



KWAZULU-NATAL PROVINCE

EDUCATION
REPUBLIC OF SOUTH AFRICA

CURRICULUM GRADE 10-12 DIRECTORATE

NCS (CAPS)

LEARNER SUPPORT DOCUMENT

GRADE 11

LIFE SCIENCES

Stanmorephysics

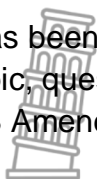
STEP AHEAD PROGRAMME

2023

PREAMBLE

This document has been prepared as support material for Grade 11 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: Photosynthesis

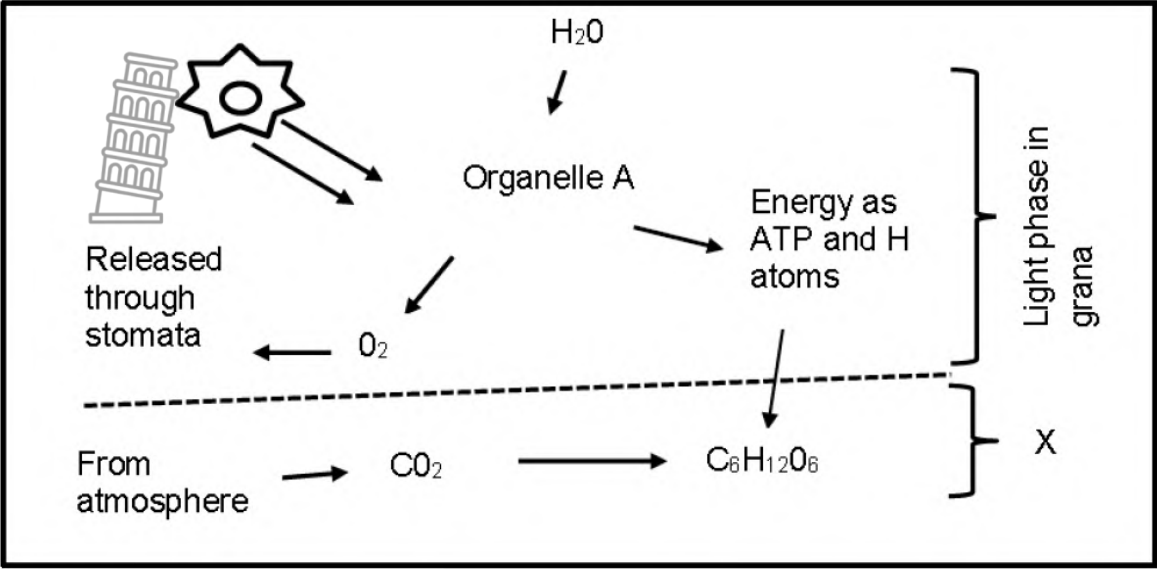
Activity 1

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

No.	Description	Biological Term
1.1	Chemical processes in organisms controlled by enzymes.	
1.2	Organisms that cannot photosynthesise and obtain food from other organisms.	
1.3	Building up chemical reactions.	
1.4	Green plants that produce their own food through photosynthesis.	
1.5	Breaking down reactions.	
1.6	The liquid part of the chloroplast where light independent phase takes place.	
1.7	The general energy carrier in the cells of living organisms.	
1.8	A glass structure that traps heat and allows light to enter and plants to grow.	
1.9	Phenomenon where the heat from the sun is trapped on Earth by CO ₂ in the atmosphere.	
1.10	Site of photosynthesis.	
1.11	The form in which excess glucose is stored in plants.	
1.12	A chemical used to test for starch.	
1.13	The organic molecules that act as catalysts and control the chemical reaction during photosynthesis.	
1.14	Energy from the sun, needed by plants for photosynthesis.	
1.15	Stacks of thylakoids where light dependent phase takes place.	
1.16	The simple sugar formed during photosynthesis in green plants.	
1.17	Stored form of glucose in animals.	
1.18	Stored form of glucose in plants.	
1.19	The green, light-trapping pigment in photosynthesis found in plant leaves.	
1.20	The splitting of water molecules into hydrogen and oxygen in the presence of light.	
1.21	The part of the chloroplast in which the light-independent reactions of photosynthesis take place.	
		(21 X1) (21)

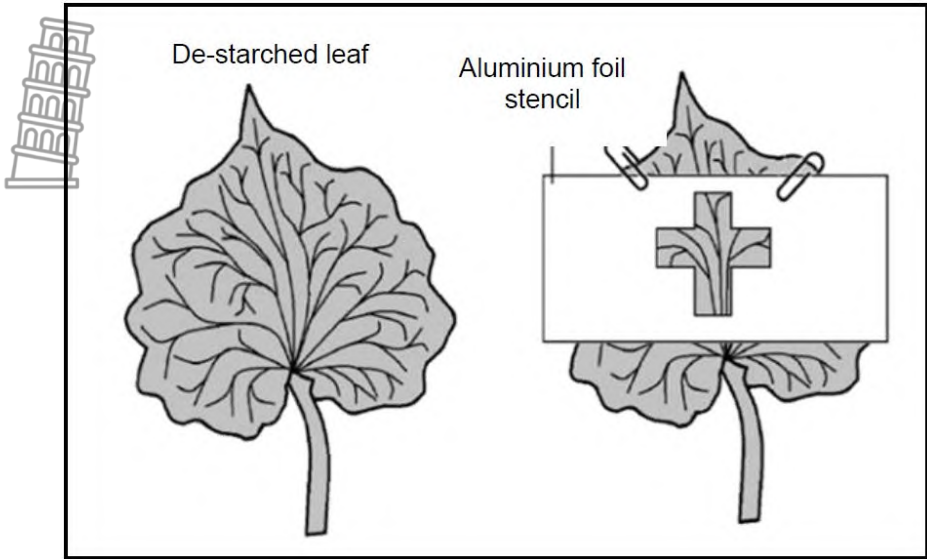


Activity 2

2	The diagram below is a schematic representation of the process of photosynthesis		
			
2.1	Define photosynthesis.		(2)
2.2	Identify organelle A .		(1)
2.3	Name the following:		
	(a) The phase represented by X .		(1)
	(b) The part of the organelle A in which the phase in QUESTION 2.3 (a) takes place.		(1)
2.4	Describe the events of the light phase as shown in the diagram above		(6)
			(11)

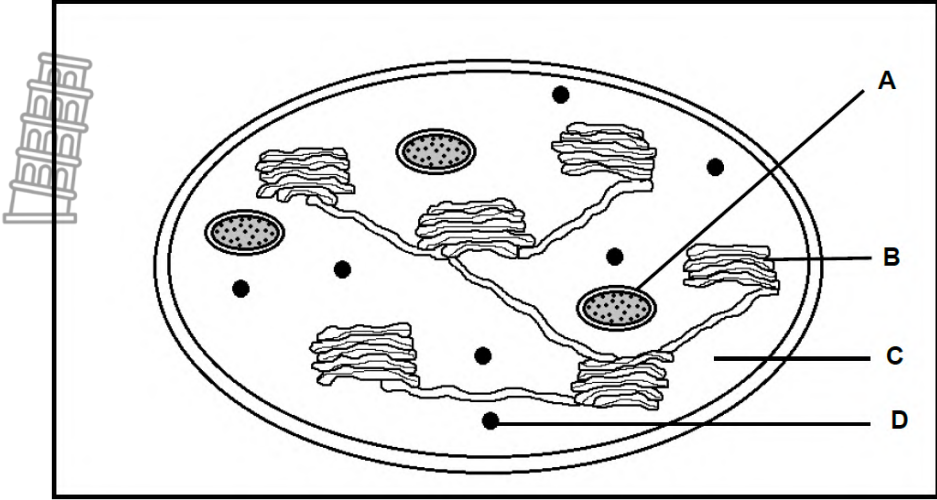


Activity 3

3	<p>An investigation was conducted to determine whether light is necessary for photosynthesis. The following diagram illustrates this investigation.</p> 		
	3.1	State the aim of this investigation.	(1)
	3.2	Give ONE reason for each of the following steps in this investigation:	
		(a) In the beginning of the investigation, the plant was kept in a dark cupboard for 48 hours.	(1)
		(b) The leaf was boiled in water.	(1)
		(c) The leaf was boiled in alcohol or methylated spirits.	(1)
	3.3	Explain ONE safety precaution that should be taken during this investigation.	(2)
	3.4	Draw a labelled diagram of the leaf showing the results of this investigation.	(4)
	3.5	State a possible conclusion for this investigation.	(2)
			(12)



Activity 4

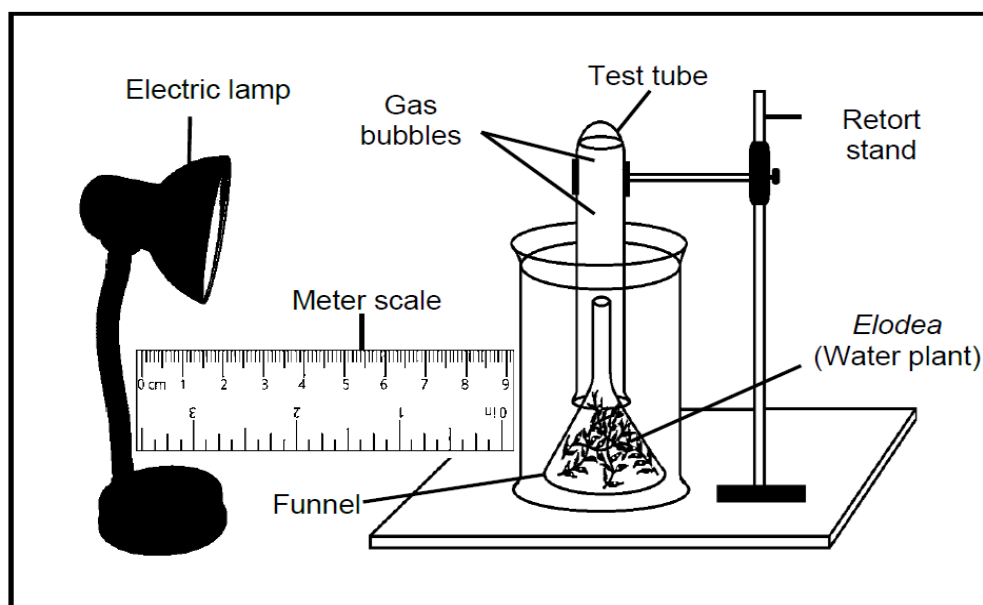
4	The diagram below represents the structure of a chloroplast.		
			
