



**KWAZULU-NATAL PROVINCE**

EDUCATION  
REPUBLIC OF SOUTH AFRICA

# CURRICULUM GRADE 10-12 DIRECTORATE

**NCS (CAPS)**

**LEARNER SUPPORT DOCUMENT**

**GRADE 10**

**LIFE SCIENCES**

*Stanmorephysics*

**STEP AHEAD PROGRAMME**

**2023**

## PREAMBLE

This document has been prepared as support material for Grade 10 Life Sciences.

The material has been arranged in such a way that studying can be undertaken topic-wise. Within each topic, questions on the different sub-topics are arranged in the same sequence as that in the 2023 Amended Annual Teaching Plan (ATP).



This document takes the following into account:

- Focus on **core concepts and content** per topic as well as the relevant Life Sciences skills.
- Activity based Revision sessions and constant feedback on assessments/activities given.
- **Scaffolding of concepts** according to **cognitive/difficulty levels** and a differentiated approach to cater for learners with different abilities.
- Addressing the **Common errors & misconceptions** in each topic.
- Providing multiple opportunities for learners to master concepts through multiple exposure using different source stimuli.
- A focus on **scientific investigations** and **biological terminology** for each topic.
- Consolidating and supplementing topics through the use of previous examination question papers.



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## Topic: Plant tissues, Plant organs, Support and transport in plants

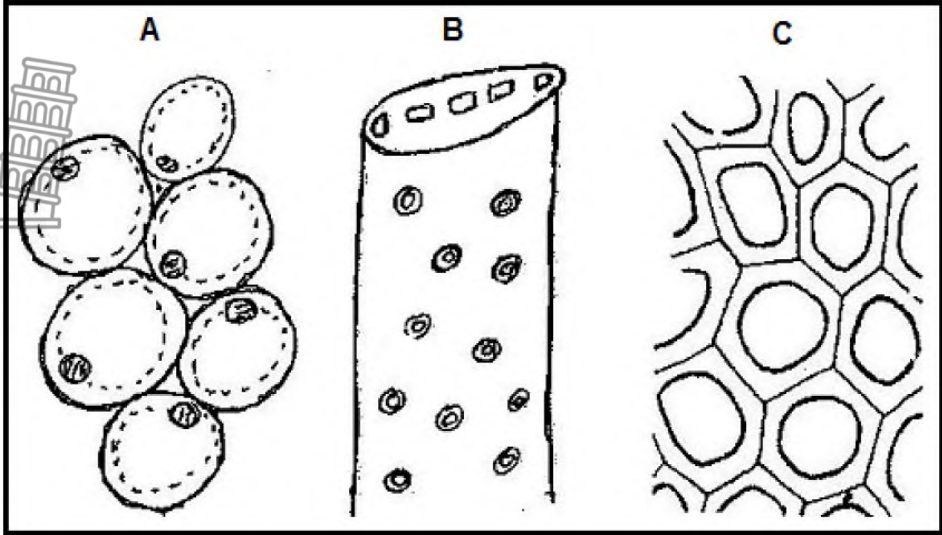
### Activity 1

Give the correct **biological term** for each of the following descriptions.

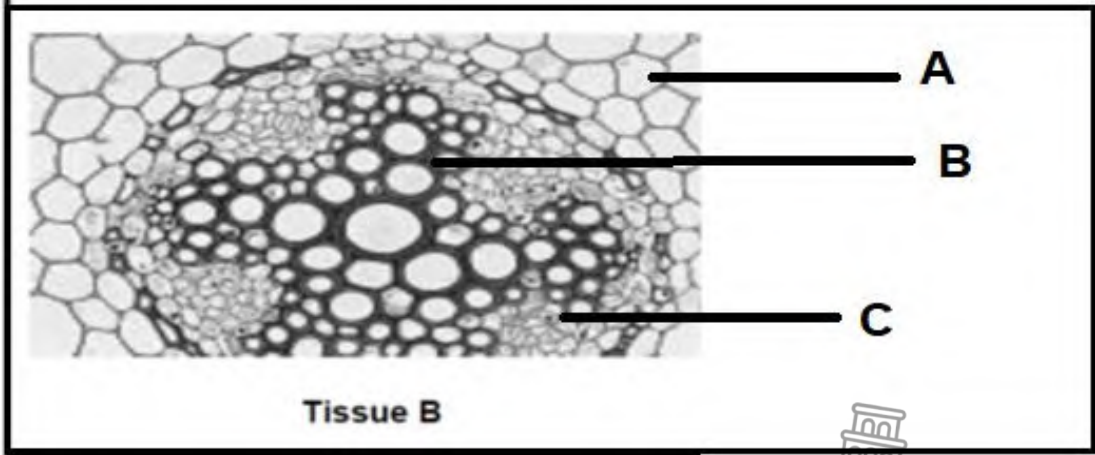
No.	Description	Biological Term
1.1	A group of similar cells adapted for a particular function	
1.2	A permanent tissue that lines the surfaces of roots, stem and leaves	
1.3	Movement of particles from a high to a low concentration	
1.4	A tissue that is actively dividing by mitosis to form new cells in plants.	
1.5	Tissue in plants that conducts water and mineral salts	
1.6	Elongated, living cells that transport the dissolved food in phloem tissue	
1.7	Elongated, living cells that transport the dissolved food in phloem tissue	
1.8	Movement of water from a high WP to a low WP across a differentially permeable membrane until dynamic equilibrium is reached	
1.9	The force that moves water into the leaf cells from the xylem vessels to replace the water lost due to transpiration	
1.10	The pressure that forces water to move through the roots and up the stem of a plant	
1.11	Apparatus used to measure the rate of transpiration	
1.12	A pore in the epidermis of the leaf between two guard cells	
1.13	Loss of water vapour through the stomata	



**Activity 2**

2.	The diagram below shows plant tissues:		
2.1	Give the LETTER and the NAME of the tissue which:		
	(a) Transports water and minerals up a plant		(2)
	(b) Provides mechanical support to the plant		(2)
2.2	Explain TWO ways in which tissue <b>B</b> is structurally suited for its function		(4)
			<b>(8)</b>

**Activity 3**

3	The diagram below shows the structure of a transverse section through dicotyledonous root with different tissues.		
3.1	Give the LETTER and NAME of tissue that:		
	(a) Transport water		(2)
	(b) Conducts manufactured food from the leaves to all parts of plants		(2)
	(c) Stores food in the form of starch		(2)
3.2	Explain why tissue <b>B</b> is lignified		(2)
			<b>(8)</b>

**Activity 4**

The diagrams below represent plant tissues

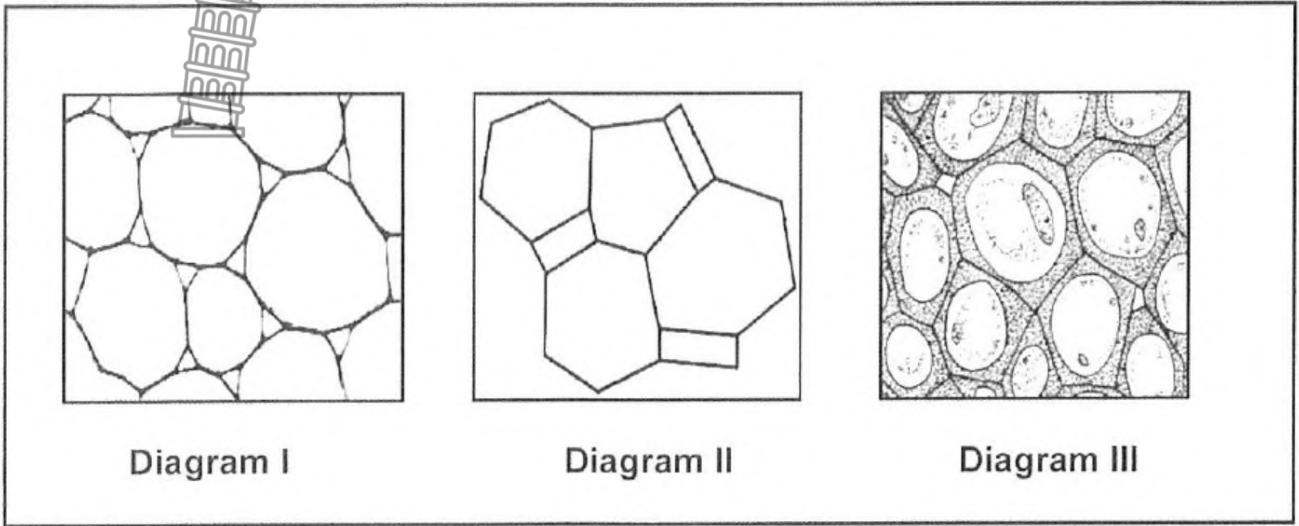


Diagram I

Diagram II

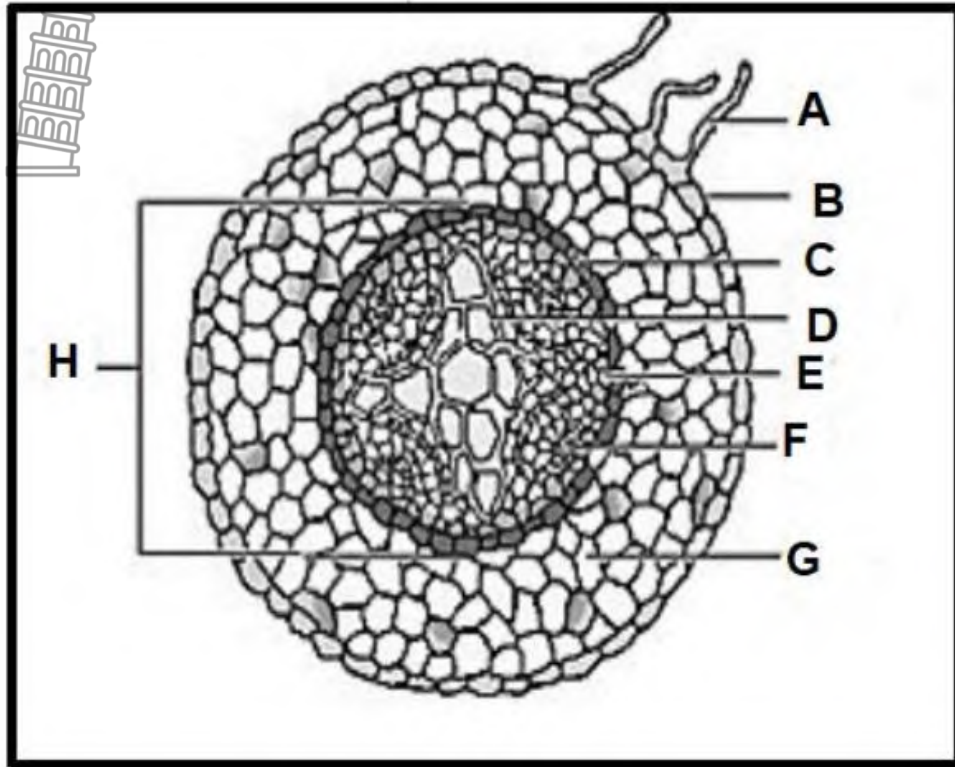
Diagram III

4.1	Identify the tissue in:	
	(a) Diagram I	(1)
	(b) Diagram III	(1)
4.2	Explain ONE consequence if the wholes of the sieve plates in the tissue in Diagram II become blocked.	(2)
4.3	Explain TWO structural adaptations of the cells in the tissue in Diagram I	(4)
4.4	Explain ONE structural adaptation of the cells in the tissue in Diagram III	(2)
		<b>(10)</b>



