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PROVINCE OF KWAZULU-NATAL

DEPARTMENT OF EDUCATION

STEP-AHEAD SUPPORT DOCUMENT

LEARNER ACTIVITIES

GRADE 10

LIFE SCIENCES

JANUARY 2021

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PREFACE

This support documents serves to assist Life Sciences teachers and learners on how to deal with curriculum gaps and learning losses as a result of the impact of COVID 19 in 2020. It also captures the challenging topics in the Grade 10 work. The Activities document should be used in conjunction with the 2021 Recovery Annual Teaching Plan. It will cover the following:

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TERM 1

TOPIC: Inorganic and Organic Compounds

Activity 1

1 The table below shows some of the elements in the human body and their percentage composition:

Elements	% composition
1. Oxygen	65
2. Carbon	18
3. Hydrogen	10
4. Nitrogen	3
5. Sodium	0,15
6. Calcium	0,05
7. Iron	0,004
8. Iodine	0,0004

1.1 Name TWO micro-nutrients in the table and state ONE reason for your choice. (3)

1.2 Name TWO macro-nutrients in the table and state ONE reason for your choice (3)

1.3 Name ONE element found in proteins BUT not in a lipid (1)

1.4 Name an element from the table that forms:

1.4.1 Part of haemoglobin (1)

1.4.2 Part of the hormone that regulates metabolism (1)

1.4.3 Helps in the growth of bones (1)

1.5 State ONE function of each of:

1.5.1 Haemoglobin (1)

1.5.2 chlorophyll (1)

1.6 Explain why the percentage composition of carbon, hydrogen and oxygen is higher in the human body compared to other microorganism (2)

(14)

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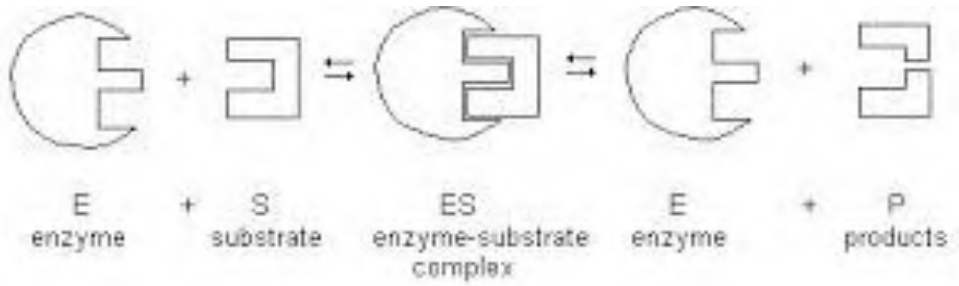
Activity 2

2. Study the following diagram and answer questions that follow:



2.1 Name and describe the mechanism above that shows how enzymes work (7)

2.2 Which LETTER in the reaction represents the enzyme? (1)

2.3 Give a reason for your answer to QUESTION 2.2 (2)

2.4 Explain the function of the enzyme in the above reaction (3)

2.5 Explain the properties of an enzyme as according to the above diagram (2)

(15)

Activity 3

3. A learner carried out three food tests on samples of peanut, apple and potato. The following table shows the results of the tests that were carried out. On the table, a tick (✓) shows a positive result and a cross (**X**) shows a negative result

TEST	CHEMICAL/REAGENT	PEANUT	APPLE	POTATO
P	Iodine solution	✓	✓	✓
Q	Fehling's A and B OR Benedict's solution	X	✓	X
R	Ether OR alcohol	✓	X	X

3.1 Which type of food test was carried out at:

3.1.1 P (1)

3.1.2 Q (1)

3.1.3 R (1)

3.2 Name TWO organic foods present in:

3.2.1 Peanut (2)

3.2.2 Apple (2)

3.3 What colour change would the learner observe at the end of testing:

3.3.1 An apple sample in test Q? (1)

3.3.2 A potato sample in test P? (1)

3.4 For which of the tests (P, Q or R) is it necessary to heat the contents of the test tube? (1)

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3.5 If a protein test was done on peanuts:

3.4.1 Name the reagent / chemical used to test it (1)

3.4.2 What colour would the learner observe in a positive test (1) **(12)**

Activity 4

4. THE SCIENTIFIC METHOD

Amylase is an enzyme that hydrolyses (breaks down) starch into sugars in humans. Sipho conducted an investigation where a solution of amylase was mixed with a starch suspension. The mixtures were kept in water baths at different temperatures for 15 minutes

4.1 What is the aim of the above investigation? (2)

4.2 Name the following variables in the above investigation:

2.2.1 Independent (1)

2.2.2 dependent (1)

4.3 Write a hypothesis for the above investigation (2)

4.4 How would Sipho improve the reliability of the investigation? (2)

4.5 Name FOUR factors that should to be kept constant in the above Investigation (4)

At the end of the time, the samples were analysed to find out how much sugar was produced. The results of the above investigation are recorded in the table below:

Temperature (^{0}C)	00	10	20	30	40	50	60	70
Units of sugar	12	36	65	90	90	30	4	2

4.6 Plot a line graph to show the results of the above investigation. (6)

4.7 What conclusion can be made about the action of salivary amylase (2)

4.8 Will you accept or reject your hypothesis? Give a reason for your answer (2)

4.9 Define optimum temperature (2)

4.10 What is the optimum temperature for the action of salivary amylase? (2)

(26)

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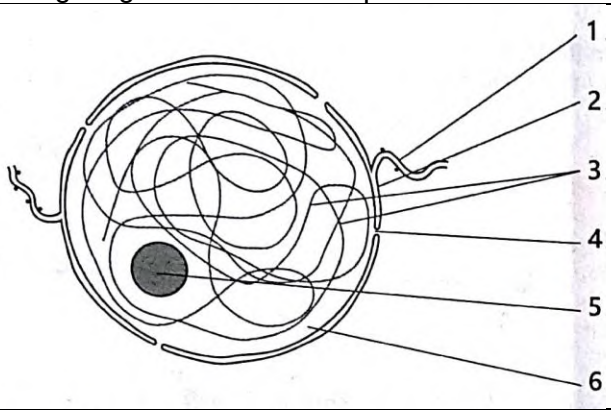
TOPIC: Cell and Mitosis

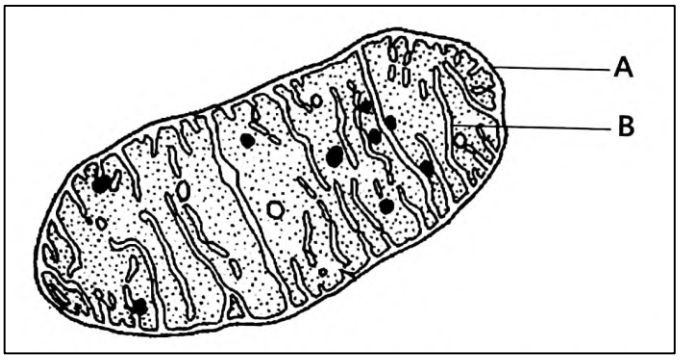
Activity 1

1.	**Give the correct biological term for each of the following:**			
	1.1	An organism that does not have a true nucleus.	(1)	
	1.2	Organisms that are made up of a single cell.	(1)	
	1.3	Organisms with true nucleus enclosed by a nuclear membrane.	(1)	
	1.4	A basic unit of life.	(1)	
	1.5	Small membrane- bound structures, with special functions found inside the cells.	(1)	
			(5)	

Activity 2

2.	Study the following diagram and answer questions that follow:			
				
	2.1	Where is the cytoplasm found?	(1)	
	2.2	Describe the appearance of cytoplasm.	(1)	
	2.3	List four compounds that are found in the cytoplasm.	(4)	**(6)**

Activity 3

3.	**The questions that follow are based on the drawing from a micrograph of a cell organelle**:			
		 A drawing from a micrograph of a cell organelle (magnification: 25000x)		
	3.1	Identify the organelle shown above.	(1)	
	3.2	Name the parts labelled A and B	(2)	
	3.3	Name the biochemical process that occurs in this cell organelle	(1)	
	3.4	Calculate the actual length of the organelle in millimetres (mm). Show all your working.	(3)	**(7)**

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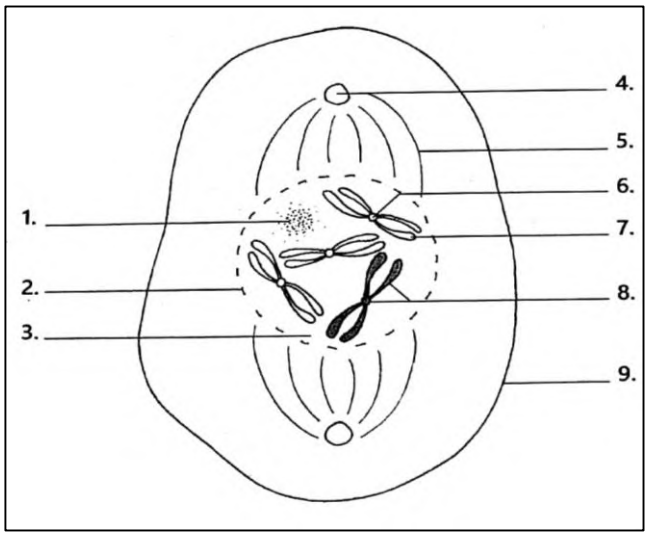
Activity 4

4. Give the correct biological term for the following definitions

4.1	When a vacuole of a cell is full of cell sap and presses against the cell wall, the cell will be	(1)
4.2	A vacuole that collects up excess water in a unicellular organism and then expels it	(1)
4.3	The movement of water into a cell.	(1)
4.4	The process of maintain a constant volume of water inside a unicellular organism	(1)
4.5	A plant cell is said to be_____ when it has lost of water and the cell is no longer firm	(1)
4.6	The movement of water out of a cell.	**(1)**
		(6)

Activity 5

5. Study the diagram the following diagram and answer the questions that follow:



5.1	Provide the label for the following diagram. Write them next to each of the numbers.	(9)
5.2	Is this a plant or animal cell? Give a reason for your answer	(2)
		(11)