4.1	Give the LETTER and NAME of the part:		
	(a) That stores the product of photosynthesis.		(2)
	(b) Where Carbon dioxide is used.		(2)
	(c) Where the light independent phase takes place.		(2)
4.2	State TWO ways in which a chloroplast is suitable for its function.		(2)
4.3	Explain the ecological importance of the dark phase of photosynthesis.		(4)
			(12)

Activity 5

5 An experiment was conducted to determine the effect of light intensity on the rate of photosynthesis.

The procedure was as follows:

- Water plants of the *Elodea* species were placed under a glass funnel in a beaker containing water
- A test tube containing water with no air bubbles was fitted over the glass funnel as shown in the diagram.
- Two pinches of bicarbonate of soda were added to the water before the start of the experiment.
- After switching off all the lights, a lighted table lamp was placed 1 m away from the beaker.
- A meter scale was placed between the table lamp and the beaker.
- The number of air bubbles released by the plants in a 1-minute period was counted and recorded in a table.
- The above steps were repeated at different light intensities by moving the lamp to different distances.
- A test was conducted to identify the gas collected in the test tube.



5.1	Identify the Independent variable in this experiment	(1)
5.2	How was the dependent variable measured in this experiment?	(2)
5.3	(a) Name the gas released as bubbles.	(1)
	(b) Describe the test conducted to identify the gas mentioned in QUESTION 5.3 (a) above.	(2)
5.4	Why was a pinch of bicarbonate of soda added to the beaker at the start of the experiment?	(2)
5.5	State TWO variables that should have been kept constant during this experiment.	(2)

5.6	<p>The table below shows the number of bubbles released by the <i>Elodea</i> plants when the light source was at different distances.</p> <table><tr><th>DISTANCE BETWEEN THE PONDWEED AND LIGHT SOURCE (METRES)</th><th>NUMBER OF BUBBLES GIVEN OFF IN 1 MINUTE</th></tr><tr><td>1,0</td><td>8</td></tr><tr><td>0,5</td><td>28</td></tr><tr><td>0,25</td><td>105</td></tr><tr><td>0,125</td><td>105</td></tr></table>	DISTANCE BETWEEN THE PONDWEED AND LIGHT SOURCE (METRES)	NUMBER OF BUBBLES GIVEN OFF IN 1 MINUTE	1,0	8	0,5	28	0,25	105	0,125	105	
DISTANCE BETWEEN THE PONDWEED AND LIGHT SOURCE (METRES)	NUMBER OF BUBBLES GIVEN OFF IN 1 MINUTE											
1,0	8											
0,5	28											
0,25	105											
0,125	105											
	(a) Calculate the percentage increase in the number of bubbles when the light source was shifted from 1,0 m to 0,5 m. Show ALL your calculations.	(3)										
	(b) Explain how the result obtained in this experiment is beneficial for the greenhouse farming of crops.	(3)										
		(16)										

Activity 6

6		
6.1	Describe the events of the dark phase of photosynthesis.	(4)
6.2	Explain THREE effects on living organisms if photosynthesis does not occur.	(6)
		(10)

Activity 7

7		
7.1	Draw a labelled diagram of an organelle present in the leaves of plants where photosynthesis takes place.	(4)



Topic: Cellular respiration

Activity 1

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

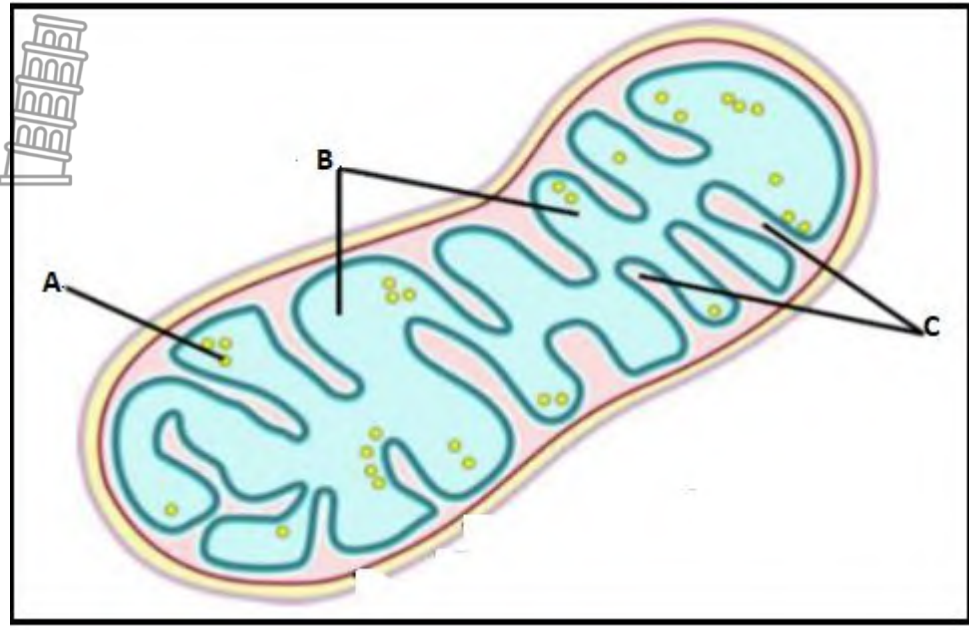
No.	Description	Biological Term
1.1	Respiration in the presence of oxygen.	
1.2	Site for respiration.	
1.3	The process where a plant grows from a seed.	
1.4	Acid formed in muscle cells, during anaerobic respiration; leads to muscle exhaustion / cramping.	
1.5	The reagent used to test for the presence of carbon dioxide.	
1.6	Breaking down of glucose in absence of oxygen, to give rise to the production of alcohol in plant cells.	
1.7	The process during which glucose is converted into pyruvic acid.	
1.8	Breaking down of glucose in absence of oxygen to form lactic acid in animal cells.	
1.9	Type of anaerobic respiration in yeast (and other) cells.	
1.10	The final hydrogen acceptor during cellular respiration.	
1.11	Folded structures found on the inner membrane of a mitochondria.	
1.12	Genetic material found in the mitochondrial matrix.	
1.13	The stage during aerobic respiration when water is released as a waste product.	
1.14	A 6-carbon molecule that is broken down during cellular respiration to provide energy in a living cell.	
1.15	A micro-organism used in the manufacturing beer or bread.	
		(15 X 1) (15)

Activity 2

2.		
2.1	Draw a labelled diagram of the organelle in which respiration takes place.	(4)



Activity 3

3.	Study the diagram below and answer questions that follow:		
			
	3.1.	Identify the organelle shown above.	(1)
	3.2.	Label parts B and C .	(2)
	3.3	Give the LETTER and the NAME of the part where:	
		(a) Proteins are synthesised	(2)
		(b) Krebs Cycle and Oxidative phosphorylation occur	(2)
			(7)

Activity 4

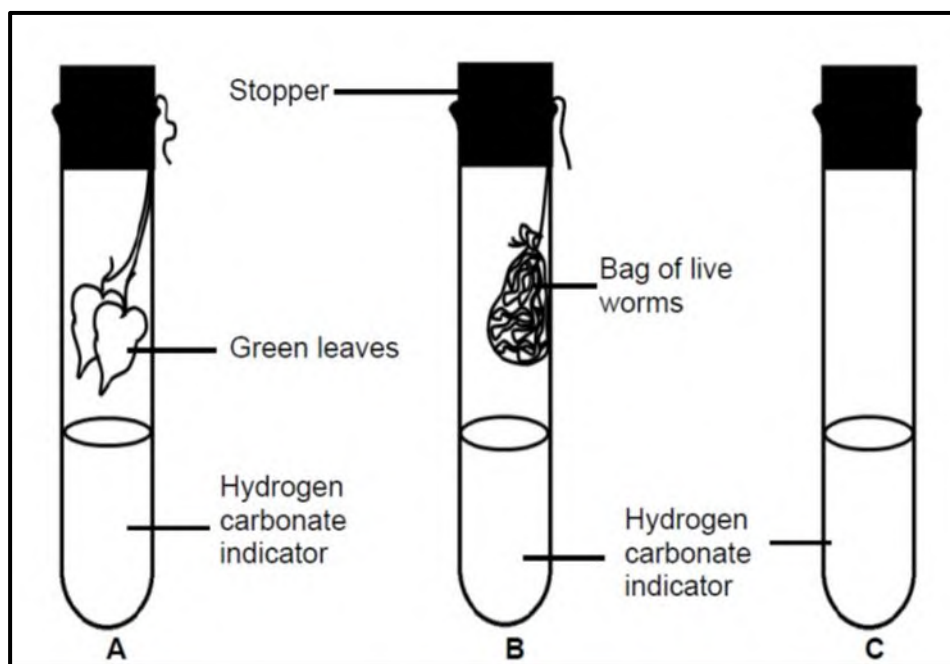
4	<p>Many food and beverage industries are entirely dependent on the fermentation process to manufacture their products. Some of the products manufactured are being distributed and sold locally while the others are exported to foreign countries.</p>		
	4.1	Name one food or beverage product which makes use of the fermentation process in its manufacture	(1)
	4.2	Explain one way in which the production of foods and beverages made by fermentation benefit the South African economy.	(2)
	4.3	Describe how yeast cells benefit from the fermentation process?	(2)
			(5)

Activity 5

- 5 The diagram below represents an experiment set up by a group of learners. All three tubes were exposed to light for 3 hours. Hydrogen carbonate was used as an indicator to test the different levels of carbon dioxide in the test tubes.

Hydrogen carbonate indicator turns:

- Purple in the presence of a small amount of carbon dioxide.
- Yellow in the presence of a large amount of carbon dioxide.
- Orange in the presence of a moderate amount of carbon dioxide.

