiosis
  - D. adaption

**You have answered correctly if you have circled B.**

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**NS & TECH**  
**GRADE 7**  
**TERM 1**

**TEST**  
**60 MARKS**

**Question 1: Multiple choice**

**[4]**

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

1.1. Which one of these is NOT part of the biosphere?

- A. Lithosphere
- B. Nanosphere
- C. Hydrosphere
- D. Atmospheres

1.1. Which of these statements is TRUE?

- A. The lithosphere is made up of water and gases
- B. The hydrosphere is made up of mostly soil and rocks
- C. The atmosphere is the layer of gas around the Earth
- D. An example of an animal found in the lithosphere is a whale

1.1. Which of these statements is FALSE?

- A. Only living things are found in the biosphere
- B. The atmosphere protects the Earth from ultraviolet rays
- C. The lithosphere is made up of oceans, rivers, lakes and underground water
- D. All living things have 7 life processes that they carry out.

1.2. Which one of these groups describes a pond ecosystem?

- A. Movement, reproduction
- B. Nutrition, breathing
- C. Excretion, growth
- D. Sleeping, thinking

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## 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	Main source of energy for the Earth	A.	Eye colour
2.1.	Needed by all living things to survive	B.	Species
2.2.	Smallest group of the animal kingdom	C.	Air
2.3.	Omnivore	D.	Rat
2.4.	Characteristics inherited from parents	E.	The Sun

## Question 3

[5]

Complete the following sentences using words in the block below.

*reptiles, vertebrates, backbone, exoskeleton, cold-blooded*

Rewrite the sentences and underline your your answers.

- 3.1 The animal Kingdom is divided into two groups, \_\_\_\_\_ and invertebrates.
- 3.2 A frog is an example of a \_\_\_\_\_ animal.
- 3.3 The five vertebrate groups are: fish, birds, amphibians, \_\_\_\_\_ and mammals.
- 3.4 Arthropods have jointed legs and a hard \_\_\_\_\_ made of chitin.
- 3.5 Vertebrates are different from other animals in the Animal kingdom because they have a \_\_\_\_\_.

## Question 4

[5]

Write the word that is being described in the sentence.

Only write the answer.

- 4.1 This can only form if a flower has been pollinated and fertilization has taken place.

\_\_\_\_\_

- 4.2 The stage of physical development when your body starts from changing from child to adult.

\_\_\_\_\_

- 4.3 Male reproductive organs that produce sperm.

\_\_\_\_\_

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4.4 The ova or female egg cells are stored here in humans.

4.5 The name of the group of diseases that can be passed on during sexual Intercourse.

### Question 5

[3]

5.1 Explain the following statement.

“Adaption is a characteristic that helps a living thing survive in its environment”

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5.2 Name two ways in which a fish is adapted to its environment.

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### Question 6

[6]

Complete the following table showing the differences between plants and animals:

<u>DIFFERENCE</u>	<u>PLANTS</u>	<u>ANIMALS</u>
Nutrition (feeding)		
Movement		
Reproduction		



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## Question 7

[7]

Complete the following table showing the differences between plants and animals:

<u>CLASSIFICATION</u>	<u>WARTHOG</u>	<u>PIG</u>	<u>COW</u>
Kingdom	Animalia (animals)	Animalia (animals)	Animalia (animals)
Phylum	Chordata (animals with backbone)	Chordata (animals with backbone)	Chordata (animals with backbone)
Class	Mammalia (mammals)	Mammalia (mammals)	Mammalia (mammals)
Order	Artiodactyla (even toed ungulate)	Artiodactyla (even toed ungulate)	Artiodactyla (even toed ungulate)
Family	Suidae (all pigs)	Suidae (all pigs)	Bovidae (all ruminants)
Genus	Phacochoerinae	Sus	Bos
Species	Phacochoerua africanus	Sus scrofa	Bos taurus