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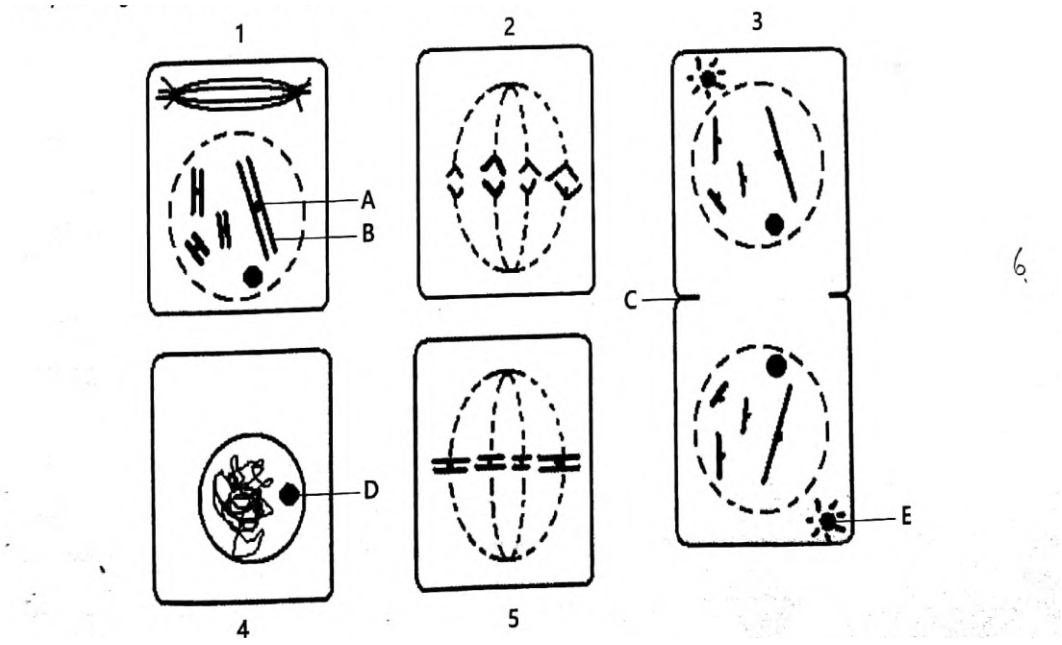
Activity 6

6. Study the diagrams below , which represent different phases of mitosis, and anwer questions that follow:



6.1 label structured A,B,D and E (4)

6.2 By making use of numbers only , arrange the phases into correct sequence (5)

Write down the number of chromosomes in a daughter cell at the end of the process shown in the diagrams above

(6)

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TERM 2

TOPIC: Animal and Plant Tissues

Activity 1

1

1.1 The basic unit of life (1)

1.2 A group of cells with the same structure that perform the same function (1)

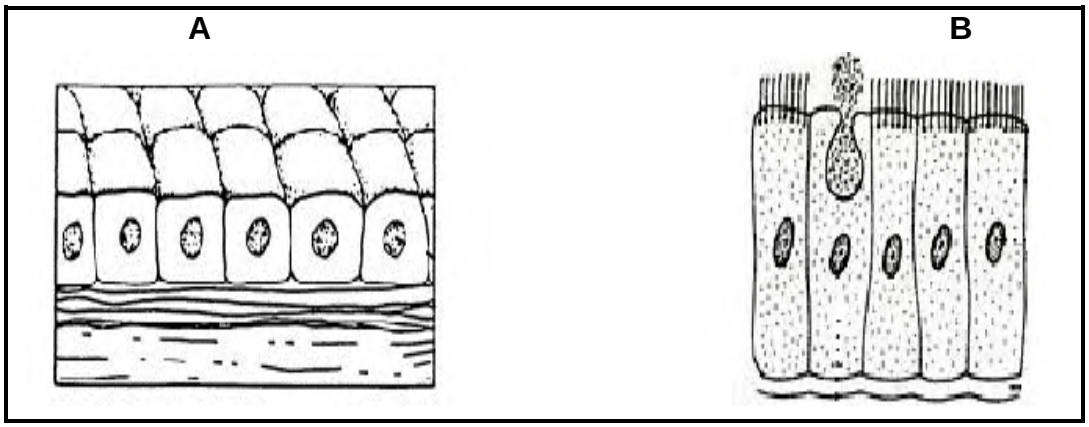
A plant tissue that consists of undifferentiated cells that are actively dividing (1)

Tissues that contain non-dividing cells (1)

(4)

Activity 2

2. A student examined sections of animal tissue and observed the following:



2.1 Identify tissue:

2.1.1 **A** (1)

2.1.2 **B** (1)

2.2 Why can **A** and **B** all be classified as tissues? (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)

(9)

Activity 3

3. Answer the following questions about connective tissues

3.1 Provide the name of the type of connective tissue that: (1)

3.1.1 Joins bone to bone (1)

3.1.2 Forms continuous layer under the skin (1)

3.1.3 Reduces friction (1)

3.1.4 Transport digested food, gases and excretory wastes

3.2 Explain why:

3.3.1 Bone tissue is hard (2)

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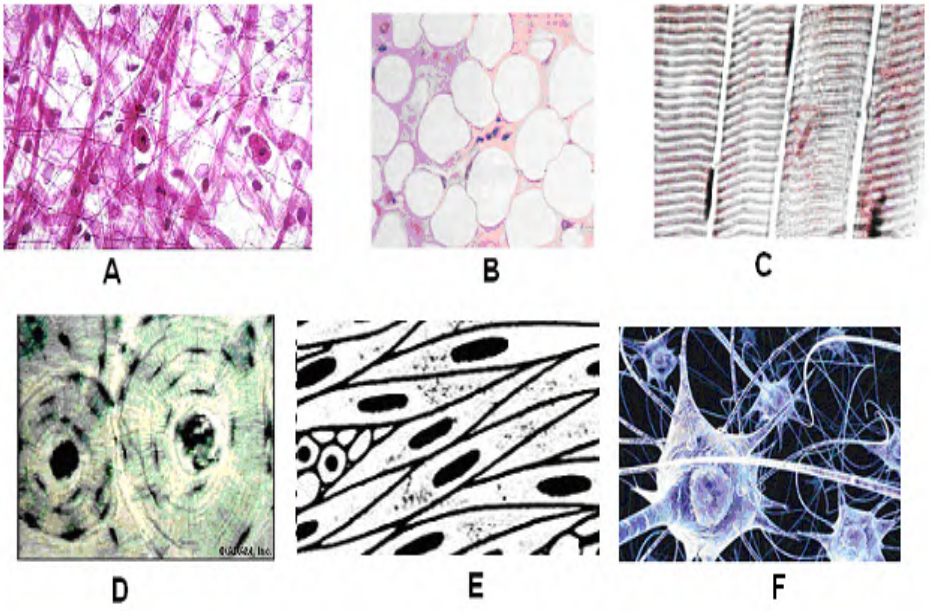
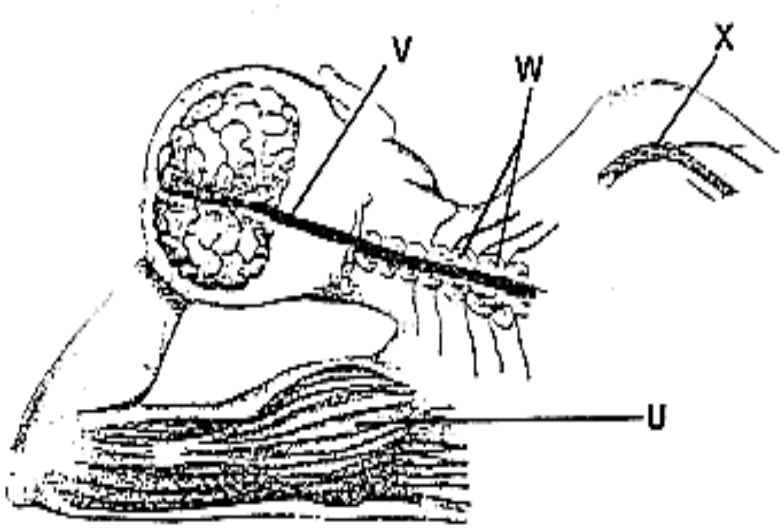
3.3.2 Loose connective tissue can stretch (2)
3.3.3 Fibrous connective tissue is strong (2)
(10)

Activity 4

4. The electron micrographs /photos below that show different animal tissues and the



The diagram below shows part of the structure of the human body.



4.1 Which tissue shown on the micrograph above (A to F) will surround the organ labelled U? Give the **letter** and the **tissue name**. (2)
4.2 Give the **letter** of the tissue (A to F) which forms:
4.2.1 the organ labelled U? (1)
4.2.2 the cord labelled V? (1)
4.3 Give the functional difference between tissue **C** and **E** (2)
4.4 Explain what will happen if tissue F failed to function. (2)
(8)

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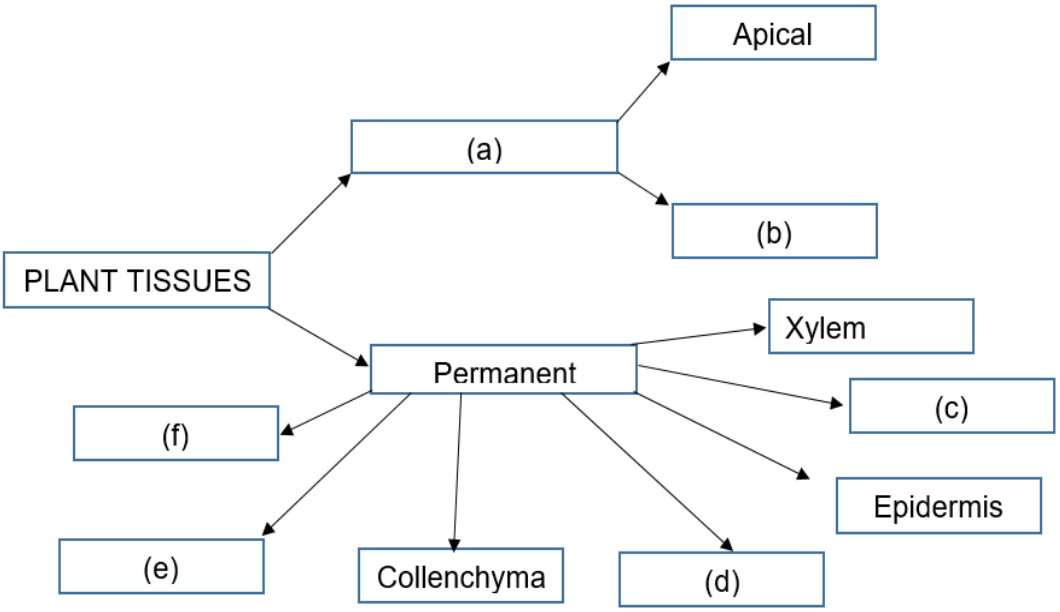
Activity 5