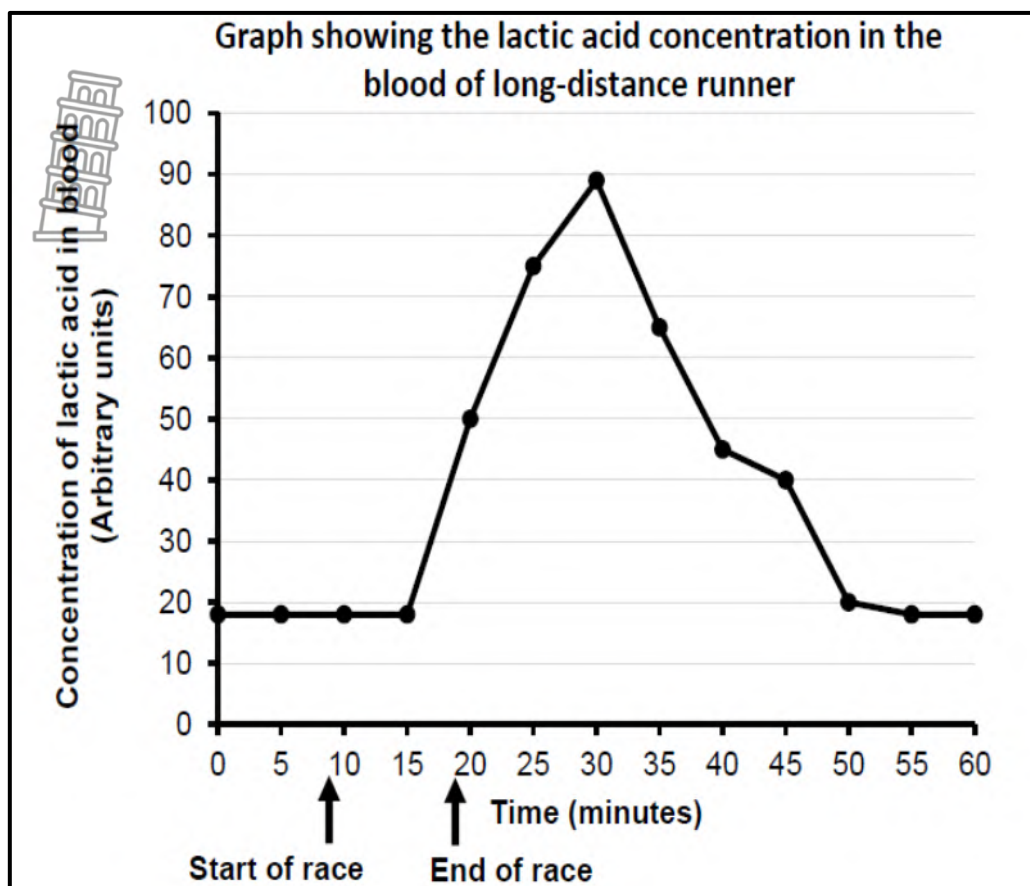


	TEST TUBE A	TEST TUBE B	TEST TUBE C
Colour of indicator at the start of the experiment	ORANGE	ORANGE	ORANGE
Colour of indicator after 3 hours	PURPLE	YELLOW	ORANGE

5.1	State a reason for closing each test tube with a stopper.	(1)
5.2	Explain why the indicator in test tube B became yellow after 3 hours.	(2)
5.3	What is the purpose of test tube C in the investigation?	(1)
5.4	Explain why the colour of the indicator would change to orange/ yellow, if test tube A is placed in a dark cupboard for the entire day.	(3)
		(7)

Activity 6

6 The graph below represents the lactic acid levels in the blood of a long-distance runner.



6.1	Name the:	
	(a) Type of respiration that takes place in the cells of a long-distance runner 15 minutes after the race has started.	(1)
	(b) Site where lactic acid accumulates during this process.	(1)
6.2	According to the graph, what is the acceptable level of lactic acid in the blood?	(1)
6.3	For how long did the lactic acid concentration continue to increase after the end of the race?	(1)
6.4	Explain why there is an increase in the lactic acid concentration in the blood.	(4)
6.5	Explain why a long-distance runner, who is suffering from severe muscle cramp, is advised to rest immediately.	(4)
		(12)

Activity 7

7	In cellular respiration glucose is broken down to release energy as ATP.	
7.1	Describe the events of:	
	(a) Glycolysis.	(4)
	(b) Krebs Cycle.	(4)
		(8)

Activity 8

8	Read the following passage and then answer the questions.		
		<div style="border: 1px solid black; padding: 10px;"> <p style="text-align: center;">Cellular respiration</p> <p>Adenosine triphosphate (ATP) is the immediate source of energy used by muscles. When glucose is broken down during cellular respiration to release energy, this energy is transferred to ATP molecules.</p> <p>The first step in the breakdown of glucose molecules takes place in the absence of oxygen. This is known as the anaerobic phase. One of the substances produced here is lactic acid which accumulates in the muscle cells.</p> <p>If plenty of oxygen is available then aerobic respiration takes place. This results in the formation of carbon dioxide and water instead of lactic acid.</p> </div>	
	8.1	Name:	
		(a) The organic compound needed for cellular respiration.	(1)
		(b) TWO products of aerobic respiration.	(2)
	8.2	State the circumstances under which aerobic respiration and anaerobic respiration take place.	(2)
	8.3	This type of biochemical process also occurs in plants. What products are produced in plant tissue? Name ONE.	(1)
			(6)

Activity 9

9.			
	9.1	Tabulate TWO differences between aerobic respiration and anaerobic respiration.	(5)



Topic: Animal Nutrition



Activity 1

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

No.	Description	Biological Term
1.1	The type of organisms that consume only plant matter.	
1.2	The type of teeth responsible for piercing into food and grasping/holding onto food in a meat based diet.	
1.3	Intake of food.	
1.4	Physical and chemical breakdown of food into its simplest form.	
1.5	The removal of undigested and unabsorbed waste from the body through the anus in the form of faeces.	
1.6	The products of digestion diffuse into the blood stream.	
1.7	Nutrients such as amino acids are incorporated into the cells.	
1.8	An automatic wave of muscle contraction and relaxation that moves food in one direction through the digestive tract.	
1.9	A ball-like mixture of food and saliva that forms in the mouth during the process of chewing.	
1.10	Is a fluid produced by the liver, and stored in the gall bladder, that aids the digestion of lipids in the small intestine.	
1.11	A semi-liquid mass of partially digested food that has gone through mechanical and chemical digestive processes while passing through the stomach into the duodenum.	
1.12	Tiny finger-like projections lining the wall of the small intestine and increasing the surface area for food absorption.	
1.13	The ability of an organism to maintain stability of internal conditions (e.g. temperature, chemical balance) despite changes in its environment.	
1.14	A gland that uses ducts to drain and transport secretions or chemicals out of the body or onto body surfaces.	
1.15	An organ that secretes hormones directly into the blood stream or lymphatic system instead of through ducts.	
1.16	The disease experience by humans when glucose levels are not being homeostatically maintained.	
		(16 X 1) (16)



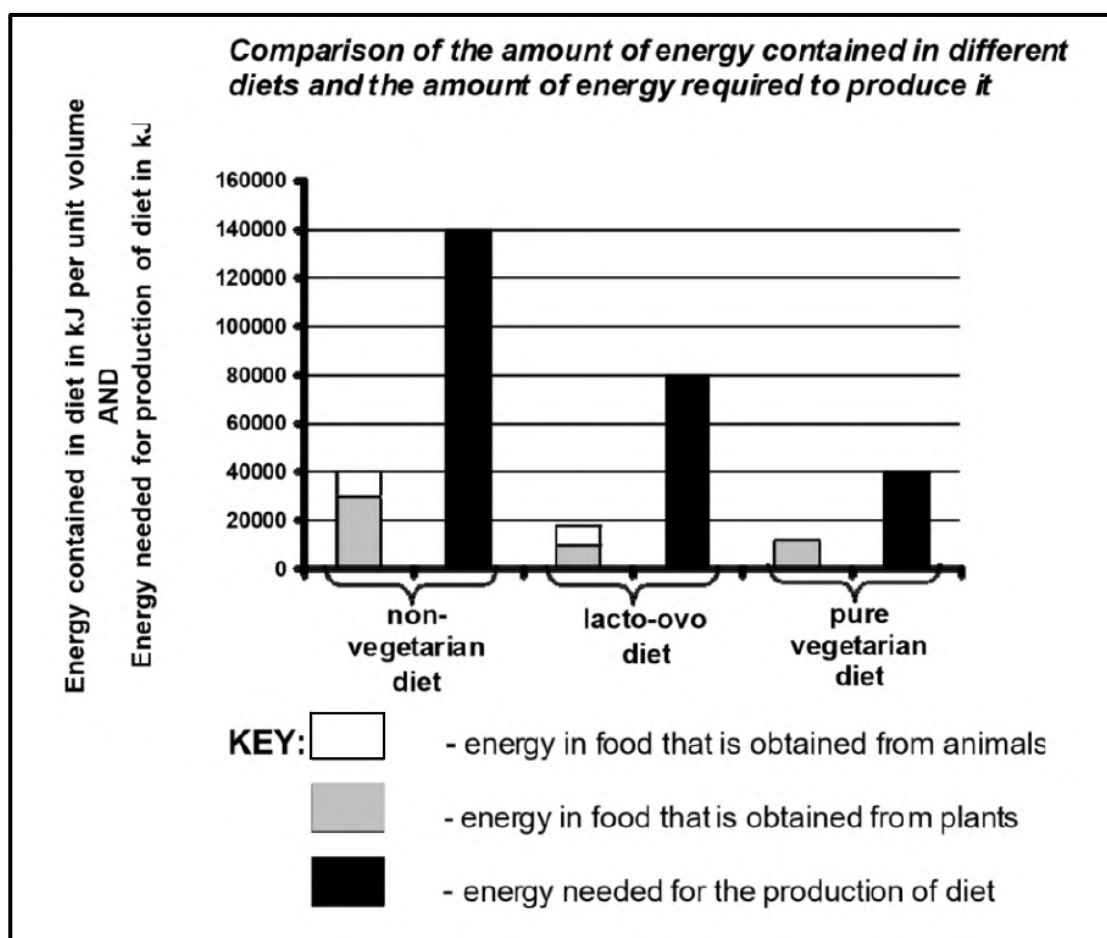
Activity 2

2	The diagrams below represents skulls of animals		
	<div style="display: flex; justify-content: space-around; align-items: center;"> <div style="text-align: center;">  <p>Diagram A</p> </div> <div style="text-align: center;">  <p>Diagram B</p> </div> </div>		
	2.1	Identify the skull that belongs to a carnivore.	(1)
	2.2	Give TWO visible reasons for your answer to QUESTION 2.1 .	(2)
	2.3	The dental formula below belongs to a sheep $\frac{0.0.3.3}{4.0.3.3}$	
		(a) State the NAME and the TOTAL NUMBER of the teeth only found at the lower jaw.	(2)
		(b) How many teeth does the sheep have altogether?	(1)
		(c) With reference to this dental formula, explain why the sheep is not adapted to consume meat.	(2)
			(8)



Activity 3

- 3 In general, people's eating patterns can be divided into three basic kinds of diet based on the type of protein eaten.
- (a) Non-vegetarian diet: where people eat / drink all types of food
 - (b) Lacto-ovo diet: where people do not eat meat but do eat eggs milk, and milk products
 - (c) Pure vegetarian diet: where people do not eat/ drink any animal-based food
- The bar graphs below show the amount of energy contained in each of these three types of diets per unit volume as well as the amount of energy needed to produce each type of diet.