**Activity 5**

5 The diagram below shows a cross section through a dicotyledonous root.

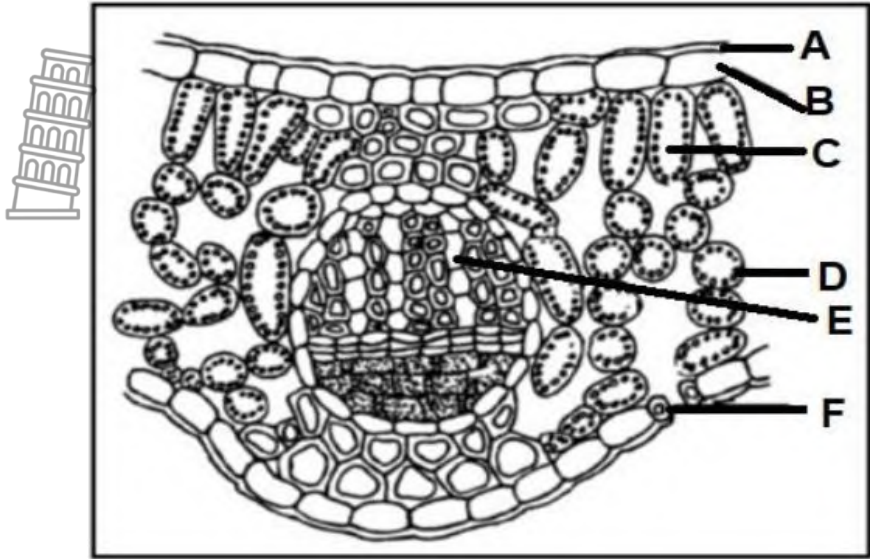


5.1	Identify part:	
	(a) A	(1)
	(b) B	(1)
5.2	Give the LETTER and the NAME of the part that:	
	(a) Give rise to side/lateral roots	(2)
	(b) Transports organic food in the plant	(2)
	(c) Stores starch in the root	(2)
	(d) Transport water in the plant	(2)
		<b>(10)</b>



**Activity 6**

6. The diagram shows the cross section of the dicotyledonous leaf.



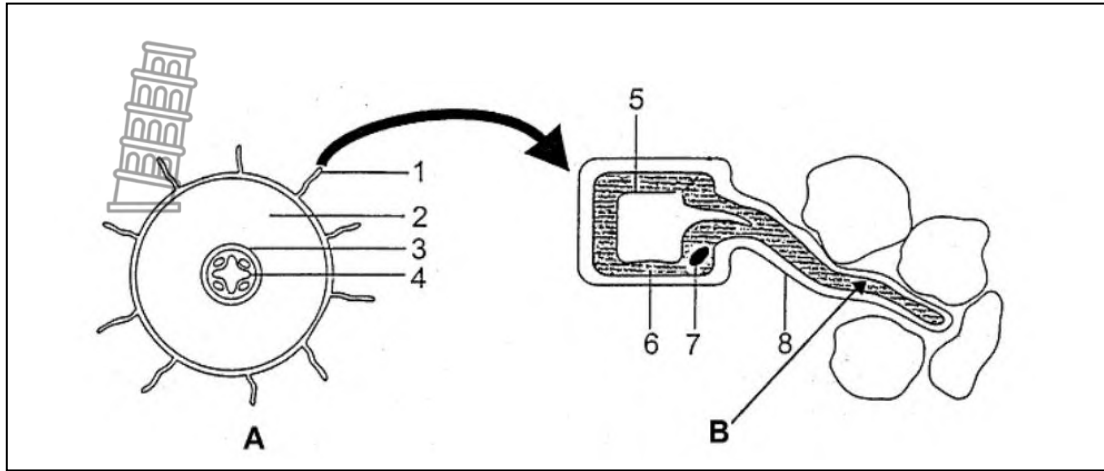
6.1	Give the LETTER of the part that:	
	(a) transparent and impermeable to water	(1)
	(a) transports water and mineral salts	(1)
6.2	Give collective term for part <b>C</b> and <b>D</b>	(1)
6.3	Tabulate ONE structural difference between parts <b>B</b> and <b>F</b>	(3)
6.4	Explain TWO ways in which part <b>C</b> is structurally adapted for its function of photosynthesis	(4)
		<b>(10)</b>





**Activity 7**

7 The diagram below represent the plant organ



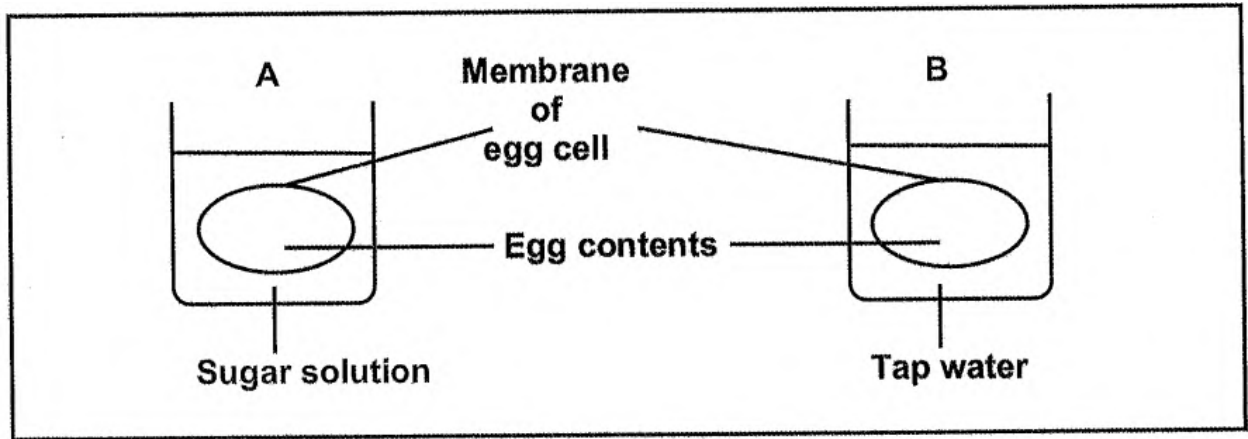
7.1	Identify organ represented by diagram A.	(1)
7.2	Identify parts numbered:	
	(a) 2	(1)
	(b) 5	(1)
	(c) 8	(1)
7.3	State ONE function of parts:	
	(a) 3	(1)
	(b) 4	(1)
7.4	Explain TWO structural adaptations which enable effective functioning of part labelled 4.	(4)
		<b>(10)</b>



**Activity 8**

- 8 The following steps were followed during an investigation:
- The shell was removed from 2 eggs
  - The two resulting eggs cells surrounded by a cell membrane were used in an investigation
  - Egg cell A was placed in a beaker containing sugar solution
  - Egg cell B was placed in a beaker containing tap water

The diagram shows the set up of the investigation.



8.1	State the process that is being investigated	(1)
8.2	Explain why cell B is expected to be larger after two days	(2)
8.3	Explain it is necessary to remove the shell from the egg	(2)
8.4	State any TWO factors that should be kept constant in this investigation.	(2)
		<b>(7)</b>



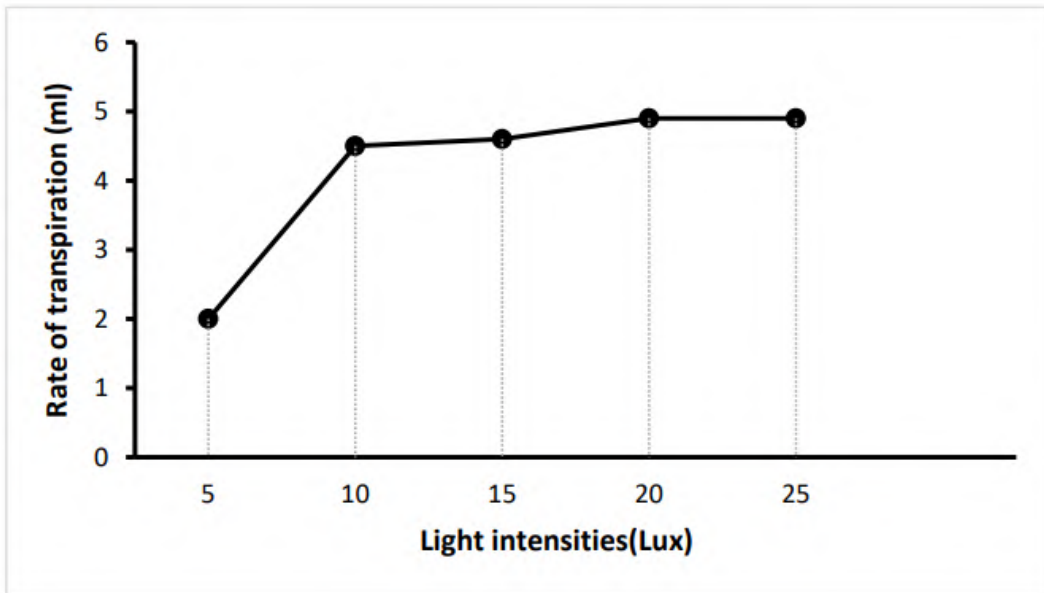
**Activity 9**

9 Grade 10 learners conducted the investigation to determine the effect of different light intensities on the rate of transpiration in leaves.

The following procedure was followed:

- 2 leafy shoot of the same plants were used
- The leafy shoots were of the same age
- The leafy shoots were than labelled leafy shoot A and leafy shoot B
- Leafy shoot A was exposed to different light intensities
- Leafy shoot B was placed in a dark area
- All other factors affecting transpiration rate were kept constant
- Potometer was used to measure the rate of transpiration in both leafy shoots
- The results of the investigation were recorded hourly for shoot A and B

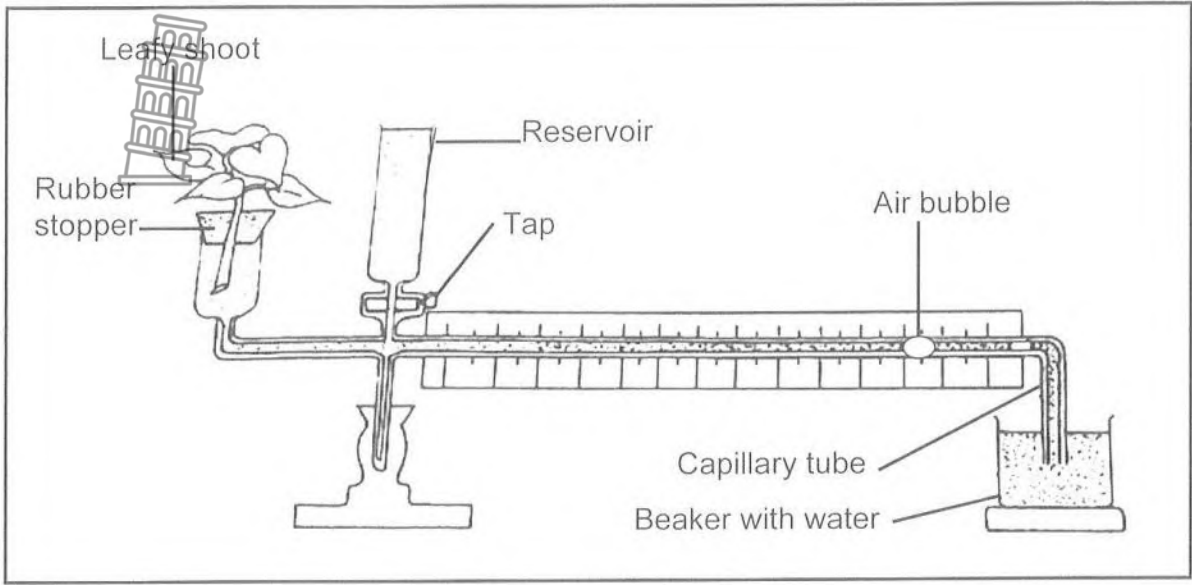
The results for leafy shoot A are shown in the graph below:



9.1	Identify :	
	(a) dependent variable	(1)
	(b) independent variable	(1)
9.2	State the effect of increasing the light intensity on transpiration rate from 5 to 10	(1)
9.3	List TWO ways in which learners could increase the reliability of the investigation	(2)
9.4	List TWO factors affecting the rate of transpiration other than the one that was investigated	(2)
9.5	Explain why leafy shoot <b>B</b> was included in the investigation	(2)
9.6	State the conclusion for the above investigation	(2)
		<b>(11)</b>

**Activity 10**

10 A group of grade 10 learners set up the apparatus shown below to investigate the effect of temperature on the rate of transpiration. This investigation was done three times.