7.1 List the classifications (there are 4) that warthogs, pigs and cows have in common \_\_\_\_\_

7.2 Which classification do only the warthog and pig have in common? \_\_\_\_\_

7.3 Which classifications do none of these animals have in common? (there are 2):

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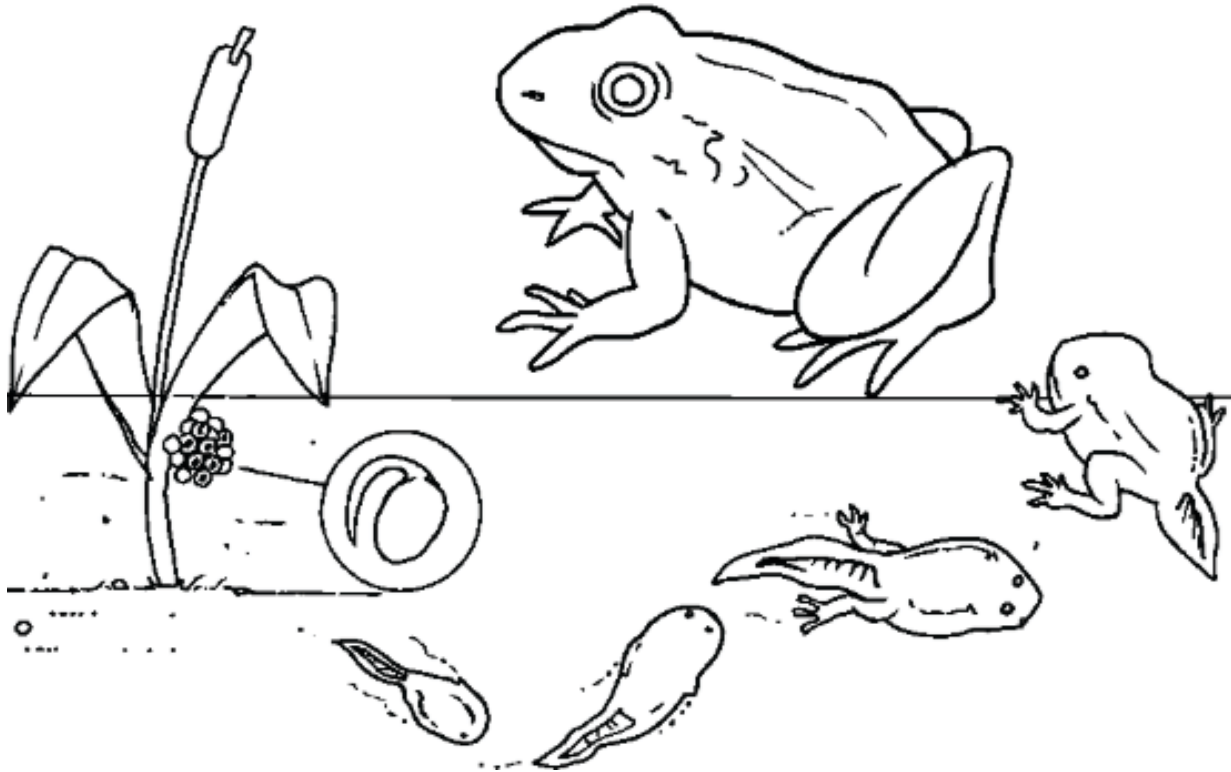
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Question 8

[8]

The diagram below shows the metamorphosis of a frog from an egg to an adult frog.



(Note to teacher: Copy this picture or use Term 1, Resource 7)

*water, land, hatch, eggs, frog, tadpoles, froglet, swim, breathe, gills, lungs, skin, tail, legs, swim, jump,*

Using this diagram and the words above, write 6-10 sentences to explain the metamorphosis from egg to frog.

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### Question 9

[8]

Draw and label two diagrams showing the differences between monocotyledons and a dicotyledons:

- The diagram should show and explain the differences in the:
  - o flowers
  - o leaves
  - o root systems.
- Each diagram must be clearly labelled as monocotyledon or dicotyledon to show that you know the difference between the two.