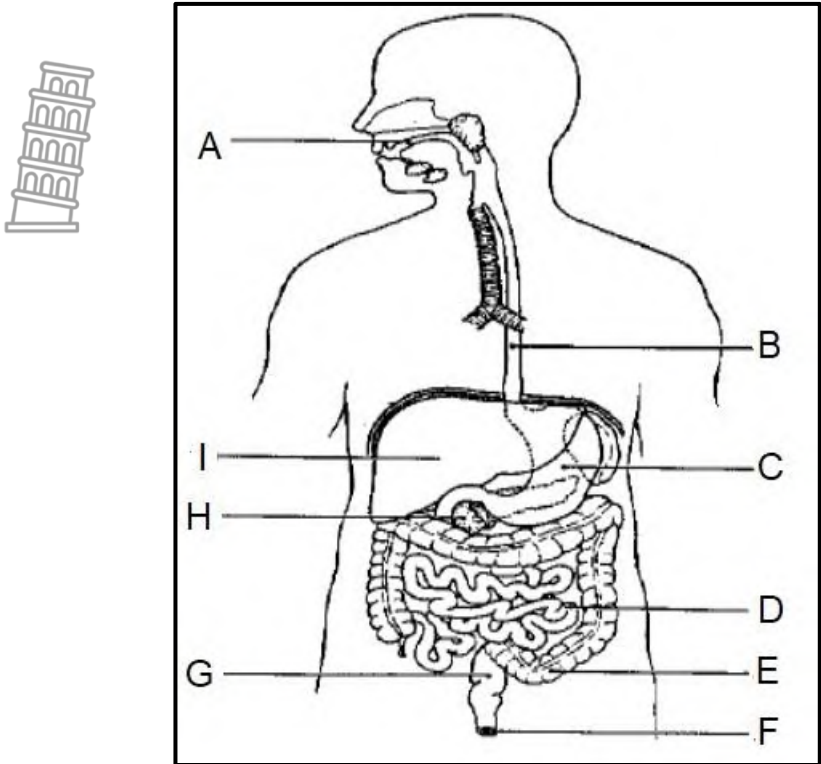
3.1	Which of the three diets given above contains the least amount of energy?	(1)
3.2	How much energy is required for the production of a non-vegetarian diet?	(2)
3.3	Suggest a reason why the diet named in QUESTION 3.1 might cause problems for very young children.	(2)
3.4	Calculate the food energy intake that is provided by animals in the non-vegetarian diet, as a percentage.	(3)
3.5	Name the main source of proteins for pure vegetarians.	(1)
		(9)

Activity 4

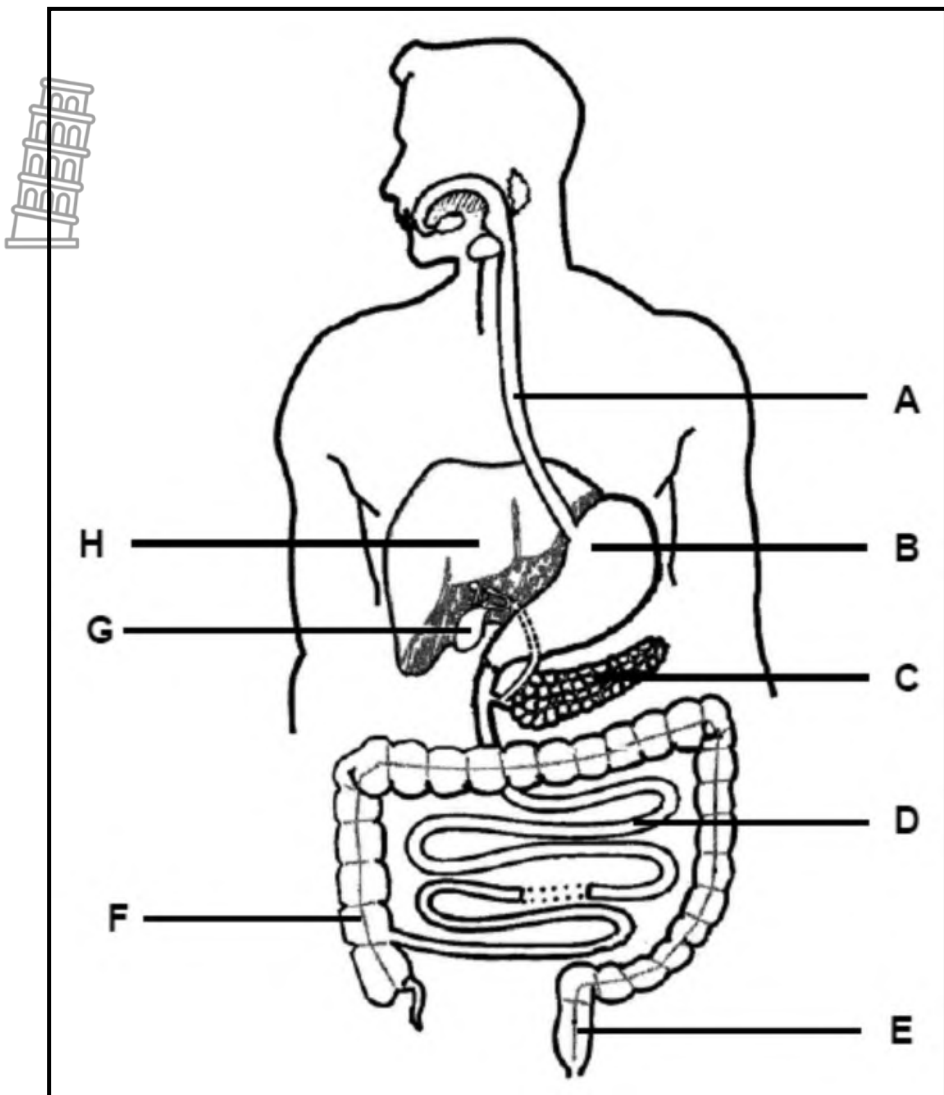
4	The following table shows the details of a meal eaten by a grade 11 learner.																																								
	<table><tr><th>Food eaten</th><th>Carbohydrate (g)</th><th>Protein (g)</th><th>Fat (g)</th><th>Vit C (g)</th><th>Iron (mg)</th></tr><tr><td>Sausage</td><td>5</td><td>9</td><td>24</td><td>0</td><td>1</td></tr><tr><td>Fried potato chips</td><td>70</td><td>8</td><td>20</td><td>20</td><td>2</td></tr><tr><td>Beans</td><td>20</td><td>10</td><td>1</td><td>4</td><td>3</td></tr><tr><td>Fruit pie</td><td>60</td><td>2</td><td>25</td><td>1</td><td>1</td></tr><tr><td>Ice cream</td><td>20</td><td>0</td><td>12</td><td>0</td><td>0</td></tr></table>					Food eaten	Carbohydrate (g)	Protein (g)	Fat (g)	Vit C (g)	Iron (mg)	Sausage	5	9	24	0	1	Fried potato chips	70	8	20	20	2	Beans	20	10	1	4	3	Fruit pie	60	2	25	1	1	Ice cream	20	0	12	0	0
Food eaten	Carbohydrate (g)	Protein (g)	Fat (g)	Vit C (g)	Iron (mg)																																				
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Beans	20	10	1	4	3																																				
Fruit pie	60	2	25	1	1																																				
Ice cream	20	0	12	0	0																																				
	4.1	Which food has the least overall nutritional value?			(1)																																				
	4.2	The total energy value of this meal is 5 000 kJ. In one day this learner requires a total of 15 000 kJ energy. Calculate the percentage of daily energy needed that this meal provides. Show all calculations.			(3)																																				
	4.3	Explain what would happen if this learner regularly ate more than 15 000 kJ per day.			(2)																																				
	4.4	Name TWO foods from the table that provide the most energy for the learner.			(2)																																				
	4.5	Draw a pie graph showing the proportion of carbohydrates obtained from each of the food types in the meal eaten by the grade 11 learner.			(6)																																				
					(14)																																				



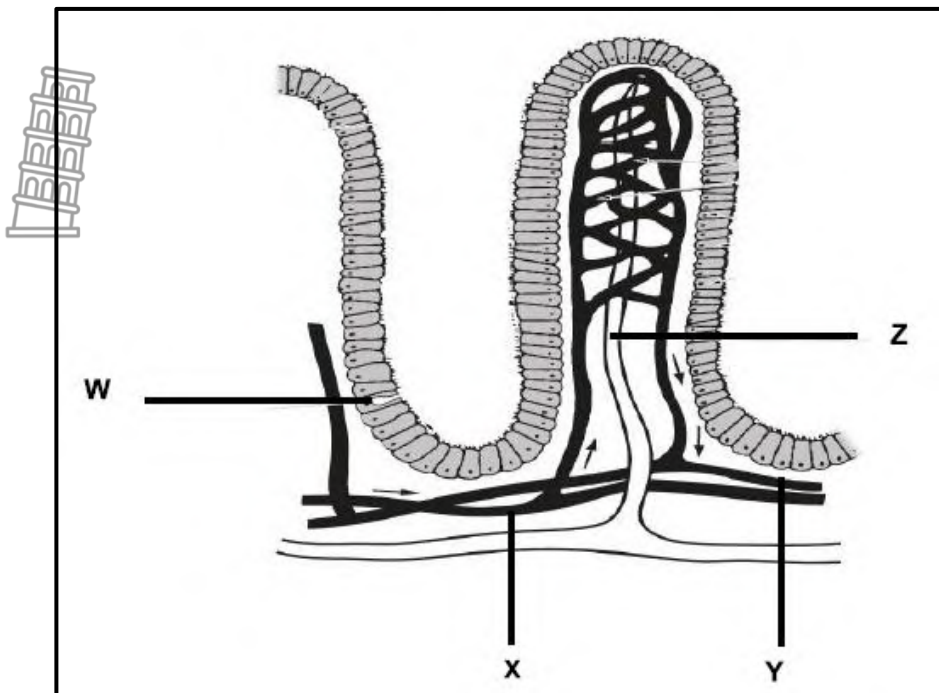
Activity 5

5	The following is a diagram of a human digestive system.		
			
5.1	Provide labels for parts B, D, E, G and I .		(5)
5.2	Write down the LETTER and the NAME of the part:		
	(a) Where ingestion takes place.		(2)
	(b) That has an acidic medium.		(2)
	(c) Where egestion takes place.		(2)
5.3	Name the muscular organ associated with part labelled A and also explain its role in nutrition.		(3)
			(14)

Activity 6

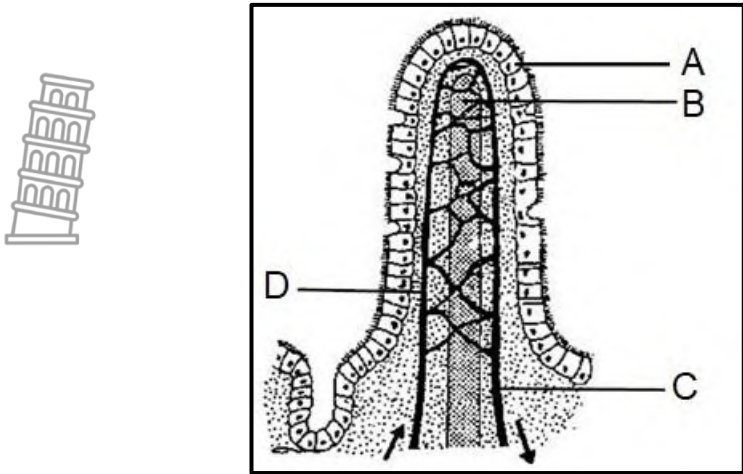
6	The diagram below showing the human digestive system.		
<div></div>			
6.1	Label parts B , C , D and G .		(4)
6.2	Write down the LETTER only of the part:		
	(a) That secretes bile.		(1)
	(b) Where chemical digestion of proteins begins.		(1)
	(c) Where most water and minerals are absorbed.		(1)
6.3	Explain the structural suitability of part B for mechanical digestion.		(2)
6.4	Describe the role of parts G and H in fat digestion.		(5)
			(14)