10.1	Name the apparatus shown above	(1)
10.2	Identify the:	
	(a) independent variable	(1)
	(a) dependent variable	(1)
10.3	Explain why the leafy shoot should be cut underwater	(2)
10.4	Explain the significance of air bubbles	(2)
10.5	What is the purpose of the water in the reservoir	(1)
10.6	State ONE way in which the grade10 learners ensured the reliability of this investigation	(1)
10.7	State TWO factors that should be kept constant in this investigation	(2)
		<b>(11)</b>



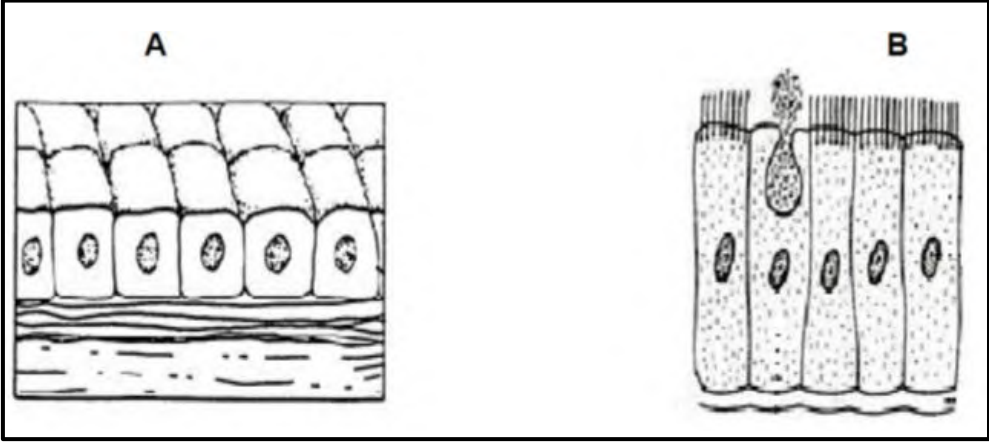
## Topic: Animal Tissues

### Activity 1

Give the correct **biological term** for each of the following descriptions.

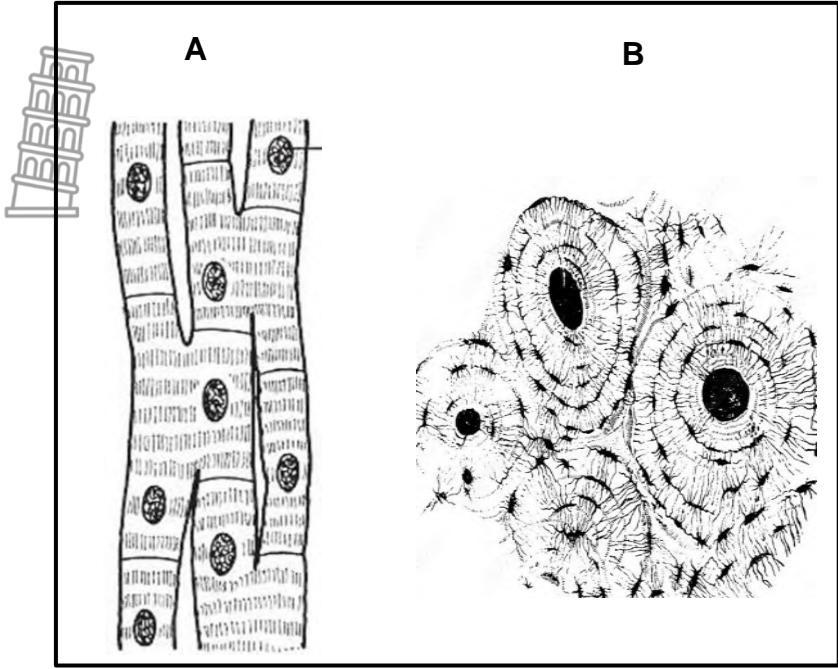
No.	Description	Biological Term
1.1	Type of epithelium lining the air passages.	
1.2	The structural unit of the nervous system.	
1.3	Tissue that joins muscle to bone.	
1.4	Tough fibrous connection between bones.	
1.5	Specialised cells in ciliated columnar epithelial tissue which produce mucus.	
1.6	The only liquid connective tissue in the body.	
1.7	Tough connective tissue that forms discs between vertebrae.	
1.8	Neurons that conduct nerve impulses towards the central nervous system.	
1.9	Type of epithelium making up multicellular glands in the body.	
1.10	Type of muscle that are attached to the bones of the skeleton.	
		<b>(10)</b>

### Activity 2

2	A learner examined sections of animal tissue and observed the following:		
			
	2.1	Identify tissue:	
		(a) A	(1)
		(b) B	(1)
	2.2	Mention TWO areas in the human body where tissue B is found	(2)
	2.3	Tabulate ONE visible difference between A and B	(3)
	2.4	Describe ONE way how tissue B is structurally suited to perform its function	(2)
			<b>(9)</b>

**Activity 3**

3 The following diagrams show human tissues.

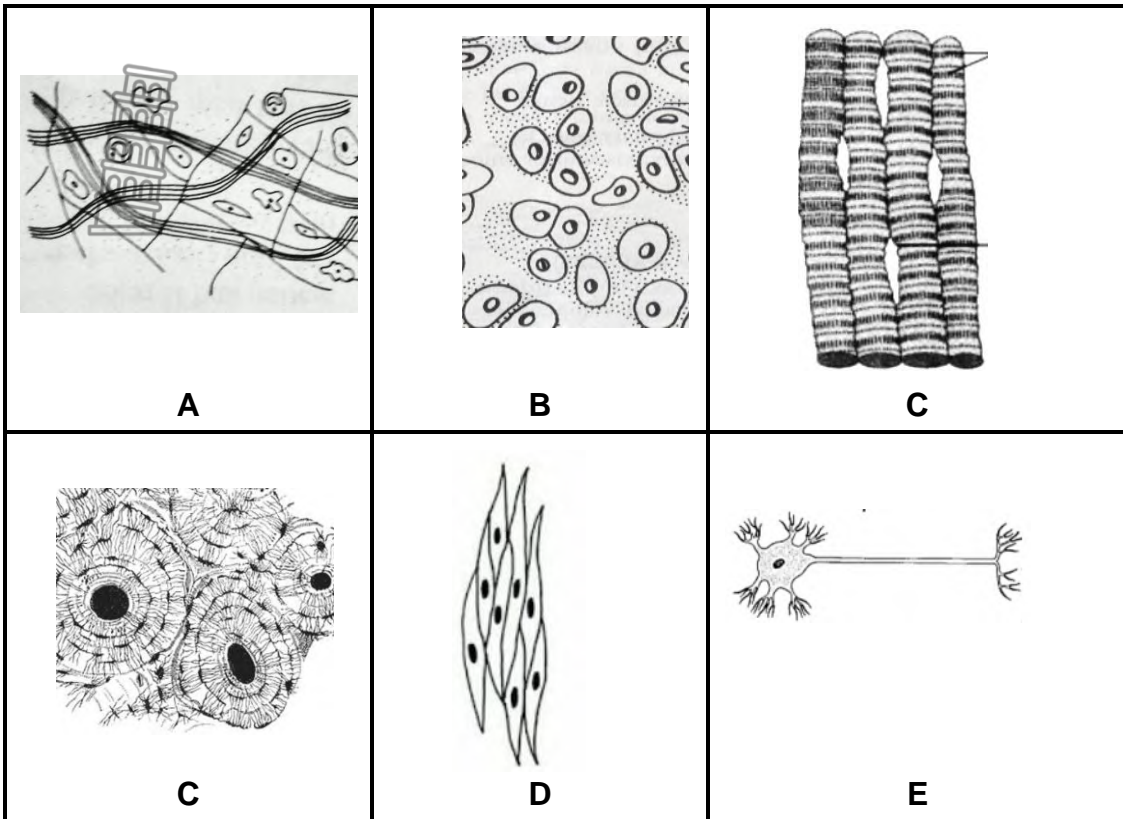


3.1	Identify tissues labelled <b>A</b> and <b>B</b>	(2)
3.2	Name the organ in the body where tissue <b>A</b> is found.	(1)
3.3	State the function of tissue labelled <b>B</b>	(1)
3.4	A person experiences an illness resulting in tissue labelled A failing to increase the rate of its contraction. Explain the effect that this would have on the person.	(4)
		<b>(8)</b>



**Activity 4**

4 The diagrams below show different animal tissues.

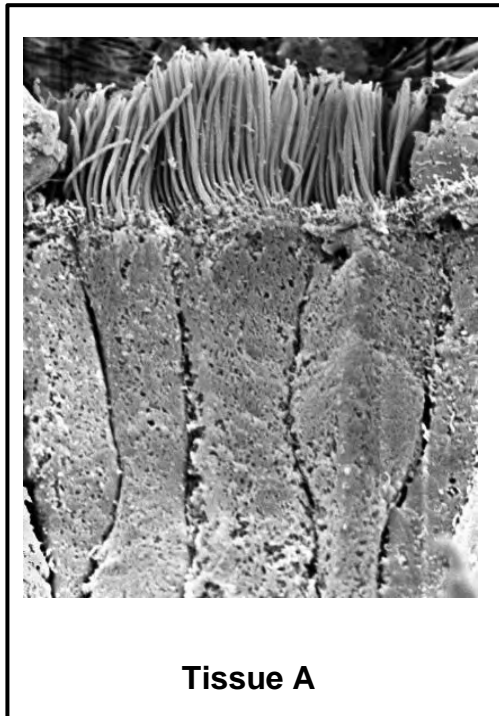


4.1	Give the functional difference between tissue <b>C</b> and <b>E</b>	(2)
4.2	Explain what will happen if tissue <b>F</b> failed to function	(2)
4.3	Provide LETTER and the NAME of the tissue which	
	(a) Insulates the body	(2)
	(b) Forms bones making up the endoskeleton	(2)
	(a) Reduces friction between bones	(2)
		<b>(10)</b>



**Activity 5**

5 The diagram below shows a micrograph of an animal tissue.



**Tissue A**

5.1	Give the name of tissue <b>A</b>	(1)
5.2	Describe TWO structural adaptation of tissue <b>A</b> for its functions.	(4)
5.3	If tissue <b>A</b> was taken from the human respiratory system, which part would that be?	(1)
5.4	Draw a fully labelled cell from tissue <b>A</b>	(4)
		<b>(10)</b>





**Activity 6**

Study the data in the following table showing the ability of tendons and ligaments to stretch and answer the questions relating to it.

One sample is a tendon and the other is a ligament.

	Test 1	Test 2	Test 3	Test 4	Test 5	Average
<b>Sample A</b>	0.04	0.08	0.1	0.06	0.9	1.18
<b>Sample B</b>	2.1	1.9	1.8	2.0	1.8	9.6

6.1	Which sample is most likely to be a tendon?	(1)
6.2	Explain your answer to QUESTION 6.1.	(2)
6.3	Give ONE function of ligaments.	(1)
6.4	Explain ONE feature of ligaments that make them well suited for their function.	(2)
6.5	Why was the investigation performed five times?	(1)
6.6	State TWO factors that must kept constant in this investigation.	(2)
6.7	Give a reason for the answer in QUESTION 6.6.	(1)
6.8	Calculate the difference in the amount of stretch in sample <b>A</b> between tests 2 and 4. Show all working.	(3)
		<b>(13)</b>

**Activity 7**

7 An investigation was carried out to determine the shortage of blood type 'O' that faces South Africa in three different blood banks (A, B,C). Blood from a person with blood type 'O' can be used safely in transfusion into patients of any other blood type.