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### Question 10

[8]

Read the following statements and say whether each one is true or false:

- 10.1 A girl can get pregnant the first time she has sexual intercourse. \_\_\_\_\_
- 10.2 Birth control pills cause cancer. \_\_\_\_\_
- 10.3 You can't get HIV if you only have sexual intercourse once. \_\_\_\_\_
- 10.4 Washing or having a bath after sexual intercourse will prevent pregnancy. \_\_\_\_\_
- 10.5 You can get HIV from kissing. \_\_\_\_\_
- 10.6 Using contraception means there is no way a pregnancy can happen. \_\_\_\_\_
- 10.7 There is no cure for AIDS. \_\_\_\_\_
- 10.8 HIV attacks the immune system. \_\_\_\_\_

### Question 11

[2]

Explain the the following stages of a human pregnancy:

- 11.1 embryo: \_\_\_\_\_
- 11.2 foetus: \_\_\_\_\_  
\_\_\_\_\_

**TOTAL: [60]**

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**NS & TECH  
GRADE 7  
MEMORANDUM  
TERM 1  
60 MARKS**

Caps Topic	Questions	Expected answer(s)	Marks
	<b>1</b>		
The biosphere	1.1	B ✓	1
The biosphere	1.2	A ✓	1
The biosphere	1.3	C ✓	1
The biosphere	1.4	D	1
	<b>2.</b>		
The biosphere	2.1	C ✓	1
Biodiversity	2.2	B ✓	1
Biodiversity	2.3	D ✓	1
Variation	2.4	A ✓	1
	<b>3</b>		
Biodiversity	3.1	vertebrates ✓	1
Biodiversity	3.2	cold-blooded ✓	1
Biodiversity	3.3	reptiles ✓	1
Biodiversity	3.4	exoskeleton ✓	1
Biodiversity	3.5	backbone ✓	1
	<b>4</b>		
Sexual reproduction	4.1	seeds ✓	1
Sexual reproduction	4.2	puberty ✓	1
Sexual reproduction	4.3	testes ✓	1
Sexual reproduction	4.4	ovaries ✓	1
Sexual reproduction	4.5	sexually transmitted diseases ✓	1
	<b>5</b>		
Biodiversity	5.1	When an organism has made changes or is especially suited to live in its environment or habitat	1
Biodiversity	5.2	Fins for swimming Gills to take air from the water	2

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6					
Biodiversity		Differences	Plants	Animals	6
		Nutrition	Makes own food	Eats plants or other animals	
		Movement	Can't move	Can walk, run, swim, fly	
		Reproduction	Spores or seeds	Live young or eggs	
7					
Biodiversity	7.1	Kingdom Phylum Class Order			4
Biodiversity	7.2	Family			1
Biodiversity	7.3	Genus Species			2
8					
Biodiversity	8	(Any 8 marks)			8
		<ul style="list-style-type: none"> <li>• Frogs lay their eggs in water.</li> <li>• The eggs hatch and become tadpoles.</li> <li>• Tadpoles have tails to swim and they breathe through gills.</li> <li>• Tadpoles then develop two small legs, but they are still living in the water.</li> <li>• The tadpole then develops two more legs. It is now a froglet.</li> <li>• The froglet can now start moving onto land.</li> <li>• Once the tail falls off, the frog is fully grown.</li> <li>• The frog can live on land, jump using its legs and swim in water.</li> <li>• The frog will breathe using lungs and through its skin.</li> </ul>			
9					
Biodiversity		(One mark per label)			8

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	10		
Sexual reproduction	10.1	True	1
Sexual reproduction	10.2	False	1
Sexual reproduction	10.3	False	1
Sexual reproduction	10.4	False	1
Sexual reproduction	10.5	False	1
Sexual reproduction	10.6	False	1
Sexual reproduction	10.7	True	1
Sexual reproduction	10.8	True	1
	11		
Sexual reproduction	11.1	We call the developing baby an embryo for the first two months of pregnancy	1
Sexual reproduction	11.2	We call the developing baby a foetus for the last seven months of pregnancy	1
		<b>TOTAL</b>	<b>60</b>