5. Study the following flowchart on plant tissues and answer the questions that follow:



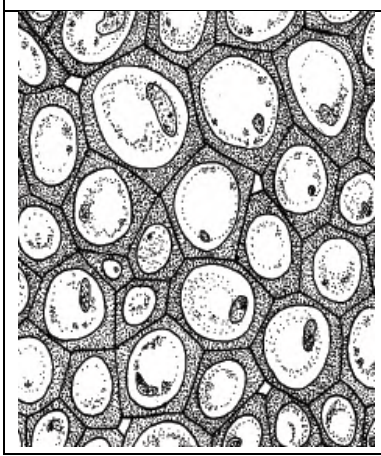
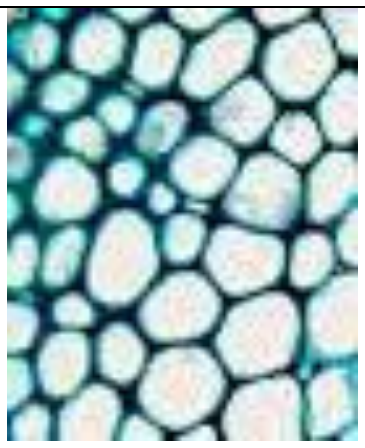
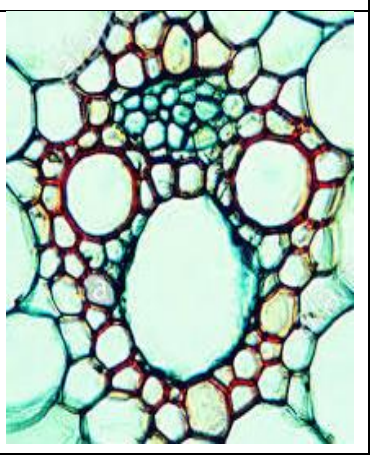
5.1 Write down letters (a) to (f) and next to each letter the correct term. (6)

5.2 Tabulate the TWO differences between apical and lateral meristematic tissues (5)

(11)

Activity 6

6. The diagrams below show various tissues

A	B	C
		

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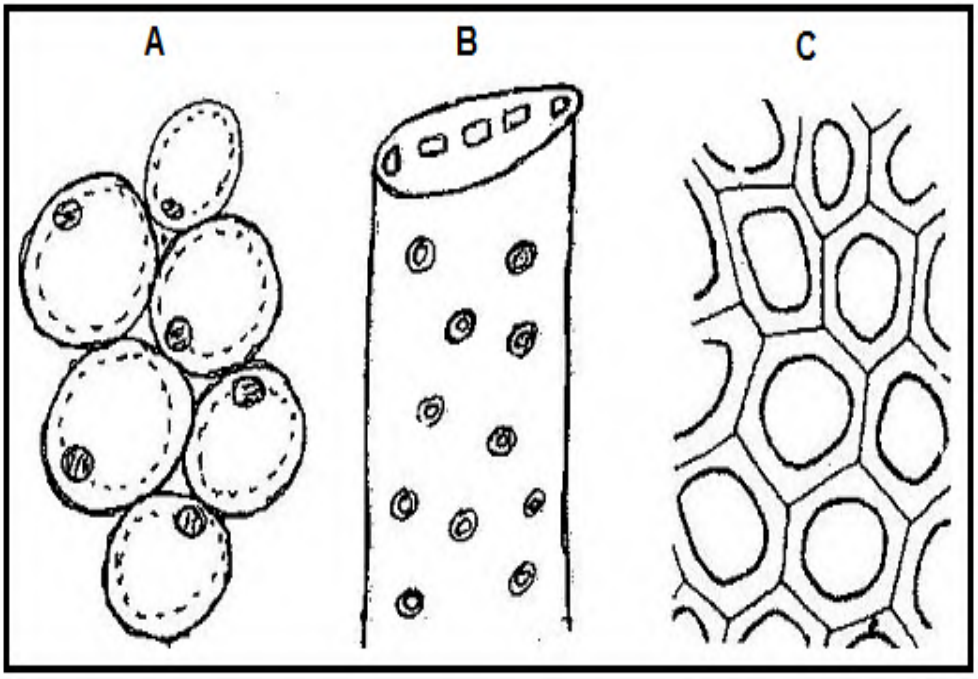
6.1 Draw the following table in your notebook and complete the information required in the table below:

Tissue	Name	Location	Function
A	6.1.1 _____	6.1.2 _____	6.1.3 _____
B	6.1.4 _____	6.1.5 _____	6.1.6 _____
C	6.1.7 _____	6.1.8._____	6.1.9 _____

(9)

Activity 7

7. Study the following plant tissues and answer questions that follow:



7.1 Give the LETTER and the NAME of the tissue which:
7.1.1 Transports water and minerals up a plant (2)
7.1.2 Provides mechanical support to the plant (2)
7.2 Explain TWO ways in which tissue **B** is structurally suited for its function. (4)
(8)

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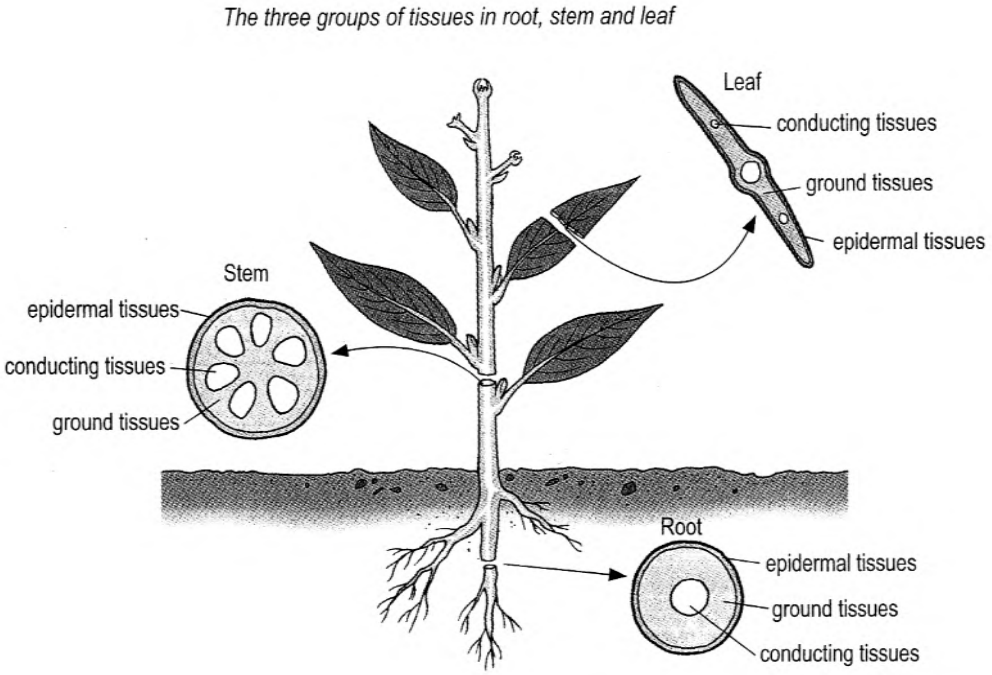
Organ: Leaf

Activity 1

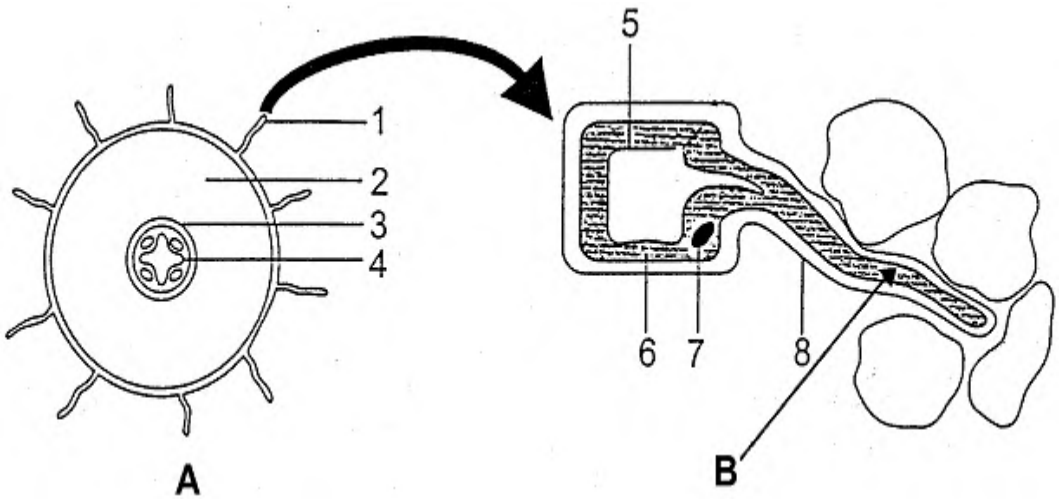
1. The diagram below shows the cross section of the leaf, stem and root of a plant



1.1 State two functions of the root. (2)
1.2 State two functions of the stem (2)
1.3 Name the TWO conducting tissues found in the plant. (2)
(6)

Activity 2

2.