Blood bank	UNITS OF TOTAL BLOOD in 2016 (litres)	
	Units of blood available	Units of blood required
<b>A</b>	20	35
<b>B</b>	122	550
<b>C</b>	181	510

7.1	How many blood units are needed in blood bank <b>C</b> to reach the maximum units required? Show ALL working.	(2)
7.2	Draw a bar graph to represent the units of blood available in each of the three different blood banks.	(6)
		<b>(8)</b>

**Activity 8**

8 Read the passage below and answer the questions

Soccer players around 35 years old and above usually experience problems with their ligaments and tendons.

Tendons are long fibres, made of tough connective tissue, attaching muscles to the bone. They have a large number of non-elastic fibres. Tendons are inelastic. This allows them to transmit the forces of contraction and relaxation to the bones so that movement can take place.

Ligaments are long fibres made of tough connective tissue. They join bone to bone and have a large number of elastic fibres. They can stretch to allow bones to move at joints.

8.1	State:	
	(a) ONE structural difference between ligaments and tendons	(2)
	(b) ONE functional difference between ligaments and tendons	(2)
	(c) The type of tissue making up tendons and ligaments	(1)
8.2	Explain why tendons need to be inelastic	(2)
8.3	What would happen if ligaments were made up of inelastic fibres?	(2)
8.4	If you dislocate your shoulder once, it may happen more easily at another time. Explain why you think this is so.	(2)
8.5	Suggest TWO things that athletes can do to prevent injuries to their ligaments and tendons.	(2)
		<b>(13)</b>



## Topic: Support system in Animals

### Activity 1

Give the correct **biological term** for each of the following descriptions.

No.	Description	Biological Term
1.1	Part of the human skull that encloses and protects the brain.	
1.2	Longest bone of the pectoral girdle.	
1.3	Long bone of the upper leg.	
1.4	Long bone in line with the thumb in the lower arm.	
1.5	Long bone in line with the little finger in the lower arm.	
1.6	Bones of the wrist.	
1.7	A structure that attaches bone to bone.	
1.8	A tough band of inelastic fibrous tissue that attaches a bone to a muscle.	
		(8)



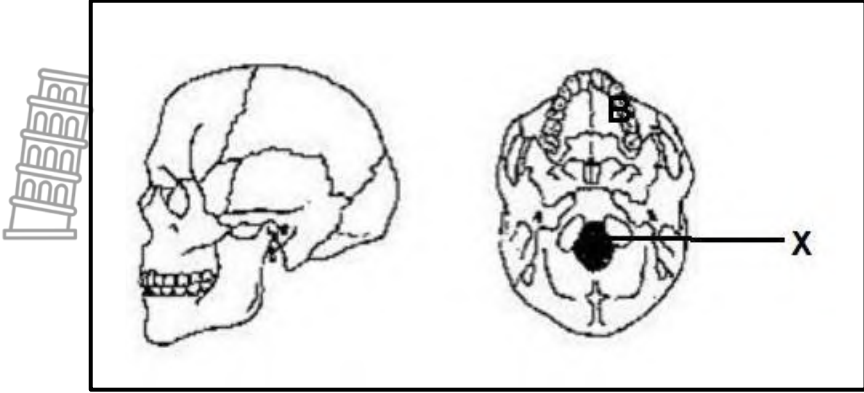
**Activity 2**

2 The diagram below shows a part of a human skeleton.

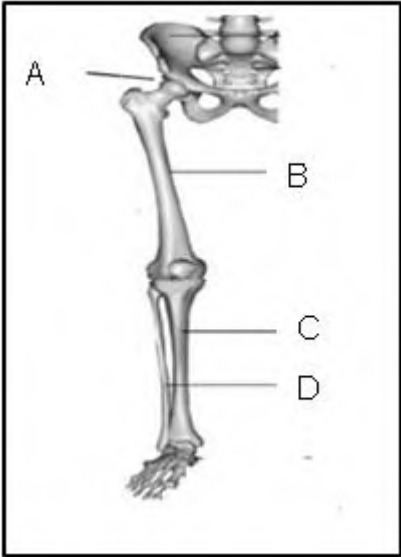
2.1	Label parts:	
	(a) D	(1)
	(b) E	(1)
2.2	Give the LETTER/S of the part/s making up the pectoral girdle	(2)
2.3	Name the type of synovial joint found between:	
	(a) B and G	(1)
	(b) C and E	(1)
2.4	TWO sets of muscles are attached to the front and back of the humerus respectively	
	(a) Name these TWO muscles.	(2)
	(b) State how these muscles function to bring about movement.	(1)
		<b>(9)</b>



**Activity 3**

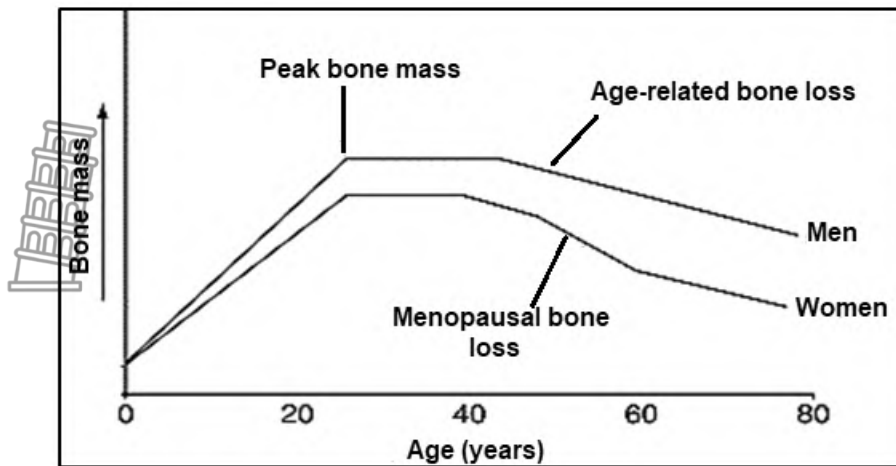
3	The diagram below represents the side and ventral views of the human skull.		
			
3.1	To which one of the two main sections of the skeleton do these structures belong?	(1)	
3.2	Identify the opening marked X.	(1)	
3.3	Which vertebra does this part of the skeleton articulate with?	(1)	
			<b>(3)</b>

**Activity 4**

4	The diagram below of part of the pelvic girdle and lower limbs.		
			
4.1	Provide labels for:		
	(a) C	(1)	
	(b) D	(1)	
4.2	Name the joint found at A.	(2)	
			<b>(4)</b>

**Activity 5**

5 The graph below shows bone mass of different ages.



- 5.1 Describe the relationship between bone density and age from 60 to 80 years in women (2)
  - 5.2 State the part of the body that is protected by the cranium. (1)
  - 5.3 List THREE functions of a skeleton other than giving protection, (3)
- (6)**

**Activity 6**

6 Osteoporosis is a disorder whereby bones develop small pores and can easily break

An investigation was conducted to determine the frequency of Osteoporosis amongst different age groups of men and women.

The investigators carried out a survey amongst 500 men and 500 women of different age groups in a certain country.

The results of the survey are shown in the table below.

AGE GROUP (years)	FREQUENCY OF OSTEOPOROSIS (%)	
	Men	Women
20-35	0	2
36-50	2	5
51-65	8	25
65-80	26	35

- 6.1 Name: (1)
  - (a) The dependent variable (1)
  - (b) The age group with the lowest frequency of Osteoporosis (1)
  - 6.2 List **THREE** planning steps that the investigators considered. (3)
  - 6.3 Which gender shows the higher frequency of osteoporosis? (1)
  - 6.4 Draw a bar graph to show the results of the survey. (6)
  - 6.5 What conclusion can be drawn about the age of the participants and the frequency of osteoporosis? (2)
- (14)**

## Topic: Transport system in animals

### Activity 1

Give the correct **biological term** for each of the following descriptions.

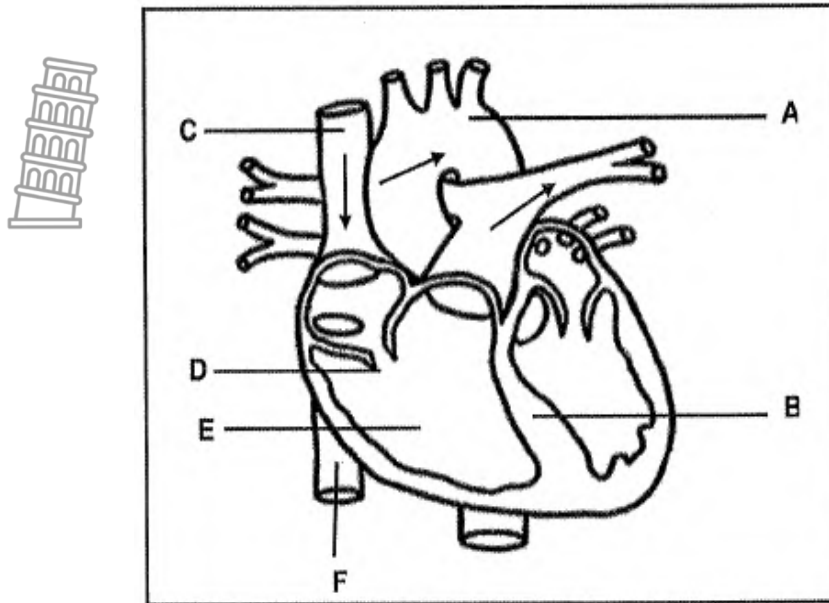
No.	Description	Biological Term
1.1	Blood vessel that carries oxygenated blood to the left atrium of the heart	
1.2	The largest artery in the body which leaves the left ventricle	
1.3	The chamber of the heart which has the pacemaker in its wall	
1.4	A type of an involuntary muscle found only in the heart	
1.5	Vessels that return components of tissue fluid back to the blood system	
1.6	Vessels that return components of tissue fluid back to the blood system	
1.7	The tissue which lines all blood vessels	
1.8	Blood vessels that allows entry and exit of substances through its walls	
1.9	Valve in the heart that controls movement between the right atrium and right ventricle	
1.10	The upper chambers of the heart	
		<b>10X1 (10)</b>

### Activity 2

2.	The diagram below shows the internal structure of a human heart.		
	2.1	Identify parts <b>1,4</b> and <b>6</b>	(3)
	2.2	Where is the blood at <b>2</b> coming from?	(1)
	2.3	Name the process that takes place when the structure at <b>3</b> contracts together.	(1)
	2.4	State the oxygen content of the blood in structure number <b>5</b>	(1)
			<b>(6)</b>

**Activity 3**

3. The diagram below shows a human heart



3.1	Identify part:	
	(a) D	(1)
	(b) E	(1)
3.2	State one function of vessel B	(1)
3.3	Explain what happens in valve A and F during ventricular systole.	(2)
3.4	Explain what will be happen if vessel C is blocked.	(3)
3.5	Tabulate TWO structural differences between vein and artery	(5)
		<b>(13)</b>

**Activity 4**

4 The table below shows the percentage of blood that passes through various organs.

ORGANS	Amount of blood flow (%)
Liver	25
Brain	15
Small intestine	15
Kidney	20
Other	X

4.1	Calculate the percentage of blood flow at X.	(2)
4.2	Draw the pie chart to represent the information in the table above	(6)
		<b>(8)</b>



**Activity 5**

5.	Read the passage below and answer the questions that follow.	
	<p>Doctors tell us to stay away from foods high in saturated fat, like butter, eggs and meat, because they are responsible for heart Disease.</p> <p>Dr Stephen Sinatra, a cardiologist who's been practicing for over 30 years and the author of <i>The Great Cholesterol Myth</i>, thinks it's wrong</p> <p>He says heart disease is caused by inflammation inside blood vessels, which is caused by numerous things such as eating too much sugar. Sugar damages arteries, increases blood pressure, and ages your organs. As sugar is found in soda drinks, candy, bread and pasta</p> <p>However, we should not confuse saturated fats with trans fats. Trans-fats are man-made fats and are in most processed foods.</p> <p>[The passage above has been adapted from an article by Lorie Johnson, a CBN News Medical Reporter (December 2012).</p>	
5.1	Name the TWO types of food that Dr Sinatra says should be avoided as they cause inflammation inside the arteries.	(2)
5.2	What type of fat is NOT naturally found in food	(1)
5.3	How is Dr Sinatra's theory about the cause of heart disease different from what most people believe?	(2)
5.4	Describe how fatty acid laid down in the arteries can lead to a heart attack.	(3)
		<b>(8)</b>