Activity 7

7	The diagram below shows the diagram of a villus found in the small intestine.		
			
7.1	Describe how nutrients are absorbed into vessel Z .		(2)
7.2	Explain ONE way in which cell W is adapted for its function.		(2)
7.3	Describe TWO ways in which the structure represented in the diagram is adapted to increase the amount of nutrients that are absorbed.		(4)
7.4	Explain ONE difference in the nutrient content of vessel Y as compared to vessel X .		(2)
7.5	Describe how amino acids are transported from Y to the liver and then to the rest of the body.		(3)
			(13)



Activity 8

8	The diagram below shows a structure associated with the digestive system.		
			
8.1	Identify the structure shown in the diagram.		(1)
8.2	Name the following parts:		
	(a) A		(1)
	(b) B		(1)
8.3	In which organ of the digestive tract would this structure be found?		(1)
8.4	Explain TWO structural adaptations of the part mentioned in QUESTION 8.3 that enables it to perform its functions.		(4)
8.5	In which part (C or D) would you expect to find more nutrients?		(1)
8.6	Explain your answer to QUESTION 8.5 .		(4)
			(13)


Activity 9

9	Read the extract below and answer the questions that follow.		
	<div style="border: 1px solid black; padding: 10px;"> <p>TOO MUCH CARBOHYDRATES AND TOO LITTLE PROTEINS The World Health Organisation (WHO) defines malnutrition as “the cellular imbalance between the supply of nutrients and energy and the body’s demand for them to ensure growth, maintenance, and specific functions.” The term protein-energy malnutrition (PEM) applies to a group of related disorders. This involves inadequate intake of protein and calories and is characterised by emaciation (extreme thinness). The term was first used in 1933, and it refers to an inadequate protein intake with reasonable caloric (energy) intake.</p> <p style="text-align: right;"><i>[Adapted from http://emedicine.medscape.com]</i></p> </div>		
9.1	State the World Health Organisation’s definition of malnutrition.		(2)
9.2	Name the condition children can suffer from if they get enough energy foods, like bread, rice and porridge, but not enough proteins?		(1)
9.3	Describe the chemical digestion of proteins in the stomach.		(5)
			(8)

Activity 10

10

The table below shows the nutritional information of a cereal provided to learners at a local high school to supplement their daily nutrient intake.



Energy and nutrients	Unit	Per 50g serving
Energy	kJ	746
Protein	g	12
Total Carbohydrate	g	29
Total Fat	g	6
Saturated fats	g	1
Polyunsaturated fats	g	3
Monounsaturated fats	g	2
Cholesterol	mg	0

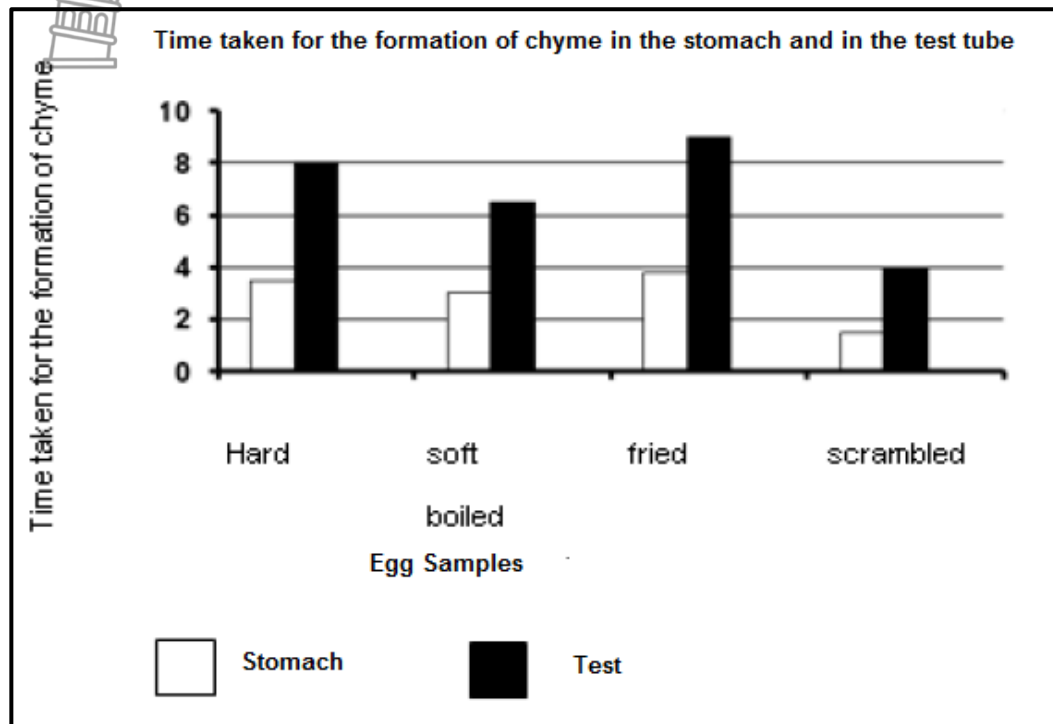
A 14-year-old girl needs 7530kJ of energy per day.

10.1	Calculate the number of servings of cereal that would provide this amount of energy. Show all working.	(2)
10.2	Draw a bar graph to represent all data in the table relating to the fat content of the cereal.	(6)
10.3	Describe the chemical digestion of proteins in the stomach.	(5)
		(13)



Activity 11

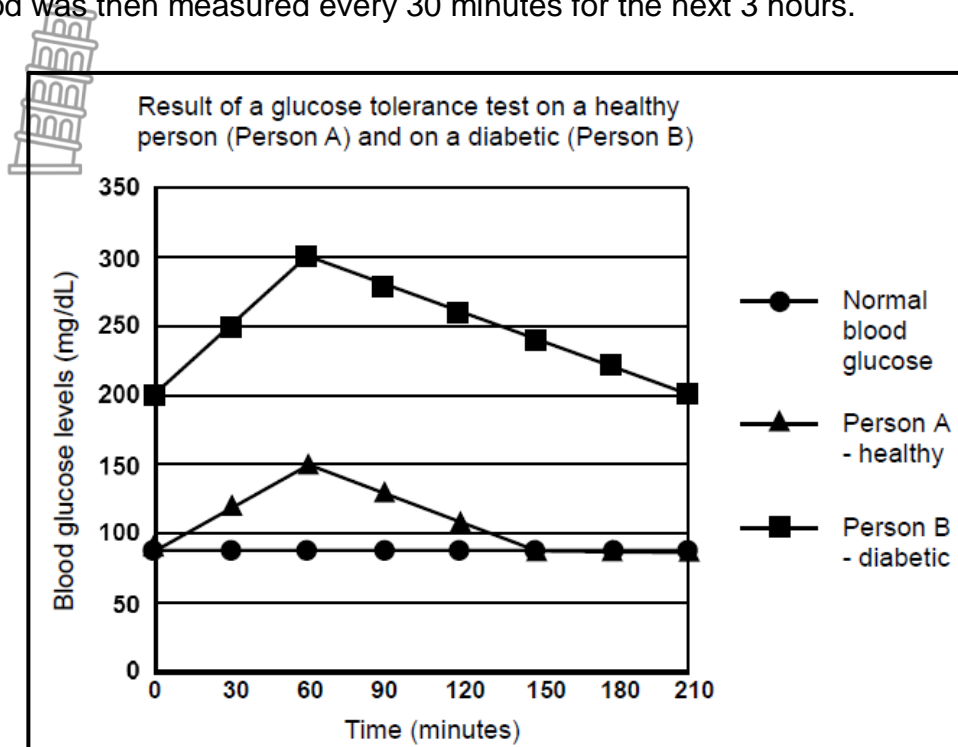
- 11 A scientist conducted an investigation on digestion, involving gastric juice. She compared the time taken for 50 g of different cooked egg samples to form chyme in the stomach, with the time taken for the same sample to form chyme in a test tube containing gastric juice. The test tube was maintained at 37°C. The results are indicated in the graph below.



11.1	State the aim of the experiment.	(2)
11.2	Identify the:	
	(a) Independent variable	(1)
	(b) Dependent variable	(1)
11.3	Give ONE reason as to why the temperature of the test tube was maintained at 37°C?	(1)
11.4	Name ONE factor other than temperature that was kept constant during the investigation.	(1)
11.5	Determine the following from the graph:	
	(a) The sample that took the longest time to form chyme in the stomach	(1)
	(b) The sample that took the shortest time to form chyme in the test tube.	(1)
11.6	Explain why the results obtained for the stomach differ from that in the test tubes.	(2)
11.7	Describe the following for the end product of food that only contains carbohydrates:	
	(a) Absorption	(4)
	(b) Transportation	(4)
		(18)

Activity 12

- 12 The graph below shows the results of a glucose tolerance test on a healthy individual (Person A) and on a diabetic person (Person B). After fasting for ten hours, they were each given a drink of glucose solution containing 50g glucose. The amount of glucose in their blood was then measured every 30 minutes for the next 3 hours.