2.1 Which organ is represented by cross-section A? (1)
2.2 Identify parts numbered 2, 5 and 8. (3)

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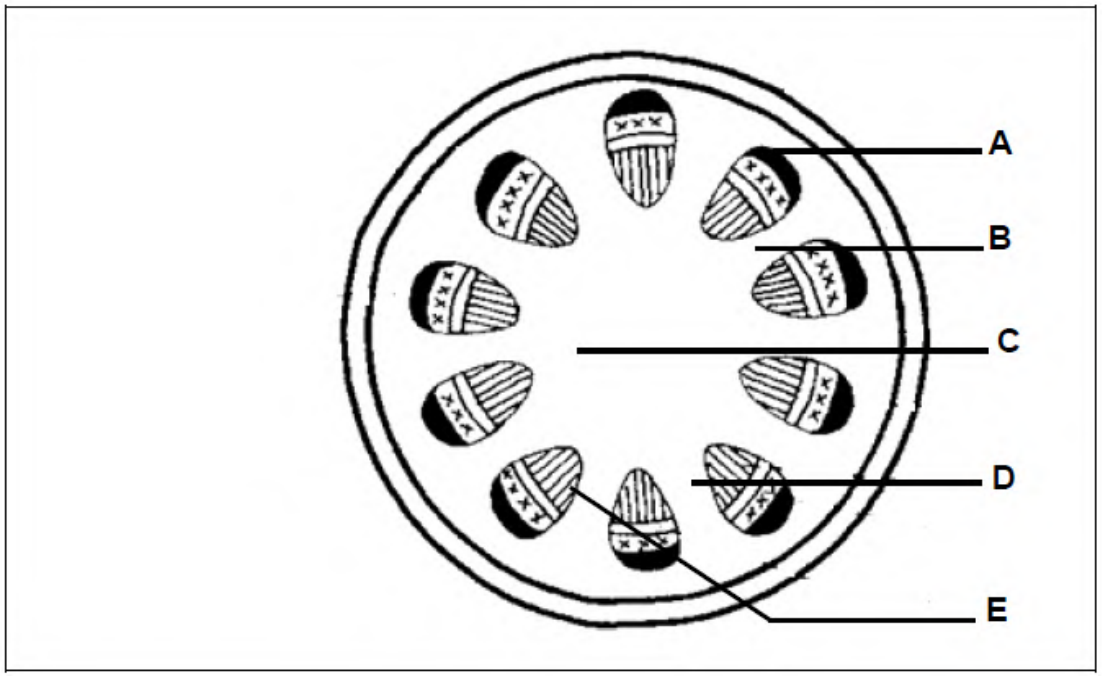
2.3 Give ONE function of each of the labels 3 and 4. (2)

2.4 Explain TWO structural characteristics which allow effective functioning of part numbered 4. (4)

(10)

Activity 3

3. The following diagram represents the internal structure of stem



3.1 Supply labels for parts A, D and E (3)

3.2 State TWO ways the above diagram represents the stem and not the root. (2)

3.3 State the function of B and C (2)

(7)

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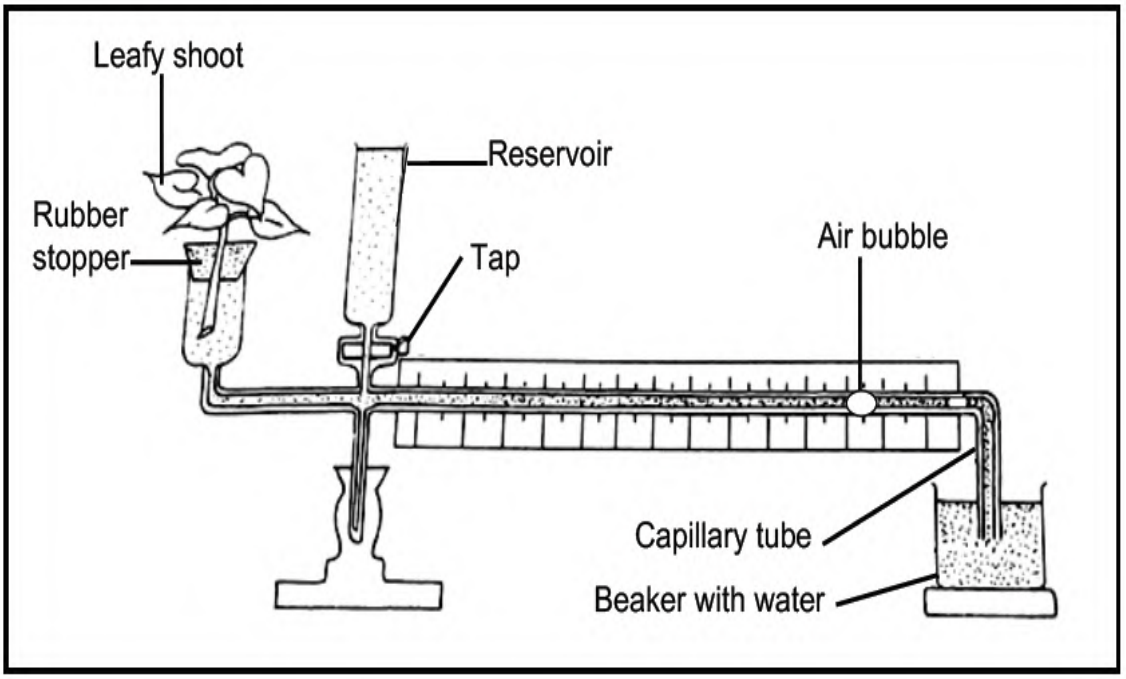
Transpiration

Activity 4

4. 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.



4.1	Identify the apparatus shown above.	(2)
4.2	For this investigation identify the:	
	(a) Independent variable	(1)
	(b) Dependent variable	(1)
4.3	4.3.1 Explain why the leafy shoot should be cut underwater.	(2)
	4.3.2 Explain the purpose of the air bubble.	(2)
	4.3.3 What is the purpose of the water in the reservoir?	(1)
	4.3.4 State ONE way in which the Grade 10 learners ensured the reliability of this investigation.	(1)
	4.3.5 State TWO factors that should be kept constant in this investigation.	(2)
		(11)

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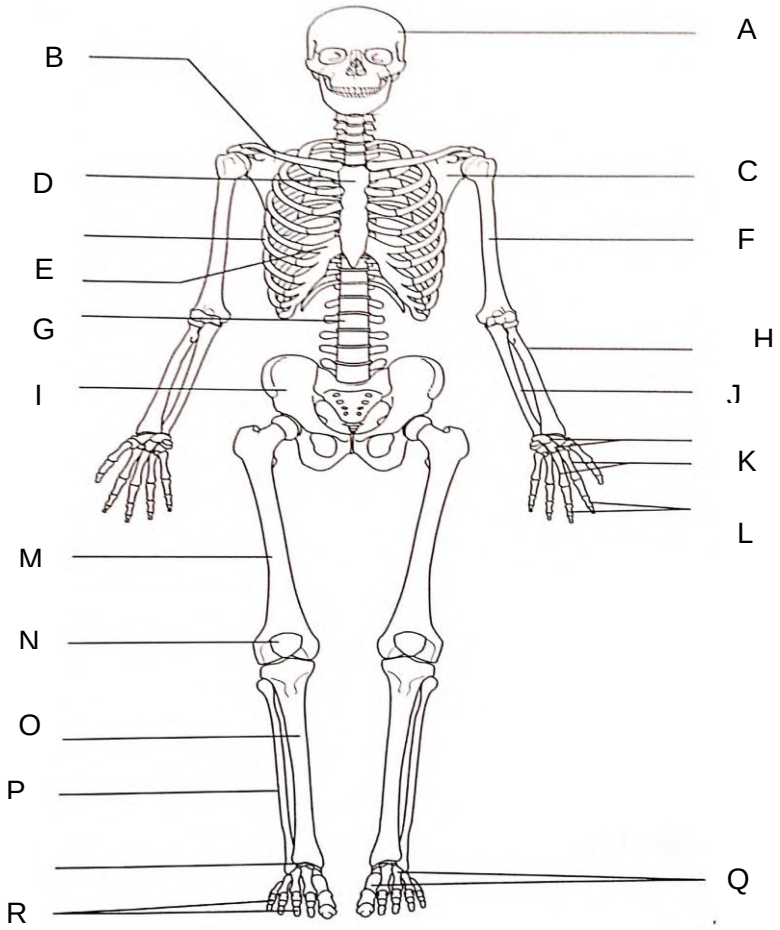
Human Skeleton

Activity 1

1. Study the diagram of the human skeleton:



1.1 Use the worksheet provided to identify Axial and Appendicular skeleton (6)
1.2 label the part B, C, F, H, J and L of the pectoral girdle and upper limb (6)
1.3 label the part I, M, N, O, P, Q and R of the pelvic girdle and lower limb (7)
(25)

Activity 2

2.

2.1 State and briefly discuss the functions of skeleton/ bones (10)

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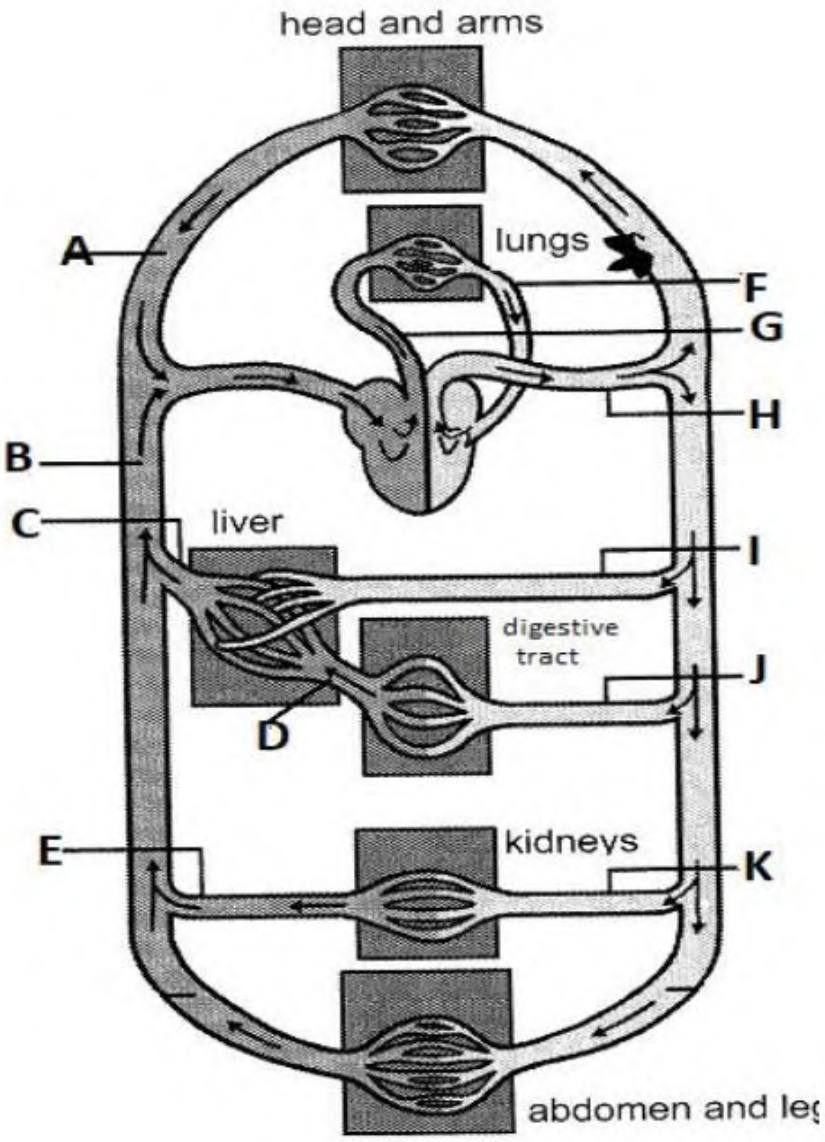
Transport System

Activity 1

1.