**Activity 6**

6	Diagrams A, B and C below represent the cross-section of three types of blood vessels.	
6.1	Identify the type of blood vessel in:	
	(a) Diagram B	(1)
	(b) Diagram C	(1)
6.2	Explain why blood vessel in diagram has a thicker smooth muscle layer.	(2)
6.3	Explain one structural adaptation of the blood vessel in diagram C	(2)
		<b>(6)</b>

**Activity 7**

7 The Diagram below form part of cardiac cycle. Study them carefully and answer the question which follow.

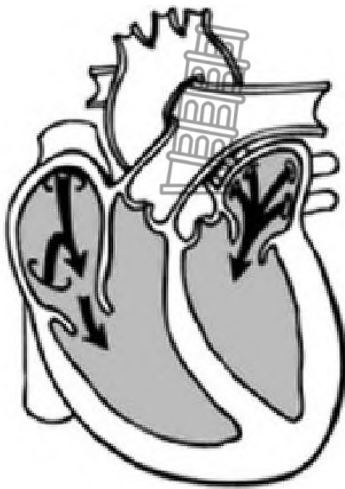


Diagram A

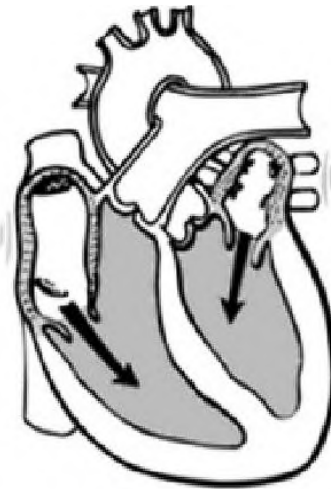


Diagram B

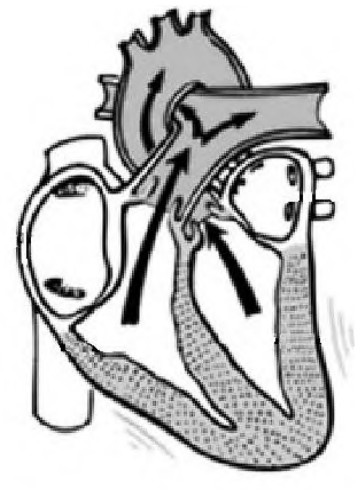


Diagram C

7.1	Name stages <b>A,B</b> and <b>C</b> respectively.	(3)
7.2	Describe what happens in the heart during phase B.	(4)
7.3	Name the special tissue that sends electrical impulses to the muscle fibre of the aorta causing them to contract.	(1)
		(9)

**Activity 8**

8.1	Describe the events of the cardiac cycle that moves blood containing oxygen And glucose through the human body.	(8)
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**Activity 9**

9.1	Describe the pathway of red blood cells as it travels from the right atrium of the heart back to the left atrium.	(8)
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## Topic: History of life on Earth

### Activity 1

Give the correct **biological term** for each of the following descriptions.

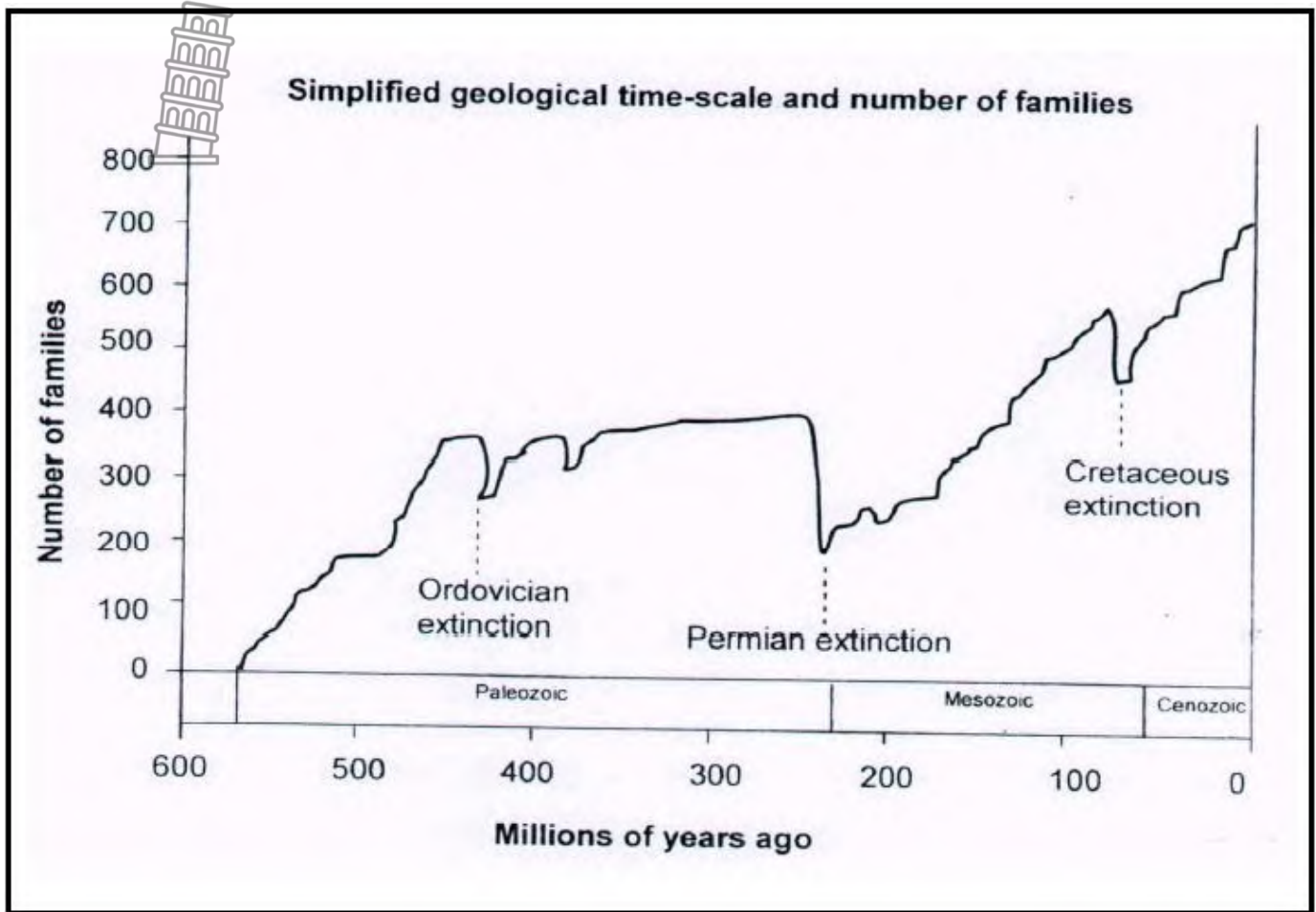
No.	Description	Biological Term
1.1	Process by which all members of a particular species die out so that not even a single one exist	
1.2	Study of life form that existed in previous geological period as represented by their fossil	
1.3	Upwards movements of plates	
1.4		
1.5	The process by which populations change over time due to the changes in their environment	
1.6	Evidence of ancient life	
1.7	Long period where earth experienced extremely cold weather	<b>(6 x 1)= 6</b>



**Activity 2**

2



The diagram below represents a simplified geological time scale showing how the number of families (groups of related species) has changed over a period of time.



2.1	What is a mass extinction?	(1)
2.2	When did the Cenozoic era begin?	(2)
2.3	Which mass extinction took place towards the end of Paleozoic era?	(1)
2.4	Approximately how many families went extinct at the end of the Paleozoic era? Show ALL workings.	(3)
2.5	Explain why the number of families increased rapidly after a mass extinction	(5)
		<b>(12)</b>



**Activity 3**

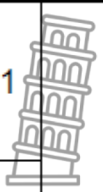
3	<p>The images below are two different fossils</p> <div style="display: flex; justify-content: space-around; align-items: center;"> <div data-bbox="277 331 644 654" style="border: 1px solid black; padding: 5px;"> <p><b>A</b></p>  </div> <div data-bbox="644 331 991 654" style="border: 1px solid black; padding: 5px;"> <p><b>B</b></p>  </div> </div>	
3.1	Identify:	
	(a) Fossil <b>A</b>	(1)
	(b) Fossil <b>B</b>	(1)
3.2	Describe how these fossils may have formed in sedimentary rock.	(4)
3.3	Name TWO other ways that fossils are formed, other than in sedimentary rock	(2)
3.4	Scientists use radioactive isotopes such as carbon-14 or potassium-40 to date fossils. What is this method of dating fossils called?	(1)
		<b>(9)</b>



**Activity 4**

4 The table below shows the timescale of a part of Earth’s history

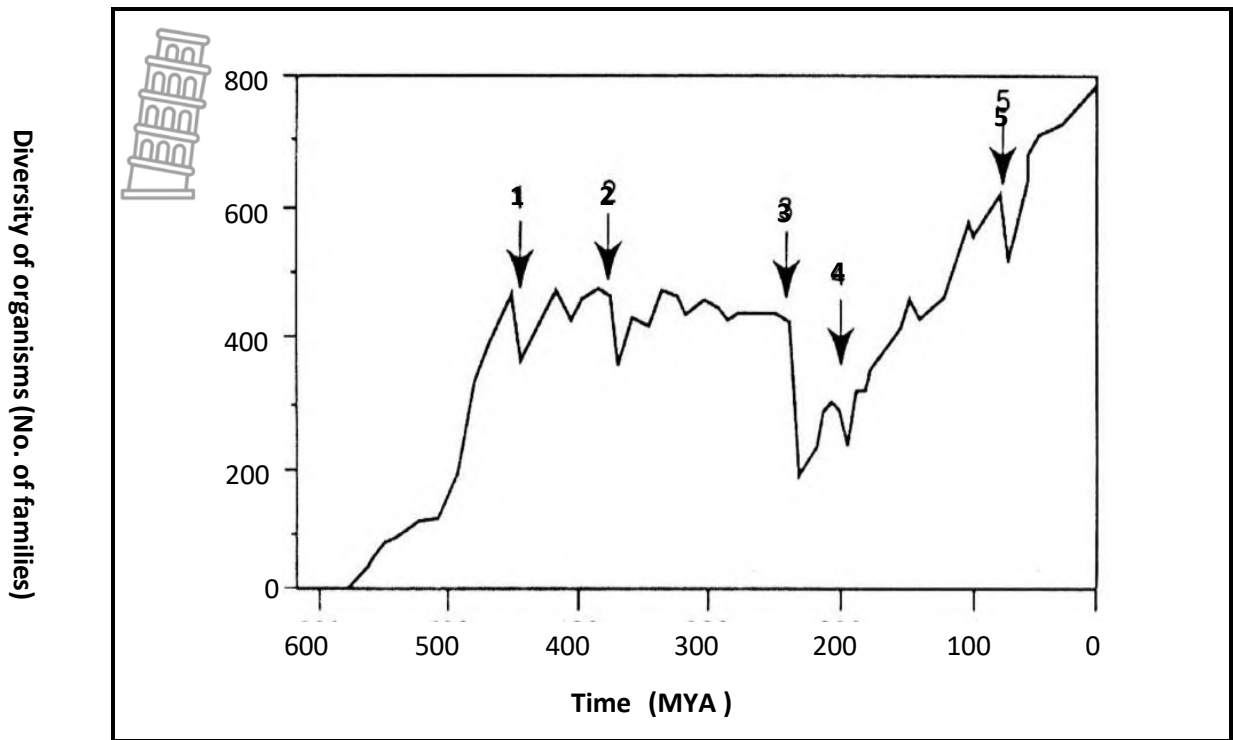
MYA	Era	Period	Fossils
298–251	Paleozoic	Permian	Trilobites, Ammonites, Fish, Animals with shells, Sponges, Jellyfish, Land plants, Corals, Amphibians, Insects, many more reptiles, Cone bearing plants
323–298		Pensylvanian	Trilobites, Ammonites, Fish, Animals with shells, Sponges, Jellyfish, Land plants, Corals, Amphibians, Insects, Reptiles
358–323		Mississippian	Trilobites, Ammonites, Fish, Animals with shells, Sponges, Jellyfish, Land plants, Corals, Amphibians, First insects, First reptiles
419–358		Devonian	Trilobites, Ammonites, Fish, Animals with shells, Sponges, Jellyfish, Land plants, Corals, Insects, First amphibians
443–419		Silurian	Trilobites, Ammonites, Fish, Animals with shells, Sponges, Jellyfish, Land plants, Corals
485–443		Ordovician	Trilobites, Ammonites, Fish, Animals with shells, Sponges, Jellyfish, First land plants
541–485		Cambrian	Trilobites, First fish, First animals with shells, Sponges, Jellyfish