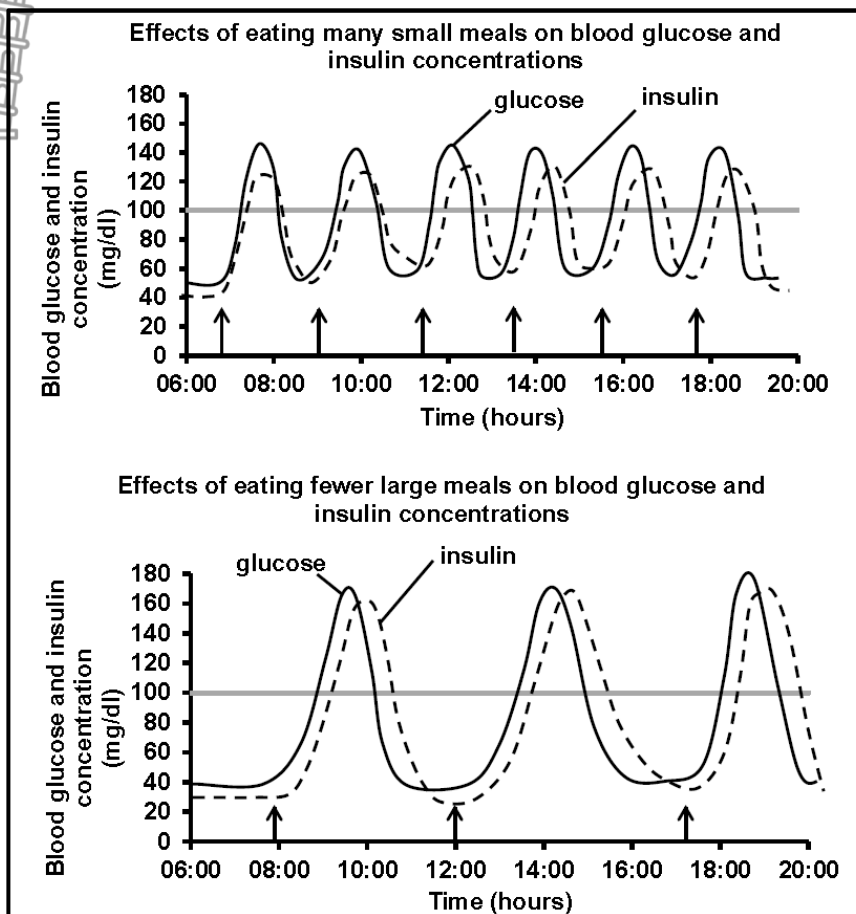


12.1	Give the greatest concentration of glucose in the diabetic's blood.	(1)
12.2	From the graph, determine how long it would take for the glucose concentration of:	
	(a) the healthy person to return to the level when the glucose solution was consumed.	(2)
	(b) the diabetic person to return to the level when the glucose solution was consumed.	(2)
12.3	Describe the effect of injecting insulin into the diabetic person have on the results of the test.	(1)
12.4	Give the main function of insulin.	(1)
12.5	Explain briefly why insulin, which is a protein, is injected into a diabetic person, rather than given orally.	(2)
		(9)



Activity 13

- 13 The graphs below show the effects of eating many small meals and eating fewer large meals on blood glucose and insulin concentrations in a normal person. The arrows on the graphs below indicate when meals were eaten. The normal blood glucose concentration is 100 mg/dl.



13.1	State what happens to the blood glucose concentration immediately after a meal is eaten.	(1)
13.2	Use the information in the graphs. Tabulate any TWO ways in which eating fewer large meals and eating many small meals affect the blood insulin levels differently.	(5)
13.3	Explain why eating many small meals per day is better for a diabetic person than eating fewer large meals a day.	(4)
		(10)



Activity 14

14	The flow diagram below shows a process that occurs in humans.		
14.1	Identify:		
	(a) Organ 1		(1)
	(b) Hormone 2		(1)
	(c) Hormone 3		(1)
14.2	Name the disorder caused when organ 1 fails to release hormone 2.		(1)
14.3	Describe the role of the liver and its relationship with organ 1 to bring about homeostasis when glucose levels are high.		(6)
14.4	Describe the role of hormone 3 to increase the levels of blood glucose.		(4)
			(14)



Topic: Gaseous Exchange

Activity 1

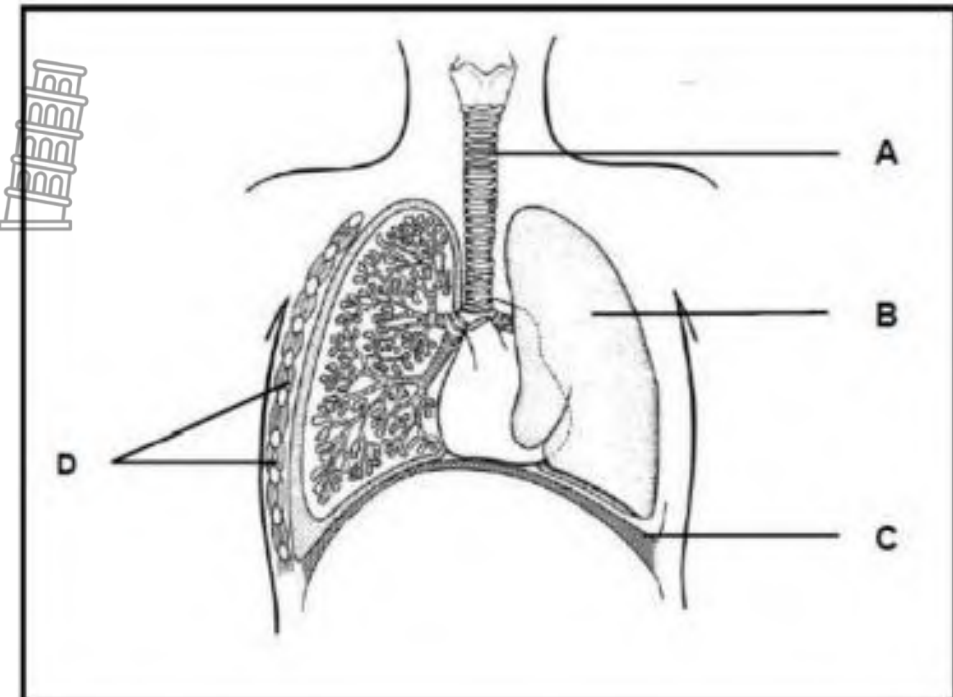
No.	Description	Biological Term
1.1	A cartilaginous flap which closes the trachea when swallowing to prevent choking.	
1.2	Taking in of oxygen-rich air into the lungs.	
1.3	Taking out of air rich in carbon dioxide from the lungs.	
1.4	Two membranes surround the lungs.	
1.5	A flap of breathing muscle that separates the chest cavity from the abdominal cavity.	
1.6	Breathing in of oxygen- rich air and breathing out of air rich in carbon dioxide.	
1.7	Air sac membrane from the bronchiole in the lungs.	
1.8	The form in which carbon dioxide is carried by blood away from tissues.	
1.9	The form in which oxygen is carried by blood to the tissues.	
1.10	A system in which the body maintains normal limits of oxygen by blood in the body.	
1.11	The blood cells that transport oxygen.	
1.12	The cartilaginous structure that contains vocal cords.	
1.13	The region of the brain that controls the rate of breathing in humans.	
1.14	The structure in the human respiratory system that closes the larynx.	
		(14 x 1) (14)

Activity 2

2	Answer the questions below based on human gaseous exchange.		
	2.1	State:	
		(a) ONE similarity between the terms breathing and gaseous.	(1)
		(b) ONE difference between the terms breathing and gaseous.	(2)
	2.2	Describe the mechanism of exhalation.	(6)
			(9)

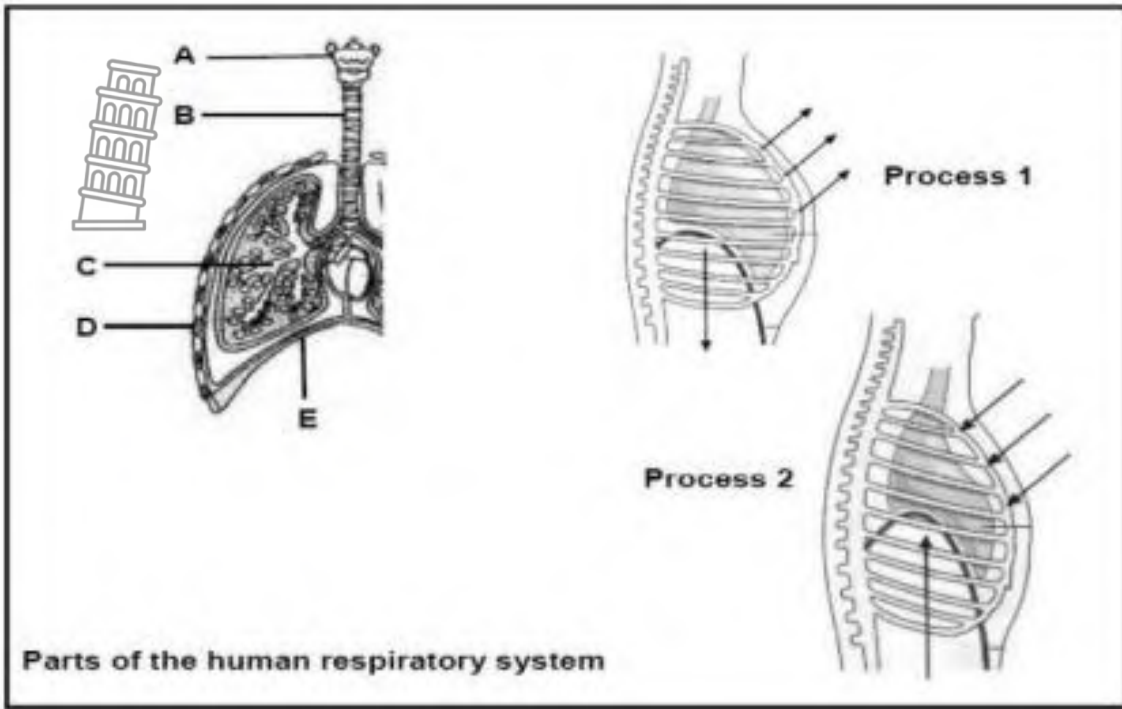


Activity 3

3	The diagram below shows the respiratory system of human.		
			
3.1	Identify parts:		
	(a) A		(1)
	(b) B		(1)
	(c) C		(1)
	(d) D		(1)
3.2	Explain ONE way in which part labelled A is adapted to perform its function.		(2)
3.3	Describe what happens to each of the parts named B and C during inhalation.		(2)
3.4	Draw a labelled diagram showing gaseous exchange across an alveolus. Use arrows to show the direction of movement of gases.		(5)
			(13)