1.1	Define double circulation	(2)
1.2	Name the two systems of double circulation	(2)
1.3	Label each of the parts in the above diagram	(2)
1.4	Describe the circulation of blood in the pulmonary circuit	(6)
1.5	Describe the circulation of blood in the systematic circuit	(10)
		(22)

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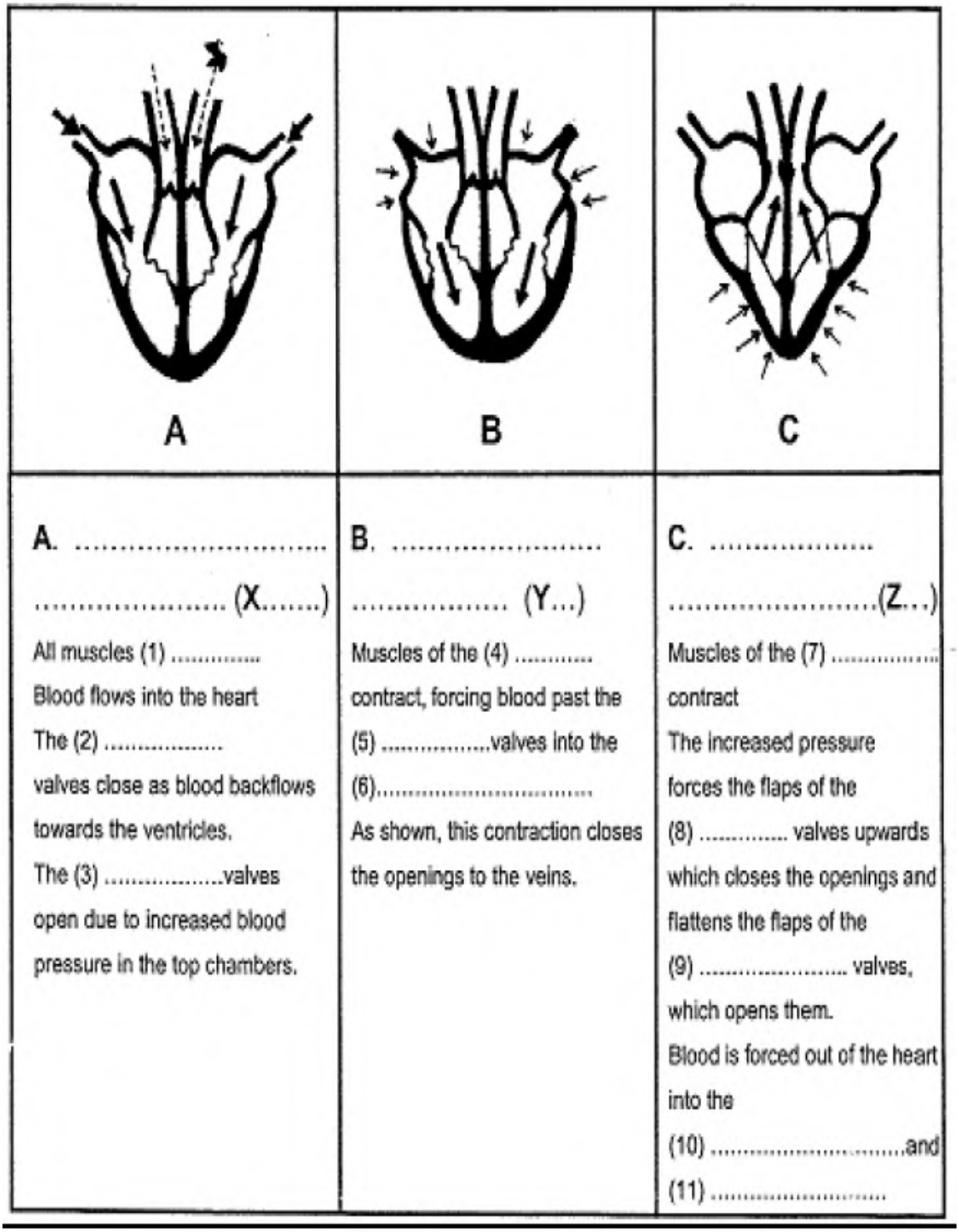
Activity 2

2. Study diagram below and answer questions that follow:

		
A	B	C
A. .... (X.....) All muscles (1) ..... Blood flows into the heart The (2) ..... valves close as blood backflows towards the ventricles. The (3) .....valves open due to increased blood pressure in the top chambers.	B. .... (Y...) Muscles of the (4) ..... contract, forcing blood past the (5) .....valves into the (6)..... As shown, this contraction closes the openings to the veins.	C. ....(Z...) Muscles of the (7) ..... contract The increased pressure forces the flaps of the (8) ..... valves upwards which closes the openings and flattens the flaps of the (9) ..... valves, which opens them. Blood is forced out of the heart into the (10) .....and (11) .....

2.1 Complete the descriptions of the cardiac cycle by filling in the names of the stages A, B and C, the time in seconds X, Y and Z, and the missing words 1-11 (17)
(17)

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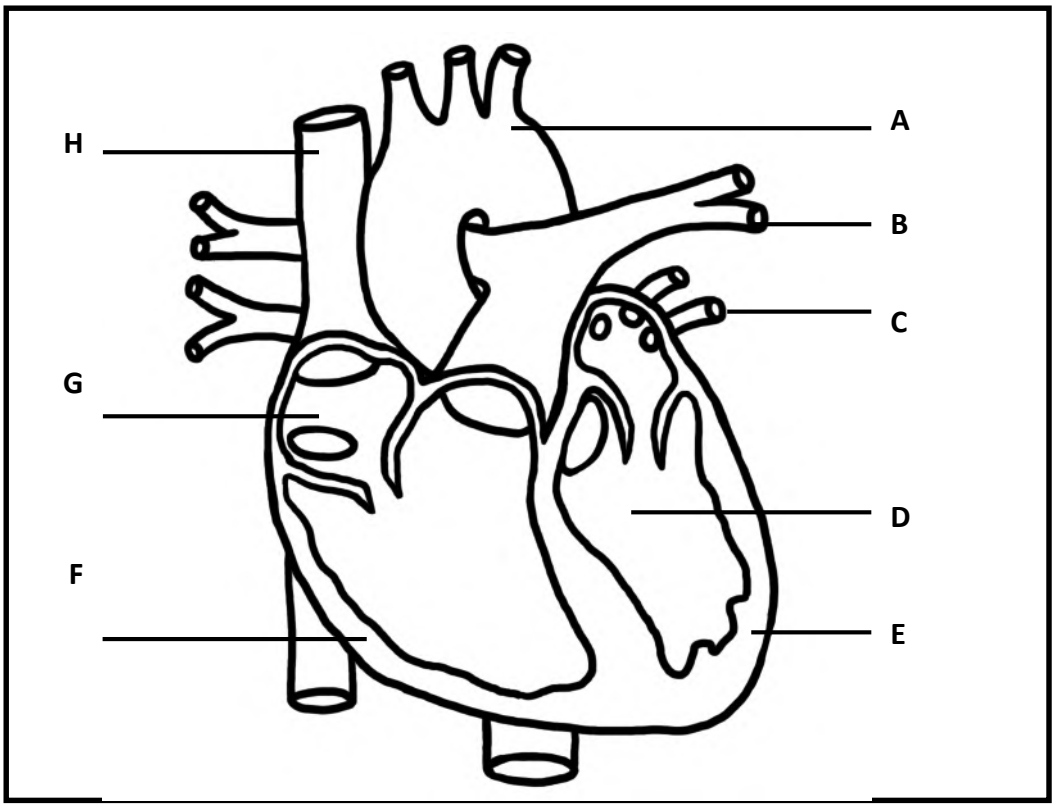
Activity 3

3. Study the diagram of the human heart below



3.1	Identify the heart chambers labelled **G** and **D.**	(2)
3.2	Write down the LETTER only of an artery that carries:	
	(a) Oxygenated blood	(1)
	(b) Deoxygenated blood	(1)
3.3	Explain why the walls labelled **E** and **F** differ in thickness	(2)
3.4	Explain what will happen if the coronary arteries, that go to the muscles of the heart, become blocked due to a high cholesterol level in the bloodstream	(3)
		(9)

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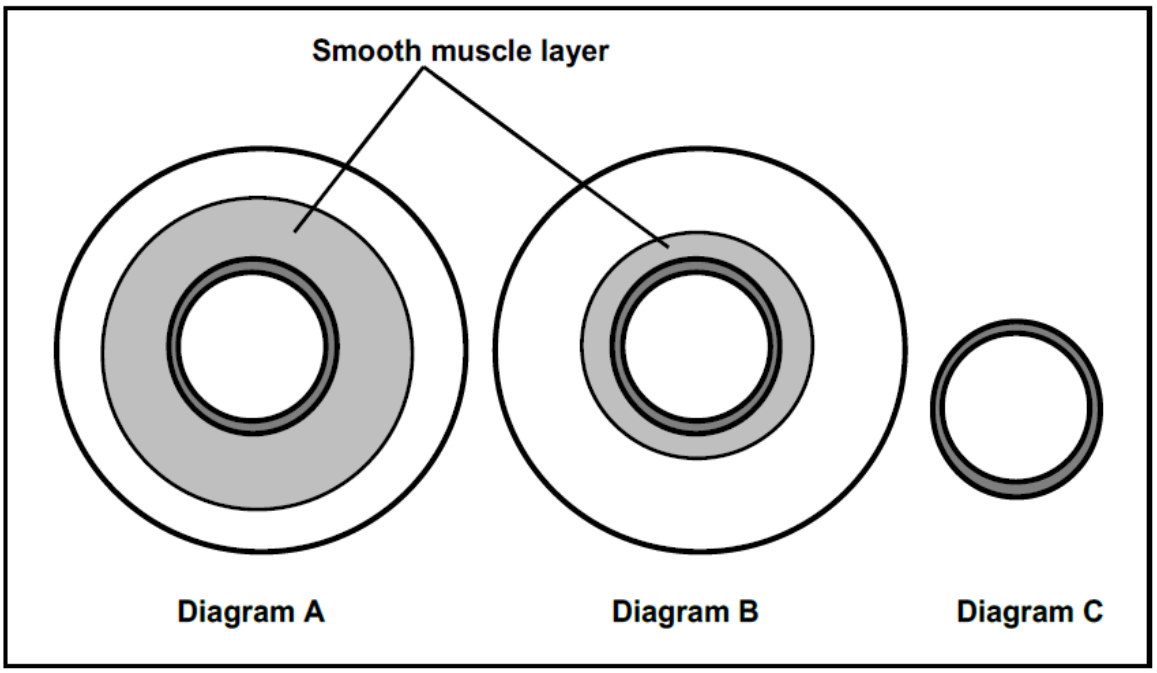
Activity 3

3. Diagrams A,B and C below represents three types of blood vessels



3.1 Identify the type of blood vessel in:
(a) Diagram B (1)
(b) Diagram C (1)
3.2 Explain why blood vessels in Diagram **A** has a thicker smooth muscle layer. (2)
3.3 Explain ONE structural adaptation of the blood vessel in Diagram **C**. (2)
3.4 Tabulate TWO differences between the composition of blood in the pulmonary artery and in the pulmonary vein (5)
(11)

Activity 3

3.