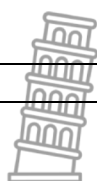
4.1	Which:	
	(a) period saw the arrival of the first land plants?	(1)
	(b) group of animals survived the longest in this era?	(1)
4.2	What do we call a time scale like the one above?	(1)
4.3	In which period above did an explosion (a large increase) in the number and diversity of fossils in the fossil record occur?	(1)
4.4	Scientists may use different layers of rock to work out if a new fossil was formed before or after a particular geological event. What do we call this method of dating fossils?	(1)
4.5	Scientists may use fossils like Ammonites to help them date other fossils found in the same layer. What do we call fossils like the Ammonites and others that help scientists to do this?	(1)
4.6	What do we call a scientist who studies fossils?	(1)
		<b>(7)</b>

**Activity 5**

5 The graph below shows the diversity of organisms over a period of Earth's history.

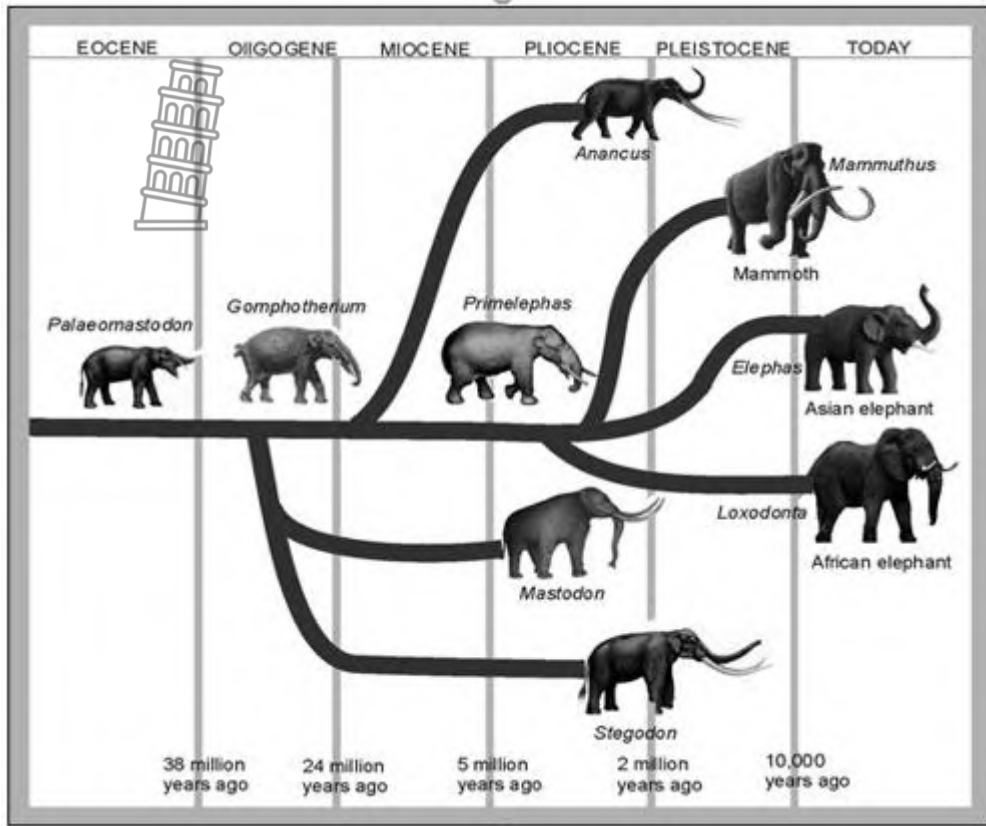


5.1	What do we call the events on the graph marked <b>1-5</b> ?	(1)
5.2	According to the graph, which event caused the greatest decrease in the diversity of organisms?	(1)
5.3	Scientists think that a volcano may have caused the decrease in diversity of organisms during the event marked <b>5</b> .  Explain how a volcano could cause so many species to die out.	(3)
5.4	Scientists have other theories about what may have caused the decrease in diversity of organisms at event marked <b>5</b> .  Name TWO other theories.	(2)
		<b>(7)</b>



**Activity 6**

6 The flow chart below shows the evolution of the modern day elephant



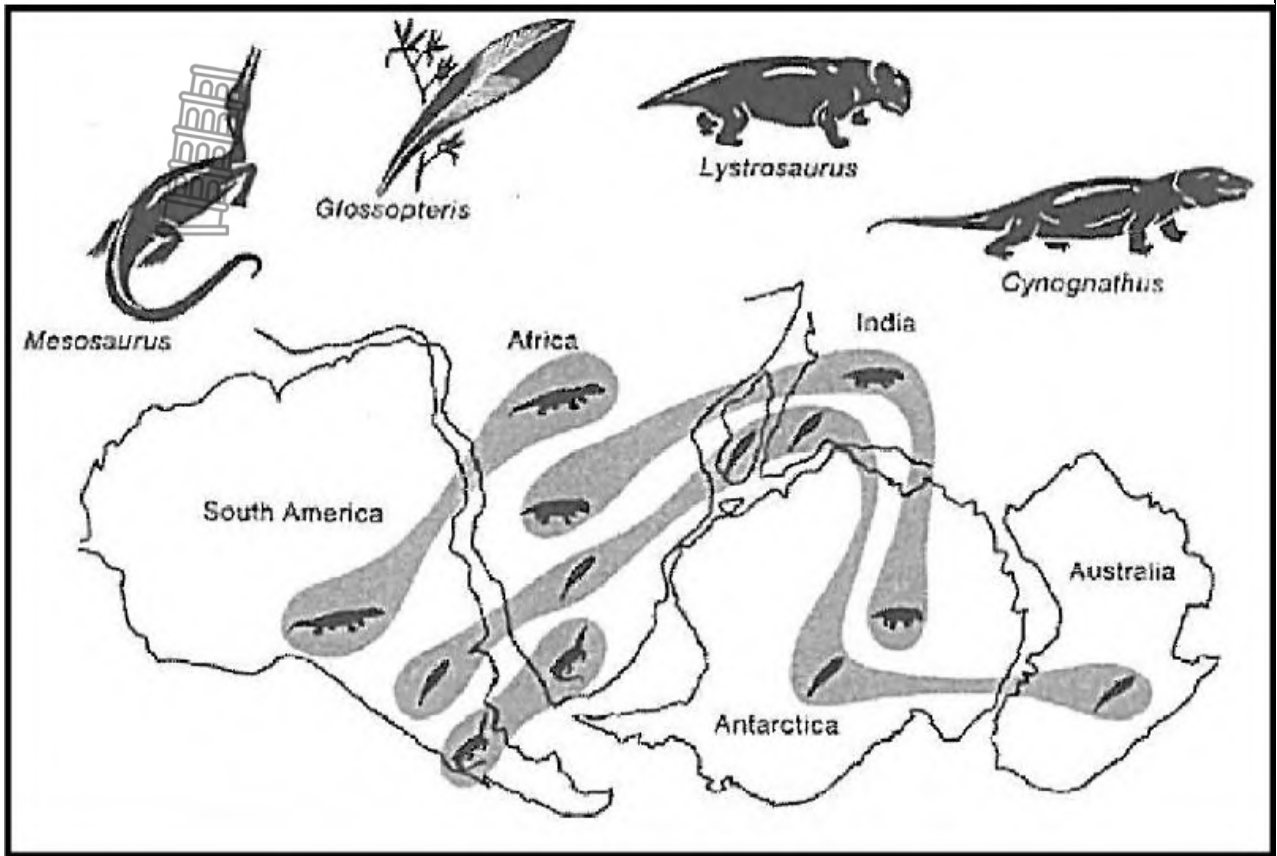
6.1	Name the earliest ancestor of the elephants.	(1)
6.2	When did the ancestor of the elephant first appear on Earth?	(1)
6.3	How does the ancestor differ from modern-day elephant?	(3)
6.4	Give the scientific name of the African elephant.	(1)
6.5	According to the flow chart, which evolved first- the African elephant or the mammoth?	(1)
6.6	When did the mammoth extinct?	(1)
6.7	Is the African under threat of becoming extinct? Give a reason for your answer .	(2)
		<b>(10)</b>





**Activity 7**

7 The diagram below shows the continents and different species



7.1	What do we call the study of the distribution of individual species?	(1)
7.2	Name the supercontinent evident in the diagram.	(1)
7.3	Using the diagram above, explain how fossil evidence supports the fact that Africa and South America may have once been joined as part of the same continent.	(2)
7.4	Which organism's fossil remains are found on all the land masses shown above?	(1)
		<b>(5)</b>



**Topic: Biosphere and ecosystem.**

**Activity 1**

Give the correct **biological term** for each of the following descriptions.

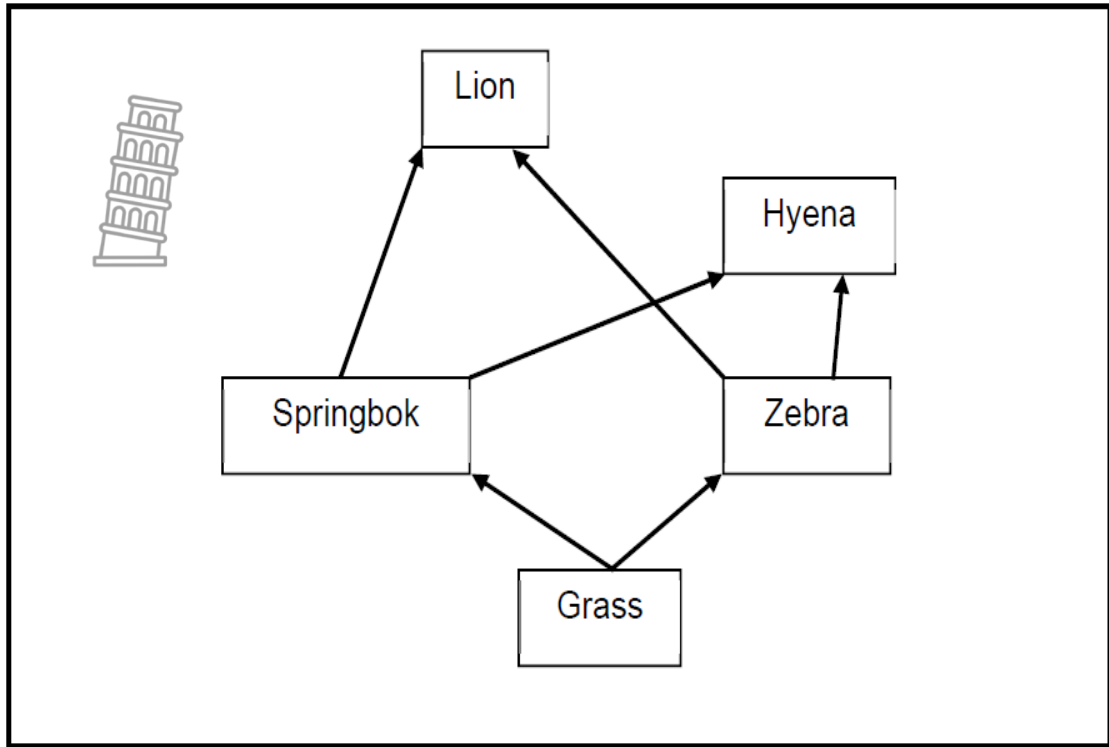
No.	Description	Biological Term
1.1	Any region with the distinct climate together with all the organisms that live in that	
1.2	The movement of energy from one trophic level to another in a food chain	
1.3	The path taken by the energy as it passes from one organisms to other in ecosystem	
1.4	Several food chain linked together to show all possible pathway of energy flow	
1.5	Animals that feed only on plant material	
1.6	The part of the biosphere that is made up of the waters of seas, lakes and rivers	
1.7	The soil and rocks forming the upper layers of the earth's surface	
1.8	The study of all the interaction or relationship within the ecosystem	
1.9	The air surrounding the earth's surface	
1.10	Non-living resources of the ecosystem	
1.11	All the living organisms within an ecosystem	
1.12	Organisms that feed on meat only	
1.13	Organisms that feed on both meat and plants	
1.14	Organisms that live in or around water	
		14X1 <b>(14)</b>