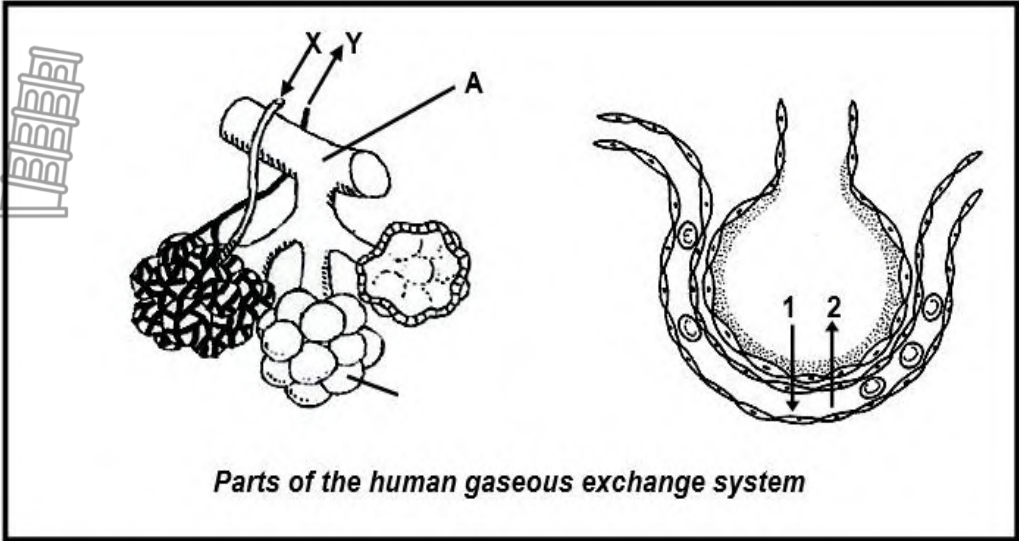


Activity 4

4	The diagrams below represent processes of the respiratory system.		
	 <p>Parts of the human respiratory system</p>		
4.1	Identify parts:		
	(a) A		(1)
	(b) B		(1)
	(c) C		(1)
4.2	Give the NUMBER of the process of inhalation from the diagrams above.		(1)
4.3	State TWO reasons from the processes taking place from the diagrams above to support your answer to QUESTION 4.2 above.		(2)
4.4	Give LETTERS and NAMES of the muscles shown in the diagram that are involved during inhalation.		(4)
4.5	When one makes use of a heater to warm the room, one is advised to place a small bowl of water next to the heater. Explain the purpose of this practice.		(4)
4.6	A person's thoracic wall was punctured during a motor vehicle accident. Explain how this injury will affect the breathing process.		(2)
4.7	Describe THREE requirements of efficient gaseous exchange system in humans.		(3)
			(19)




Activity 5

5	Study the diagrams below and answer the questions that follow:		
	 <p><i>Parts of the human gaseous exchange system</i></p>		
5.1	Identify:		
	(a) Part A		(1)
	(b) Process represented by 1 and 2		(1)
5.2	With regard to carbon dioxide and oxygen concentrations, which one will be the highest at:		
	(a) X		(1)
	(b) Y		(1)
5.3	List TWO features visible on the diagram that make the above structure an efficient respiratory surface.		(2)
5.4	Explain how the diffusion of carbon dioxide takes place at tissue surface.		(4)
5.5	State TWO ways in which CO ₂ is transported by blood.		(2)
			(12)



Activity 6

6	The following table shows the volume of air inhaled by a person over a time frame of 120 seconds.																										
	<div></div> <table><thead><tr><th>Time (sec)</th><th>Volume of air inhaled (litres)</th></tr></thead><tbody><tr><td>10</td><td>3,5</td></tr><tr><td>20</td><td>3,5</td></tr><tr><td>30</td><td>3,5</td></tr><tr><td>40</td><td>3,5</td></tr><tr><td>50</td><td>3,5</td></tr><tr><td>60</td><td>5,0</td></tr><tr><td>70</td><td>5,0</td></tr><tr><td>80</td><td>5,0</td></tr><tr><td>90</td><td>4,5</td></tr><tr><td>100</td><td>4,0</td></tr><tr><td>110</td><td>3,5</td></tr></tbody></table> <p>Asthma is a respiratory condition marked by attacks of muscular contraction in the bronchi of the lungs, causing difficulty in breathing.</p>		Time (sec)	Volume of air inhaled (litres)	10	3,5	20	3,5	30	3,5	40	3,5	50	3,5	60	5,0	70	5,0	80	5,0	90	4,5	100	4,0	110	3,5	
Time (sec)	Volume of air inhaled (litres)																										
10	3,5																										
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70	5,0																										
80	5,0																										
90	4,5																										
100	4,0																										
110	3,5																										
	6.1	Explain how the information in the table would be different if this suffered from asthma.	(2)																								
	6.2	State for how long this person exercised.	(2)																								
	6.3	Explain your answer in QUESTION 6.2 .	(2)																								
	6.4	Use the information in the table to draw a line graph for 30 to 100 seconds.	(6)																								
			(12)																								



Activity 7

7	<p>Wearing a face mask is recommended to reduce the spread of the corona virus. There are some concerns about the efficiency of breathing when wearing a face mask.</p> <p>Scientists investigated the effect of wearing face masks on the carbon dioxide levels in blood.</p> <p>They:</p> <ul style="list-style-type: none"> • Obtained permission from 150 healthy volunteers, aged 30, to participate in the investigation • Applied a sensor to the participants' skin to measure the carbon dioxide levels in the blood • Asked the participants to: <ul style="list-style-type: none"> ○ Sit still for 10 minutes without wearing a face mask ○ Sit still for 10 minutes while wearing a face mask ○ Exercise for 10 minutes without wearing a face mask ○ Exercise for 10 minutes while wearing a face mask • Allowed a 15-minute interval between each 10-minute phase • Recorded the carbon dioxide levels at the end of each 10-minute phase • Ensured that the face mask covered the nose and mouth 		
	7.1	Identify the:	
		(a) Independent variable	(1)
		(b) Dependent variable	(1)
	7.2	State TWO factors that were taken into consideration in the selection of the participants.	(2)
	7.3	Give ONE reason why the results at the end of this investigation may be considered reliable.	(1)
	7.4	Explain why scientists allowed a 15-minute interval between each phase.	(2)
	7.5	Give a reason why the carbon dioxide levels were measured while participants were sitting still.	(1)
	7.6	Describe the homeostatic control of carbon dioxide when it is high in blood.	(7)
			(15)



Activity 8

8

Grade 11 learners carried out an investigation to determine the effect of physical activity on the rate and breathing rate of humans.

The procedure for the investigation was as follows:

- They chose five learners of the same age to participate in their investigation
- They measured the heart rate and breathing rate of each learner before the physical activities
- The learners each walked a distance of 5km and also ran a distance of 5km
- They measured the heart and breathing rate of each learner after walking and running.

The table below shows the results of their investigation.

Physical activity	Average heart rate (beats per minutes)	Average breathing rate (breaths per minute)
Rest	71	12
Walking	88	13
Running	120	17

8.1	Identify the independent variable.	(1)
8.2	State TWO planning steps the learners considered for this investigation.	(2)
8.3	State ONE way in which the learners ensured validity of their investigation.	(1)
8.4	State the effect of running on the breathing rate, using the results in the table above.	(1)
8.5	Explain your answer in QUESTION 8.4 .	(2)
8.6	Calculate the difference in the learner's heart rate between rest and running.	(2)
8.7	State the conclusion that can be drawn from the results of the investigation.	(2)
		(11)



Activity 9

9 A study was carried out on eight swimmers (2 females and 6 males). They were all record holders and had participated in National championships and the Olympic games. These swimmers attended a 23 day camp which was at an altitude of 2300 metres above sea level. Before and after the camp their blood was tested for their red blood cell count and haemoglobin concentration. Their performance was also measured before and after the camp by looking at their times in races. Six out of the eight swimmers improved upon their performances after the camp.

The table below shows the average changes in the swimmer’s blood before and after the high altitude training camp.

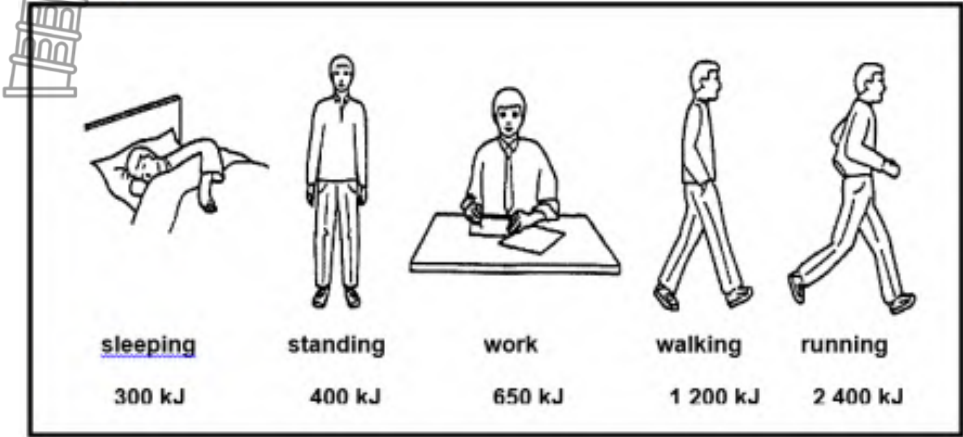
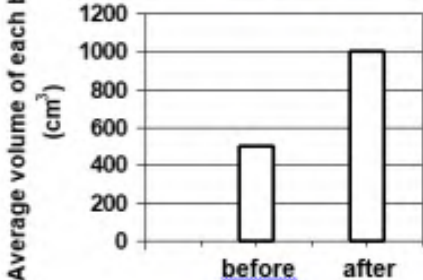
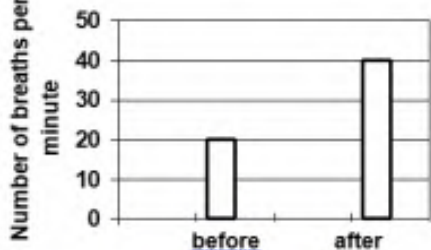
	Before camp	After camp
Red blood cells (millions/mm ³)	4,69	5,37
Haemoglobin (g/dL)	14,8	16,8

(adapted from Biol.Sport 2012: Athletic performance of swimmers after altitude training (2300M above sea level) in view of their blood morphology changes <https://researchgate.net/>)


9.1	Give two observations that could be made relating to the altitude training.	(2)
9.2	Give another name for red blood cells.	(1)
9.3	State the function of haemoglobin in the blood.	(1)
9.4	Name the important element that is found in haemoglobin.	(1)
9.5	Calculate the average increase in red blood cells of the swimmers after camp training.	(3)
9.6	Identify a dependent variable in the above table.	(1)
9.7	Explain the advantage of a swimmer training at high altitudes before participating in an Olympic event.	(2)
9.8	How could the reliability of the results obtained in the above experiment be improved?	(2)
		(13)