3.1 (1)
3.2 (2)
(10)

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TERM 3

TOPIC: BIOSPHERE TO ECOSYSTEMS

Activity 1
BIOMES

1.	**Complete the table below.**				
TYPE OF BIOME	**LOCATION**	**DESCRIPTION**	**CLIMATE**	**SOIL**	**VEGETATION**
Grassland	1.1_____ (1)	Consists of mainly grasses	1.2 _____ (1)	1.3_____ (1)	1.1.4 _____ (1)
Forest	1.5_____ (1)	1.6 _____ (1)	1.7 _____ (1)	1.8 _____ (1)	Large shrubs and trees forming the canopy. Ferns and mosses grow in the shade.
Fynbos	1.9 _____ (1)	1.10 _____ (1)	Wet cold winters Hot, dry and long summers 200 – 1000 mm winter rainfall	1.11_____ (1)	1.12 _____ (1)
Savanna	Mpumalanga and Limpopo provinces, coastal belt of KZN to Eastern Cape	1.13 _____ (1)	1.14 _____ (1)	1.15 _____ (1)	1.16 _____ (1)
Nama Karoo	1.17 _____ (1)	1.18 _____ (1)	1.19 _____ (1)	Soil is rich in nutrients	1.20 _____ (1)
Thicket	1.21_____ (1)	1.22 _____ (1)	1.23 _____ (1)	1.24 _____ (1)	Short trees, low intertwining shrubs and vines often armed with spines.
					(24)

1.2 Answer the following questions.

1.2.1 Explain the difference between the terms Biosphere and Biome. (2)

1.2.2 You have been tasked to plan a 5-day Eco-tour for foreign visitors. They would like to visit 5 different Biomes on their trip. You have to supply them with information in tabular form regarding the climate and flora (vegetation) of 5 different Biomes. Draw up the table that you will give to your visitors on arrival. (10) **(12)**

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Activity 2

2.

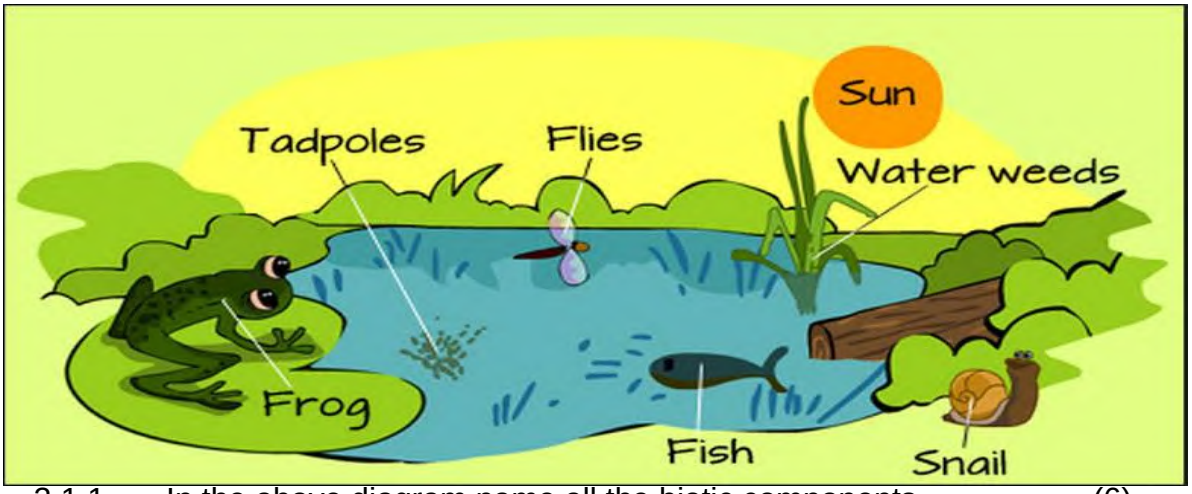
2.1 Define ecology (3)

2.2 List Three ways in which the humans influence the environment negatively. (3)

(6)

Activity 3

3.1 Study the diagram below and answer questions that follow:

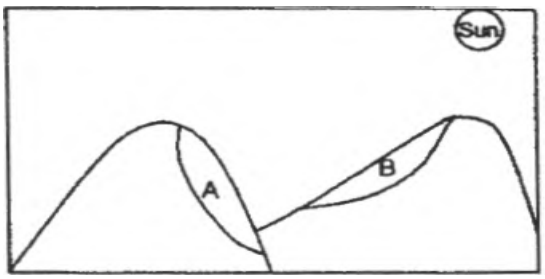


3.1.1 In the above diagram name all the biotic components (6)

3.1.2 In the above diagram name all the abiotic components (2)

(8)

3.2 The accompanying diagram represents part of a mountain range in the province of KZN and illustrates the physiographic factors of ecosystems.



3.2.1 Name THREE physiographic factors and briefly state what is meant by each. (6)

3.2.2 State with a reason which slope (**A** or **B**)

(a) Faces north (2)

(b) Is colder (2)

3.2.3 Which slope (A or B) can be described as gentle? (1)

3.2.4 On which slope (A or B) would you expect to find shade-tolerant plants? (1)

(12)

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3.3 Read the article below on the effect of physiographic factors on plants.

Mount Kenya is one of the highest mountains in Africa. Although it is on the equator, it is so high that its summit is permanently covered with ice and snow. The average temperature at night is about -10°C and during the day can warm up to 15°C. Because Mount Kenya is on the equator it gets almost the same amount of sunlight the whole year round.

On Mount Kenya, different plant types grow at different altitudes. The steepness and aspect of the slope also influence the kind of plants which grow there.

The lower slopes are covered with forests of bamboo and trees like yellowwoods. The north-western slopes are drier and have more savannah-type woodlands.

Above the forests lies a ring of plants called heaths. These include plants like ericas, which also grow in the Western Cape in South Africa. But unlike the small ericas that grow in the Western Cape, the ones on Mount Kenya grow up to 4 metres tall, There is rain almost every day at this height (higher than 3000m).

3.3.1 At about 3 500 to 3 800 metres, the vegetation changes.

Name TWO physiographic factors which influence the growth of plants on Mount Kenya. (2)

3.3.2 Apart from the physiographic factors you have named, what other abiotic factors influence the growth of plants on the mountain? (2)

3.3.3 Why do you think the north-western slopes of the mountain are drier? (2)

3.3.4 How can you tell that the lower slopes receive more rainfall? (2)

3.3.5 Why do you think the plants on the top of the mountain have tough leaves and stems? (2)

(10)

3.4 The steepness of a slope affects plant growth through differential incidents of radiation, wind velocity and soil type. A steep slope is susceptible to rapid surface runoff and soil erosion which cause soil degradation. Likewise, the influence of the abiotic factor on plant growth and distribution is noticeable.

3.4.1 State ONE climate factor from the passage that has an effect on plant growth. (1)

3.4.2 State ONE disadvantage of planting on a steep slope mentioned in the passage. (1)

3.4.3 Explain why there are usually more plants on the South –facing slope than on the North-facing slope (2)

(4)

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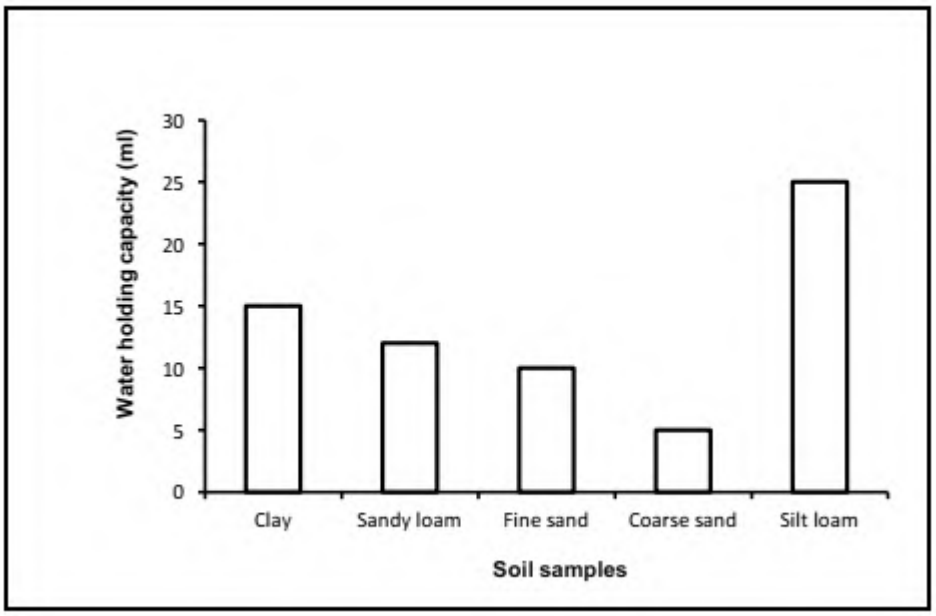
Activity 4

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



4.1.1 For this investigation identify the:

(a) Dependent variable (1)

(b) Independent variable (1)

4.1.2 What is the water holding capacity of silt loam? (1)

4.1.3 Which soil has the lowest water-retaining ability? (1)

4.1.4 State TWO ways in which the reliability of the investigation can be increased (2)

4.1.5 Explain the consequences to plant roots if the soil became waterlogged. (3)

4.1.6 Identify TWO factors which should be kept constant this investigation. (2)
(11)

4.2 An investigation was carried out to investigate the effect of alkaline pH on the growth of roots of young Austrian pine plants

The results are shown on table below:

Plant type	Length (cm)
A	30
B	10
C	45
D	20

4.2.1 List TWO planning steps that were taken during this investigation. (2)

4.2.2 Identify the independent variable in this investigation. (1)

4.2.3 Which plants grow better in alkaline soil according to these results (1)

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4.2.4 State one factor that the investigator would have kept constant to ensure validity of the results. (1)
(5)

Activity 5

5.1 The table below shows some results of a study which investigated the effect of different temperatures and levels of light on the growth of tomatoes. The amount of tomatoes produced by each plant is called the yield. In this example the yield is measured in kilograms of tomatoes. The yield of each plant was measured at different temperatures and light levels.