**Activity 2**

2.	Graph below represent part of food chain.	
	<div style="border: 2px solid black; padding: 10px; display: inline-block;">                     PLANT → GRASSHOPPER → BIRD → SNAKE → OWL                 </div>	
2.1	In the food chain above identify:	
	(a) Herbivore	(1)
	(b) Producer	(1)
2.2	In the food chain above snake is a consumer. Explain why do we call it a consumer?	(2)
2.3	Explain what will happen to the population of plants and grasshoppers if all the birds die.	(3)
		<b>(7)</b>

**Activity 3**

3. The diagram below shows food web.

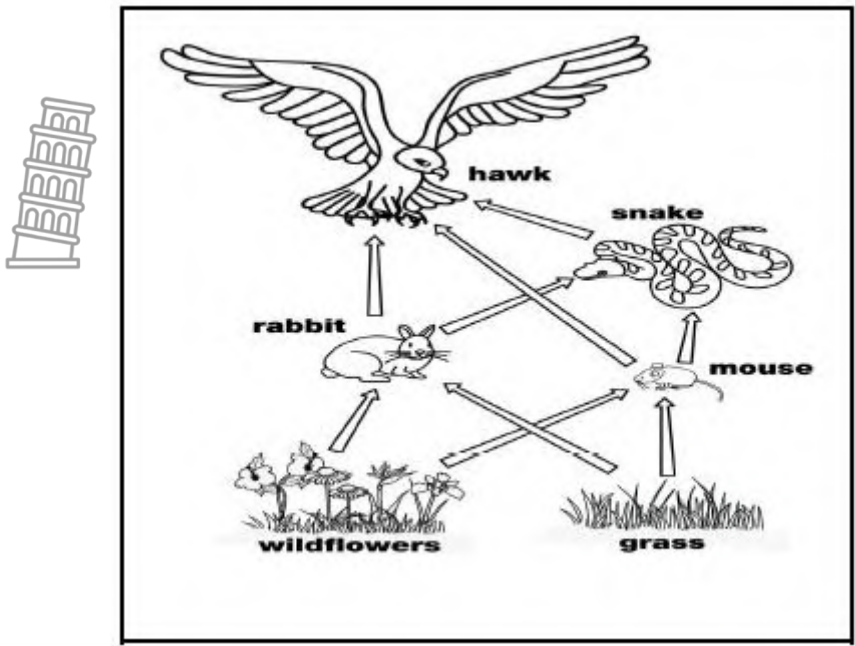


3.1	Name the organisms above that represent a...	
	(a) Producer	(1)
	(b) Primary consumer	(1)
3.2	Explain what may happen if the hyena was removed from this ecosystem	(3)
		<b>(5)</b>



**Activity 4**

4. The diagram below represent a feeding relationship of different animals in an ecosystem.



4.1	State the type of diagram above.	(1)
4.2	Define the term ecosystem	(2)
4.3	Identify an organisms in this diagram which is a:	
	(a) Herbivore	(1)
	(b) Tertiary consumer	(1)
4.4	Draw a food pyramid to show different trophic level of organisms in the diagram above.	(4)
4.5.	Explain the changes that may result in the ecosystem if the wild flowers and grass are removed from the area.	(2)
		<b>(11)</b>

**Activity 5**

5. Grade 10 learners investigated to determine water holding capacity of different soil types.

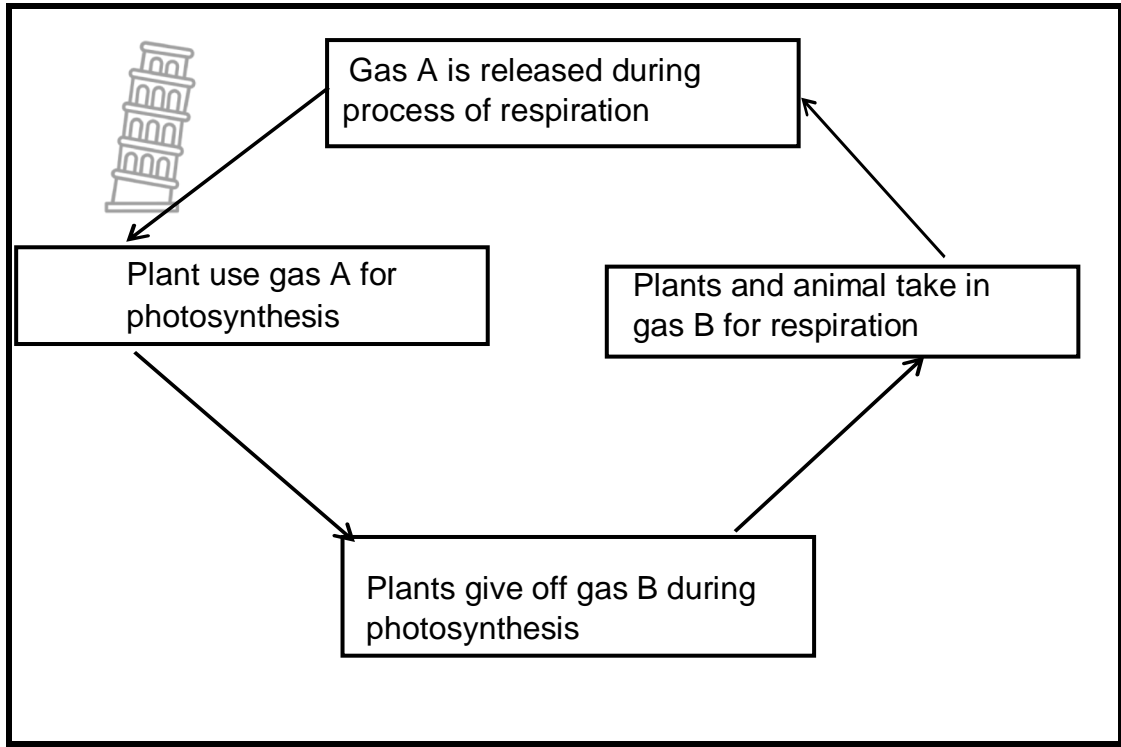
The result of the investigation is shown in the tale below.

Soil type	Amount of water retained (ml)
Soil X	60
Soil Y	190
Soil Z	100

5.1	Name the soil type that is best for planting crops.	(1)
5.2	Give a reason for your answer in QUESTION 5.1.	(2)
5.3	The total amounts of water were poured in soil X was 200 ml. Calculate the percentage of water that was drained out in soil X	(3)
		<b>(6)</b>

**Activity 6**

6. The flow diagram represent one of the nutrient cycle.

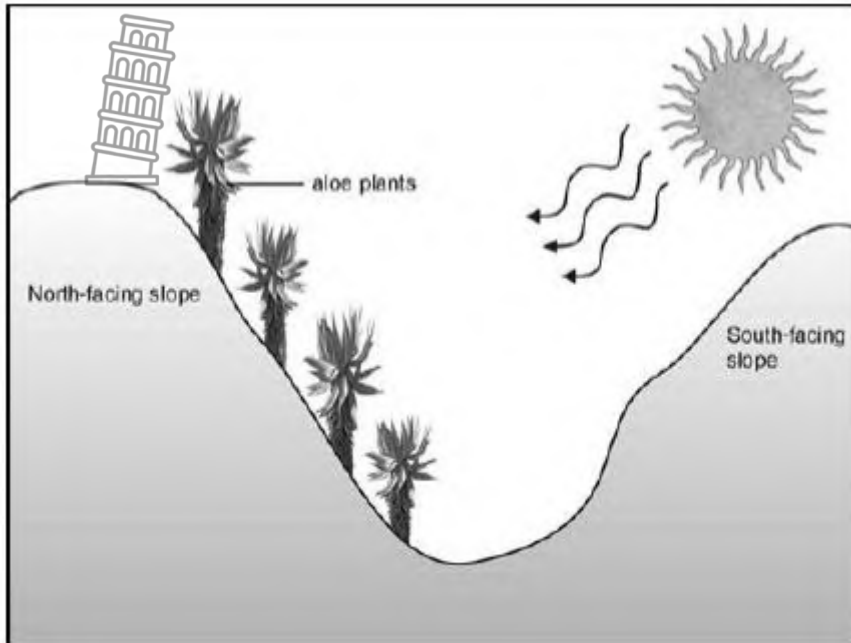


6.1	Identify the above nutrient cycle	(1)
6.2	Name gas:	
	(a) A	(1)
	(b) B	(1)
6.3	Gas A has been reported to be drastically increasing in the atmosphere due to human activities.	
	(a) Explain the impact that the increase of gas A in the atmosphere have on The environment.	(3)
	(b) Suggest TWO ways to reduce an increase of gas A in the atmosphere.	(2)
		<b>(8)</b>



**Activity 7**

7 Aloe generally grows on rocky north-facing slope, especially in the Eastern cape. Use the diagram below to answer the questions that follow.

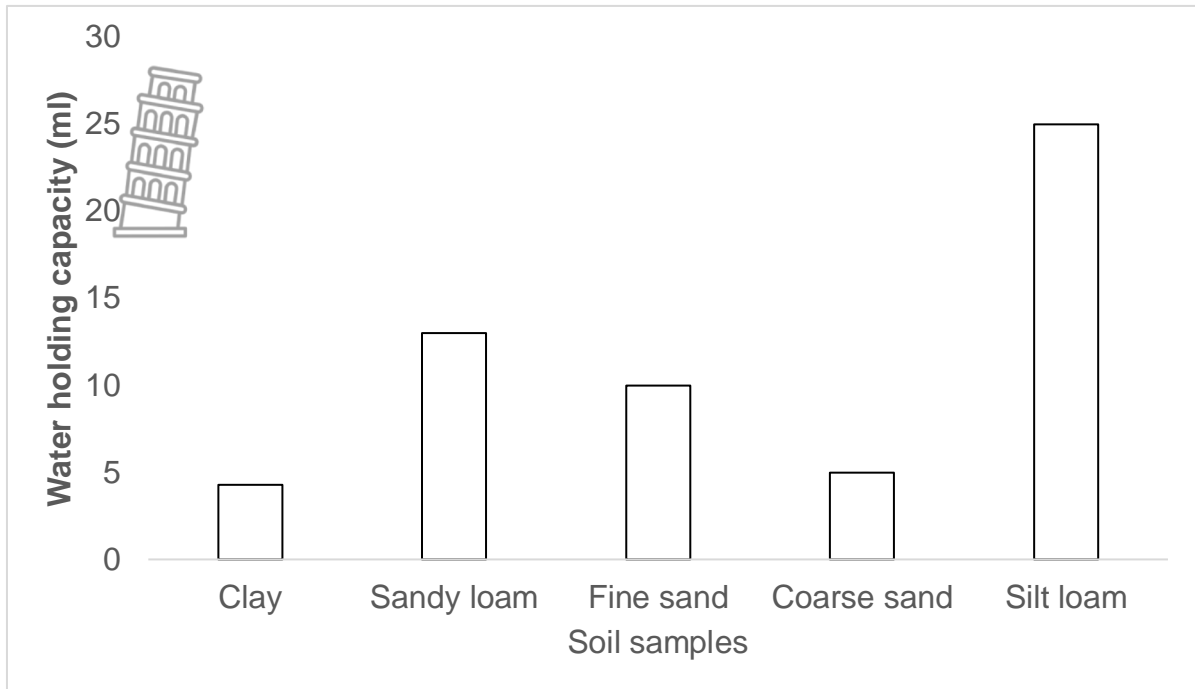


7.1	Give ONE structural adaptation of the leaves of aloe plants to its Xerophyte mode of life	(2)
7.2	Explain why do aloes prefer to grow on a north facing slope rather than on a south facing slope	(2)
7.3	Define the following terms:	
	(a) Aspect	(1)
	(b) Altitude	(1)
7.4	State TWO abiotic factors that can be seen in the diagram above.	(2)
		<b>(8)</b>



**Activity 8**

8 The graph below shows the results of an investigation carried out to determine the water capacity of different soil samples.



8.1	For this investigation identify the:	
	(a) Dependant variable	(1)
	(b) Independent variable	(1)
8.2	State the water holding capacity of silt loam	(1)
8.3	Give the soil type that has the lowest water holding capacity	(1)
8.4	State TWO ways in which the reliability of the investigation can be increased.	(2)
8.5	Explain what will happen to plant root if the soil become waterlogged	(3)
8.6	State TWO factors that should be kept constant in the investigation	(2)
		<b>(11)</b>

**Activity 9**

9.1	Describe the role of carbon dioxide in carbon cycle.	<b>(5)</b>
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**Activity 10**

10.1	Describe nitrogen cycle	<b>(8)</b>
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**Activity 11**

11 Nathan and Nqaba heard that the Spekboom plant is very good at storing carbon dioxide from the atmosphere which helps prevent the extreme increase in the Earth's temperature called global warming. This carbon dioxide is used by plants for photosynthesis.

They decided to investigate how quickly different plants absorb CO<sub>2</sub>.

They obtained three different types of plants from their local nursery: a Spekboom, an Aloe and a Prickly Pear. They made sure that the plants are of the same height. They planted them in equal sized pots with the same type and amount of soil. All three plants were placed in the same location and received equal amounts of water.

They measured the weight/mass of their plants in the pots at the start of the investigation. They then left the plants to grow for one month and measured their weight/mass again.

The results are shown in the table below.

Plant	Weight/Mass (g)		
	Start	End	Increase
Aloe	800	832	32
Prickly Pear	800	843	43
Spekboom	800	871	71

11.1	Identify the independent variable.	(1)
11.2	State the purpose of measuring the starting weight/mass of the plants?	(1)
11.3	Identify <b>TWO</b> ways that Nathan and Nqaba ensured the validity of their investigation	(2)
11.4	Give <b>ONE</b> way in which the reliability of their investigation could be improved?	(1)
11.5	Calculate the percentage increase in mass from the start to the end of the investigation of the Spekboom plant	(2)
11.6	Explain how using the weight gain of the plants will give Nathan and Nqaba an idea of how much CO <sub>2</sub> the plants are absorbing	(2)
11.7	Plot a bar graph of weight/mass increase of the three plants	(6)
		<b>(14)</b>



## Topic: Biodiversity and Classification

### Activity 1

Give the correct **biological term** for each of the following descriptions.

No.	Description	Biological Term
1.1	The sorting and grouping of organisms according to similarities and differences	
1.2	The large variety of living organisms found on Earth.	
1.3	Species found in one area and nowhere else in the world	
1.4	Species that occur naturally in a habitat	
1.5	Organisms that do not have a true nucleus	
1.6	The study of past and present distribution of biological organisms in the world	
		<b>(6 x 1) = 6</b>

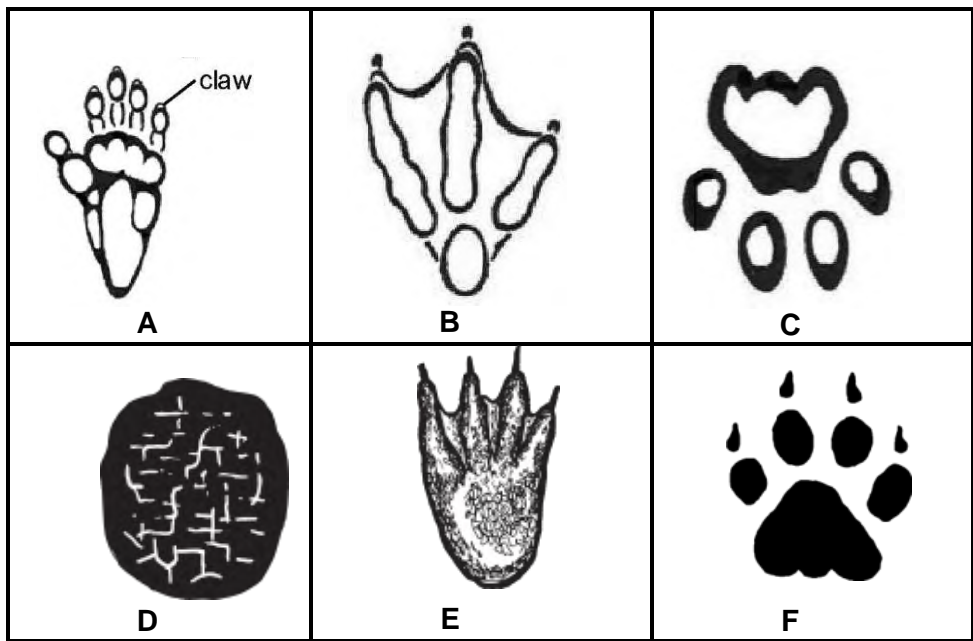
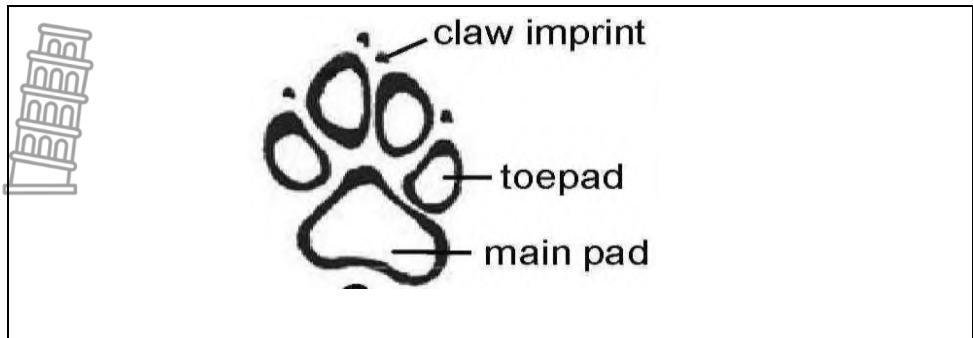
### Activity 2

2.		<p>Read the passage below and answer the questions that follow:</p> <div style="border: 1px solid black; padding: 10px; margin: 10px 0;"> <p>Carolus Linnaeus established a hierarchical classification system of grouping similar organisms together. He grouped from broad groups called Kingdoms down to the smallest group called species.</p> <p>Using his system, a lion is fully classified as follows:</p> <p>Animalia, Chordata, Mammalia, Carnivores, Felidae, panthera leo.</p> </div>	
	2.1	According to Linnaeus' system, which class does the lion belong to?	(1)
	2.2	The lion's scientific or binomial name, panthera leo, has been written incorrectly. Rewrite it correctly.	(2)
	2.3	Why is it necessary for organisms to have scientific names?	(2)
			<b>(5)</b>



**Activity 3**

3. Kuhle and Bongile found the animal tracks shown below while walking with their class in a nearby field. Their teacher gave them the key below to help them identify the footprints.



1	Track has distinct claw imprints	Go to 2
	Track does not have claw imprints	Go to 5
2	Track has four toepads	Go to 3
	Track has three or five toepads	Go to 4
3	Webbed foot	<b>Crocodile</b>
	Foot not webbed	<b>Cheetah</b>
4	Three toepads	<b>African Penguin</b>
	Five toepads	<b>Baboon</b>
5	Toepad imprints visible	Go to 6
	Toepad imprints are not visible	<b>Elephant</b>
6	Four toepad imprints	<b>Leopard</b>
	Three toepad imprints	<b>Dassie</b>

3.1	Use the key above to identify footprints <b>A, B, C</b> and <b>D</b> . Write down only the letter (A, B, C or D) and the name of the animal	(4)
		<b>(4)</b>

**Activity 4**

4. The table below shows how living organisms are classified according to the Five Kingdom classification system.

Kingdom	Body Structure	Nutrition
Monera	Unicellular, prokaryotic	Autotrophic / heterotrophic
(a)	Unicellular, eukaryotic	Autotrophic / heterotrophic
Fungi	Multicellular, eukaryotic, cell walls containing (b)	Heterotrophic
Plantae	Multicellular, eukaryotic, cell walls containing (c)	(d)
Animalia	Multicellular, eukaryotic, no cell walls	Heterotrophic

4.1	Fill in the missing pieces of information from the table labelled (a) to (d).	(4)
4.2	Define the term eukaryotic	(1)
		<b>(5)</b>

**Activity 5**




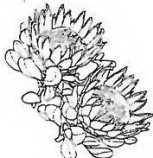
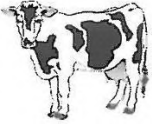
5. There are different ways of classifying organisms. The binomial nomenclature system is used internationally to classify and identify organisms, for example, humans are called *Homo sapiens*.

5.1	Name the scientist who came up with the binomial system of classification of organisms	(1)
5.2	Give the taxonomy names in humans used to represent the following	
	(a) <i>Homo</i>	(1)
	(b) <i>sapiens</i>	(1)
5.3	In which class would you classify all organisms that have fur on their bodies and can maintain a constant internal body temperature?	(1)
5.4	State ONE criterion scientists used to classify organisms.	(1)
		<b>(5)</b>



**Activity 6**

6. According to the Five-Kingdom system of classification, each of the organisms shown below belongs to a different Kingdom. Complete the table by filling in the missing words. Write down only the question number (6.1–6.10) and the answer, for example 6.1 Animalia.

<b>Organism</b>					
<b>Kingdom</b>	6.1	Protista	Fungi	6.2	Animalia
<b>Genus</b>		Paramecium	Agaricus	Protea	Bos
<b>Species</b>		caudatum	Bisporus	Cynaroides	Taurus
<b>Prokaryote or Eukaryote</b>	6.3	6.4	Eukaryote	Eukaryote	6.5
<b>Unicellular or Multicellular</b>	6.6	Unicellular or Multicellular	Multicellular	6.7	Multicellular
<b>Method of Feeding</b>	Autotrophic and heterotrophic	Autotrophic, Heterotrophic and Saprophytic	6.8	6.9	
<b>Scientific name</b>		6.10			

6.1	Write numbers 6.1 – 6.10 and fill in the missing words	(10)
		(10)



**Activity 7**

7. Read the extract below and answer the questions that follow.

Carolus Linnaeus established a hierarchical classification system of grouping similar organisms together. He grouped from broad groups called Kingdoms down to the smallest group called species.

Using his system, a lion is fully classified as follows:  
Animalia, Chordata, Mammalia, Carnivores, Felidae, panthera leo.

7.1	According to Linnaeus' system, which class does the lion belong to?	(2)
7.2	The lion's scientific or binomial name, panthera leo, has been written incorrectly. Rewrite it correctly.	(2)
7.3	Why is it necessary for organisms to have scientific names?	(1)
		<b>(5)</b>