Day Temperature in °C	**Yield per plant in kg.**	
	Low light levels	**High light levels**
5	0,5	0,5
10	1,2	1,4
15	3,2	5,0
20	3,4	8,5
25	3,5	7,8
30	2,5	6,2

5.1.1 Draw two line graphs on the same system of axes to represent the results in the table. (12)

5.1.2 What information can you deduce from the graphs about the conditions which give the highest yield of tomatoes? (2)

5.1.3 From the graph, determine:

(a) The amount of tomatoes a plant will produce if the temperature is 27°C at low light levels (2)

(b) The amount of tomatoes a plant will produce if the temperature is 27°C at high light levels (2)

5.1.4 Explain why the light level seems not to affect the yield when the temperature is 5°C? (2)

5.1.5 Estimate the yield that would be expected at 35°C? (2)

5.1.6 What is the best temperature for growing tomatoes? (2)

5.1.7 Why do you think there was hardly any change in yield between 15°C and 25°C when the plants were grown at low light levels? (2)

5.1.8 Light and temperature are abiotic factors which influence the growth of tomatoes. What other abiotic factors will influence the growth of tomato plants? (2)
(28)

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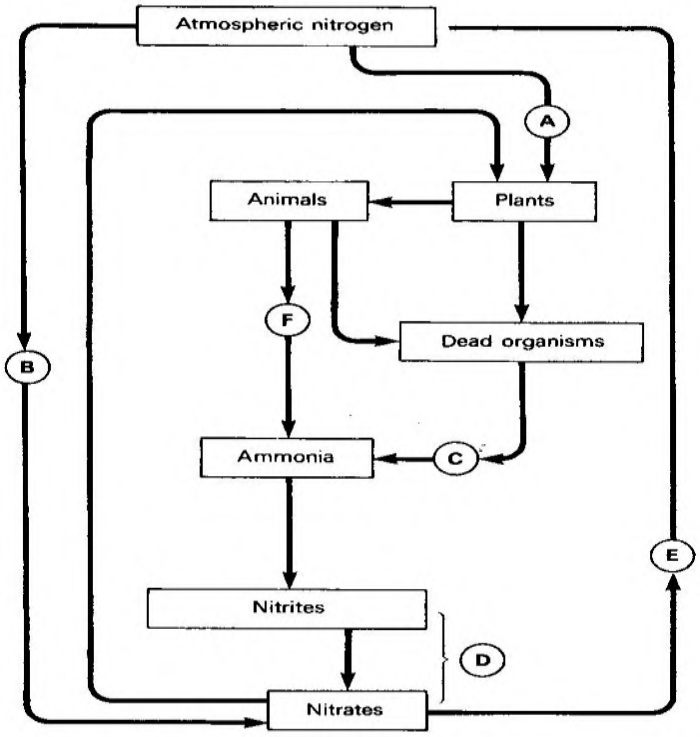
5.2 Study the diagram below.



5.2.1 Describe the processes shown by A and B by which nitrogen is converted to nitrates. (4)

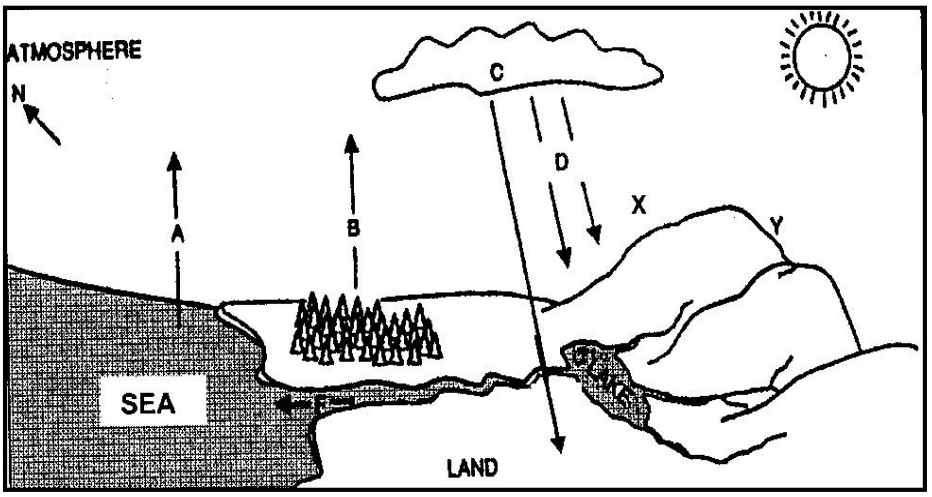
5.2.2 Name two types of organisms represented by C which produce ammonia from dead organisms. (2)

5.2.3 Explain how some soil nitrates are converted back into atmospheric nitrogen. (1)

5.2.4 Which substances (represented by F) released by animals that form ammonia. (2)
(9)

Activity 6

6.1 The diagram below illustrates the water cycle in nature



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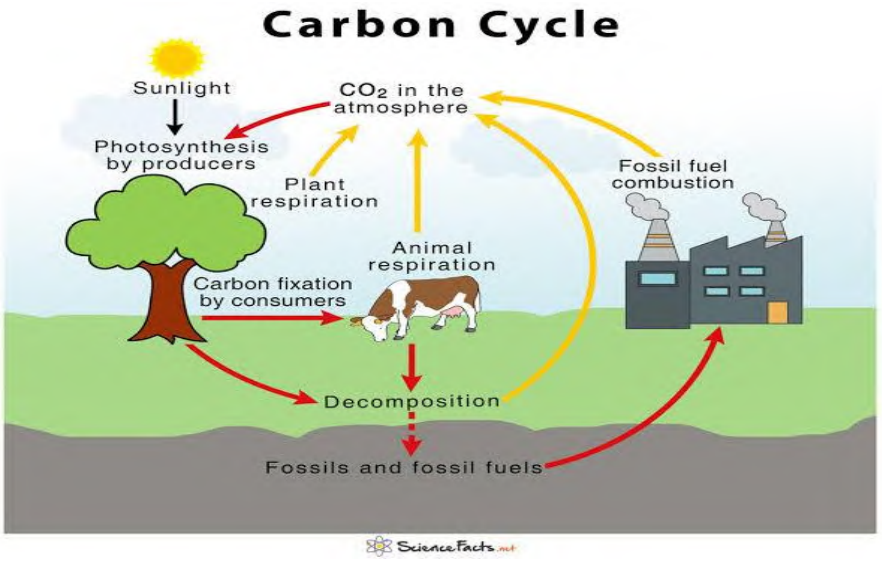
6.1.1 Identify the process represented by **A**, **B**, **C** and **D**. (4)

6.1.2 Name TWO weather elements that play a role in this cycle. (2)

(6)

6.2 Study the diagram below.



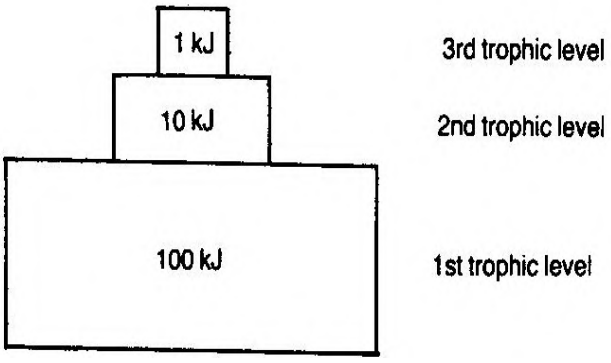
6.2.1 List Four ways in which Carbon dioxide is returned to the atmosphere as shown in the diagram above. (4)

6.2.2 Name the process by means of which plants convert carbon dioxide to glucose and starch. (1)

(5)

Activity 7

7. A food pyramid is shown below for a simple food chain involving a rabbit, a fox and grass. The pyramid shows how much energy (in kilojoules) is passed on at each trophic level.



7.1 Which of the organisms will occupy the:

(a) First trophic level (1)

(b) Second trophic level (1)

(c) Third trophic level (1)

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7.2 What percentage of energy is transferred to the 2nd and 3rd trophic levels, respectively? (3)
7.3 State TWO reasons why there is a loss of energy at each transfer? (2)
7.4 Draw a food chain for this pyramid. (2)
7.5 What is the original source of energy for this food chain? (1)
(11)

Activity 8

8.1 Study the food chain below and answer the questions that follow.

pondweed → tadpole → eel → bird

8.1.1 If the food chain represented above was the only one to exist in the ecosystem as a result of limited biodiversity, predict what would happen if…

(a) all the tadpoles died (4)
(b) all the birds died (4)
(8)

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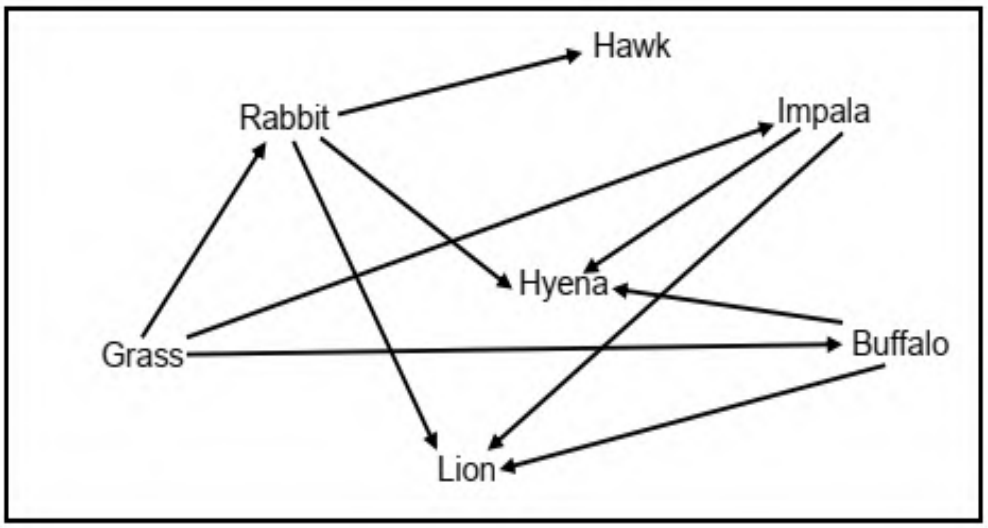
8.2 The diagram below illustrates feeding relationships in an ecosystem in a game reserve.



8.2.1 What term is used to describe the feeding relationships illustrated on the diagram above? (1)

8.2.2 What do the arrows on the diagram represent? (1)

8.2.3 Identify the following on the above food chain:

(a) Carnivore (1)

(b) Primary consumer (1)

8.2.4 Give a reason why the Lions and Hyenas would still survive even if all the impalas in this game reserve were to die out. (2)

8.2.5 Which organism in this ecosystem would be affected the most as a result of an outbreak of a disease that only kills rabbits. (1)

8.2.6 Give a reason for your answer to **Question 8.2.5** above. (1)

8.2.7 Explain how poaching (illegal killing) of Lions would affect the number of Hyenas in this game reserve. (2)
(10)

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BIODIVERSITY AND CLASSIFICATION

Activity 1

1. The table below illustrates the number of species that are endemic to South Africa.

Taxonomic group	Total SA species	% Endemic species	Endangered species
Plants	23 420	60%	483
Marine fishes	2 200	15%	2
Amphibians	111	55%	5
Reptiles	363	35%	6
Birds	694	10%	11
Mammals	258	15%	9

1.1 What does endemic mean? (1)

1.2 Draw a bar graph to illustrate the percentage of endemic species in each of the taxonomic groups in the table above. (6)

(7)

Activity 2

2.1 The table below shows the abundance of different organisms in various regions in KZN.

	Number of different organisms			
Regions	**Mammals**	**Reptiles**	**Plants**	**Birds**
Durban	140	65	4050	76
Bulwer	110	68	7852	84
Kokstad	90	54	5020	66
Nkandla	82	88	5162	40

2.1.1 State TWO kingdoms that are not represented in the table above. (2)

2.1.2 What percentage of the mammals are found in the Nkandla region? Show all working. (3)

(5)

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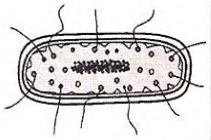
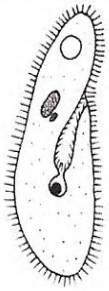
2.2 According to the five –kingdom system of classification, each of the organisms shown below belongs to a different kingdom. Complete the table by filling in the missing words.

ORGANISM					
Prokaryote or eukaryote?	3.1	3.2	3.3	Eukaryote	3.4
Unicellular or multicellular?	3.5	Unicellular or multicellular	3.6	3.7	Multicellular
Example	3.8	Paramecium (protist)	3.9	Mealie plant	3.10

Activity 3

3. Study the table provided below giving the classification of three organisms.

	HUMAN	**LION**	**CAT**
Kingdom	Animal	Animal	Animal
Phylum	Chordata	Chordata	Chordata
Class	Mammal	Mammal	Mammal
Order	Primate	Carnivore	Carnivore
Family	Hominidae	Felidae	Felidae
Genus	*Homo*	*Panthera*	*Felis*
Species	*sapiens*	*leo*	*domesticus*

3.1 Use the binomial system to give the scientific name for the cat. (2)

3.1 All three organisms belong to the same class. List TWO characteristics that all organisms that belong to this class will have in common. (2)

3.1 Use information from the table to explain why the lion is more closely related to the cat than to humans. (1)
(5)

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TERM 4

HISTORY OF LIFE ON EARTH

Activity 1

1.

Era	Geological Period	From (mya)	To (mya)	Major Biological Events
Coenozoic	Quartenary	1,8	Today	Humans appear, ice ages
	Tertiary	65	1,8	Flowering plants and mammals spread
Mesozoic	Cretaceous	142	65	First flowering plants, dinosaurs extinct
	Jurassic	206	142	Dinosaurs dominant, first birds, cycads spread
	Triassic	248	206	First dinosaurs and mammals dominate
Palaeozoic	Permian	290	248	Reptiles diversify, trilobites extinct
	Carboniferous	354	290	Amphibians and reptiles appear on land
	Devonian	417	354	Land Vertebrates appear, fish and simple plants diversify
	Silurian	443	417	Simple plants, scorpions and jawed fish appear
	Ordovician	495	443	Jawless fish, plant spores appear
	Cambrian	545	495	Animals with skeletons appear, trilobites common
Precambrian		2500	545	Eukaryotes, soft bodied animals and sea plants appear
		3800	2500	Prokaryotes diversify, photosynthesis brings more oxygen to the air
		4560	3800	Early forms of life near the end of this period

1.1 Explain what is meant by 'geological time scale? (2)

1.2 What is the importance of a geological time scale? (2)

1.3 What does the abbreviation 'mya' stand for? (1)

1.4 When did the first living cells appear on earth? (2)

1.5 When did the first land plants appear? (2)

1.6 Explain why did the land plants evolve before other organisms could become terrestrial. (4)

1.7 In which period did the first amphibians appear? (1)

1.8 Name the periods that occurred during the Coenozoic era. (2)

1.9 How long did the Mesozoic era last? Show your working (3)

(19)

Activity 2

2 Give the correct biological terms for each of the following terms

2.1 The process by which all members of a particular species die out so that not even a single one exists. (1)

2.2 The process by which populations change over time due to the changes in their environment (1)

2.3 The study of past and present distribution of biological organisms in the world. (1)

2.4 The study of life forms that existed in previous geological periods, as represented by their fossils. (1)

2.5 Something that happened in the past. (1)

2.6 Upward movements of the plates. (1)

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2.7 Evidence of ancient life forms (1)
2.8 Long periods where earth experienced extremely cold weather. (1)
2.9 The time intervals in which the life's earth history has been divided. (1)
2.10 The breaking up of the original land mass into different continents. (1)
(10)

Activity 3

3. Briefly describe the following three events that was used by scientist to explain how life began on Earth

3.1 Increase in levels of oxygen (2)
3.2 Climate change- e.g. Ice age (2)
3.3 Geological events (2)
(6)

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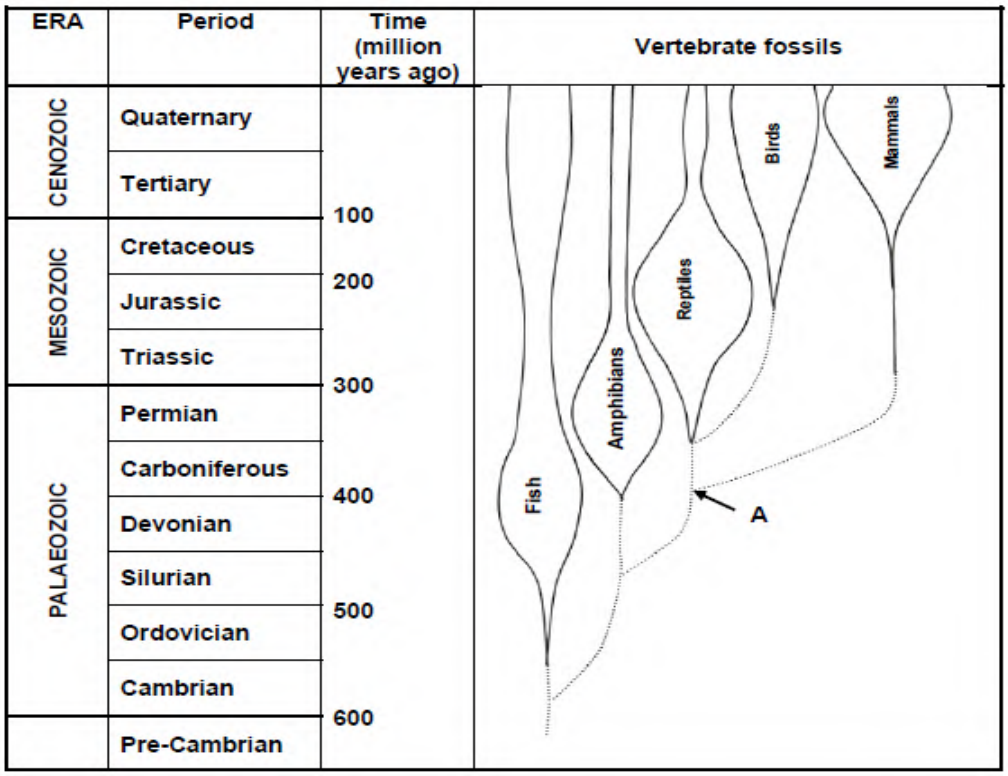
Activity 4

4. Interpret the following geological time scale, and answer questions that follow:



4.1 During which geological period were the most species of amphibians present? (1)

4.2 What does the abbreviation 'mya stand for? (1)

4.3 Describe the changes in the number of reptiles and mammals during the Cretaceous period (2)

4.4 Name any TWO vertebrate classes that were directly derived from the common ancestor labeled **A** in the diagram? (2)

4.5 Use the information in the diagram to explain which TWO of the three classes (birds, reptiles and mammals) are more closely related. (3)
(9)

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Activity 5

5. The following questions are based on the extinction of dinosaurs on earth.

5.1 What evidence do scientists use to show that dinosaurs once existed on Earth? (1)

5.2 How long ago did the dinosaurs become extinct? (2)

5.3 Describe a hypothesis that has been proposed for the extinction of many species, including the dinosaurs, during the time mentioned in QUESTION 5.1.2. (6)

(9)

Activity 6

6. Mention four causes of the mass extinction? **(4)**

Activity 7

7.

Explain what is meant by mass extinction **(3)**

Activity 8

8. Study the table below that shows the decay of carbon-14 over time, and answer the questions that follow:

	DECAY OF CARBON-14							
Years from the present	0	5730	11460	17190	22920	**X**	34380	40110
Number of half-lives elapsed	0	1	2	3	4	5	6	7
Percentage of original carbon-14 remaining	100	50	25	12,5	6,25	**Z**	1,56	0,78

8.1 Name the two main types of methods used to determine the age of fossils. (2)

8.2 Calculate the value of:

(a) **X** (2)

(b) **Z** (2)

8.3 Explain why it would not be possible to date a fossil that existed 80 million years ago using the decay of carbon-14. (2)

8.4 Give TWO reasons why there are gaps in the fossil records. (2)

(10)

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Activity 9

9. Study the fossil below which was discovered and classified as transitional fossil.

	9.1	What is the scientific name of the prehistoric bird in Diagram A?	(2)	
	9.2	Explain why scientists concluded that this prehistoric bird is a transitional fossil.	(2)	
	9.3	Describe how this fossil could have been formed.	(4)	
			(8)	

Activity 10

10.			
		Describe the impact of humans on biodiversity and the natural environment	(10)