Activity 10

10	The diagrams below show how much energy, in kilojoules (kJ), is needed by a man to do various activities for an hour. The bar graphs illustrate the effect of exercise on the man's rate and depth of breathing. Study the diagrams and bar graphs and answer the questions that follow:																								
<div><table><tr><td><u>sleeping</u></td><td>standing</td><td>work</td><td>walking</td><td>running</td></tr><tr><td>300 kJ</td><td>400 kJ</td><td>650 kJ</td><td>1 200 kJ</td><td>2 400 kJ</td></tr></table></div> <div><p><i>The effect of exercise on the man's rate and depth of breathing</i></p><div><p>Graph A</p><table><tr><th>Activity</th><th>Average volume of each breath (cm³)</th></tr><tr><td><u>before</u></td><td>500</td></tr><tr><td>after</td><td>1000</td></tr></table></div><div><p>Graph B</p><table><tr><th>Activity</th><th>Number of breaths per minute</th></tr><tr><td><u>before</u></td><td>20</td></tr><tr><td>after</td><td>40</td></tr></table></div></div>				<u>sleeping</u>	standing	work	walking	running	300 kJ	400 kJ	650 kJ	1 200 kJ	2 400 kJ	Activity	Average volume of each breath (cm ³)	<u>before</u>	500	after	1000	Activity	Number of breaths per minute	<u>before</u>	20	after	40
<u>sleeping</u>	standing	work	walking	running																					
300 kJ	400 kJ	650 kJ	1 200 kJ	2 400 kJ																					
Activity	Average volume of each breath (cm ³)																								
<u>before</u>	500																								
after	1000																								
Activity	Number of breaths per minute																								
<u>before</u>	20																								
after	40																								
10.1	According to graph A , state the effect of exercise on the depth of breathing.	(1)																							
10.2	Calculate the total volume of air that passes in and out of the man's lungs each minute after exercise. Show ALL your working.	(3)																							
10.3	The main reason for breathing during exercise is to take in oxygen that is used for energy release. Explain why the man continues to breathe heavily shortly after an exercise.	(2)																							
10.4	Identify an activity that used 20 kJ per minute in the graph above.	(2)																							
10.5	Give a reason for your answer to QUESTION 10.4 above.	(2)																							
10.6	Sleeping uses 300 kJ of energy per hour. Explain what this energy is used for.	(2)																							
		(12)																							

Activity 11

11	An investigation was conducted to determine the effect of smoking on the prevalence of other diseases. Study the table below and answer the questions that follow.																																					
	 <table border="1"> <thead> <tr> <th rowspan="2">Diseases</th><th colspan="3">Mortality rate per 100 000</th></tr> <tr> <th>Active-smoker</th><th>Passive smoker</th><th>Non-smoker</th></tr> </thead> <tbody> <tr> <td>Lung cancer</td><td>200</td><td>190</td><td>11</td></tr> <tr> <td>Cancer of the mouth or larynx</td><td>30</td><td>20</td><td>6</td></tr> <tr> <td>Other cancers</td><td>195</td><td>80</td><td>105</td></tr> <tr> <td>Respiratory diseases</td><td>60</td><td>56</td><td>12</td></tr> <tr> <td>Heart diseases</td><td>220</td><td>138</td><td>80</td></tr> <tr> <td>Other medical conditions</td><td>70</td><td>40</td><td>35</td></tr> <tr> <td>Suicide, homicide, accidents</td><td>70</td><td>75</td><td>20</td></tr> </tbody> </table>			Diseases	Mortality rate per 100 000			Active-smoker	Passive smoker	Non-smoker	Lung cancer	200	190	11	Cancer of the mouth or larynx	30	20	6	Other cancers	195	80	105	Respiratory diseases	60	56	12	Heart diseases	220	138	80	Other medical conditions	70	40	35	Suicide, homicide, accidents	70	75	20
Diseases	Mortality rate per 100 000																																					
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Heart diseases	220	138	80																																			
Other medical conditions	70	40	35																																			
Suicide, homicide, accidents	70	75	20																																			
	11.1	State the dependent variable for this investigation.	(1)																																			
	11.2	Suggest why South Africa has strict laws that control smoking in public places.	(2)																																			
	11.3	State how many smokers per 100 000 die of heart disease.	(1)																																			
	11.4	Give the ratio among active smokers, passive smokers and non-smokers that die of respiratory disorders.	(2)																																			
	11.5	Suggest two controlled variables that can improve this investigation.	(2)																																			
	11.6	State the effect of smoking on the prevalence of cancer. Use the information in the table to explain your answer.	(1)																																			
	11.7	Explain the effect of smoking on the bronchioles and alveoli of the lungs.	(3)																																			
	11.8	Draw a bar graph representing the above information for active smokers.	(6)																																			
			(18)																																			



Topic: Excretion

Activity 1

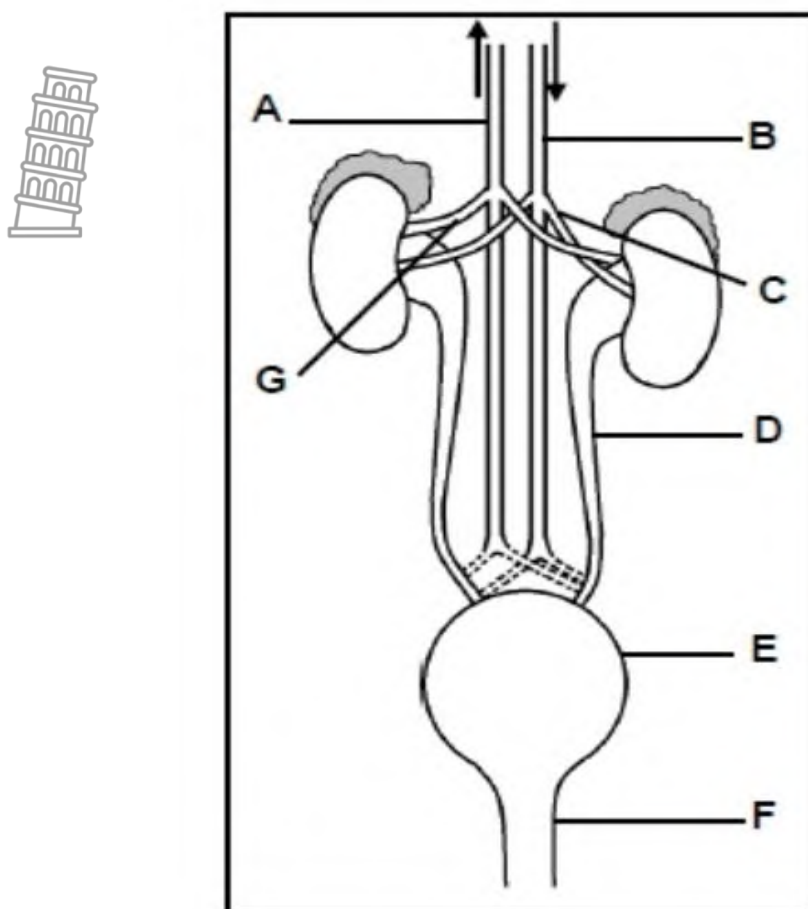
Give the correct **biological term** for each of the following descriptions.

No.	Description	Biological Term
1.1	The process by which the body eliminates metabolic waste products.	
1.2	The ejection of solid waste from the body.	
1.3	The release of useful substances (enzyme, saliva) from cells or glands.	
1.4	A pair of bean-shaped organs in the abdominal cavity on either side of the mid-line below the diaphragm.	
1.5	A pair of ducts which carry urine from the kidneys to the bladder.	
1.6	The functional and structural unit of the kidney	
1.7	A tube which runs through the penis carries urine and the semen to the outside.	
1.8	A main artery leaving the heart leaving the heart, supplying the body with blood.	
1.9	A part that brings oxygenated, unfiltered blood to the kidneys.	
1.10	An outer membrane covering the kidney.	
1.11	A control of water levels in the body.	
1.12	A blood vessel bringing blood from the renal artery into the Bowman's capsule of the nephron and forming the glomerulus.	
1.13	A blood vessel from the renal artery that leaves the Bowman's capsule.	
1.14	A cup shaped structure surrounding the glomerulus.	
1.15	Specialised cells that lines Bowman's capsule and responsible for ultrafiltration.	
1.16	A hormone responsible for osmoregulation.	
		(16 X 1) (16)



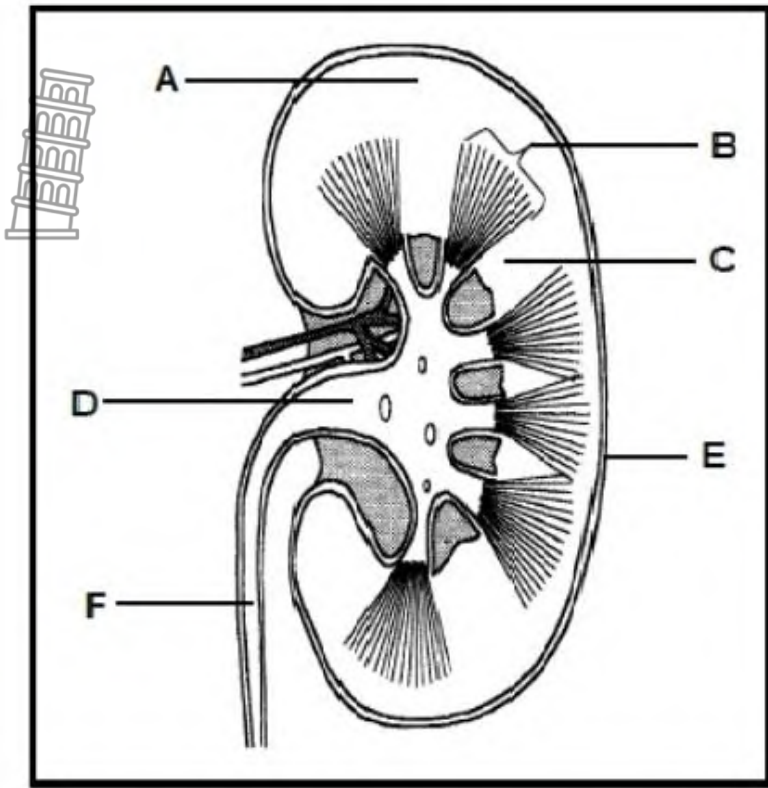
Activity 2

2.1 The diagram below shows a human excretory system.

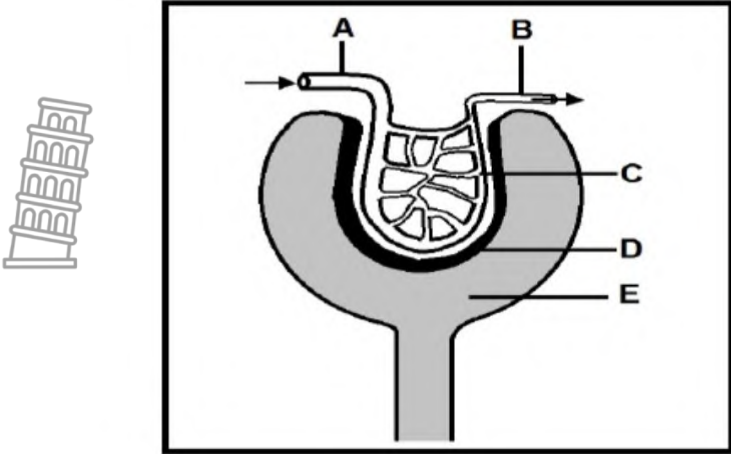


2.1	Name the parts:	
	(a) A	(1)
	(b) B	(1)
	(c) C	(1)
	(d) G	(1)
2.2	Name the blood vessel that	
	(a) Transports deoxygenated blood back to the heart	(1)
	(b) Is under high pressure	(1)
	(c) has the lowest blood pressure	(1)
2.3	Give the that LETTER and NAME of the:	
	(a) Part that collects and stores urine temporarily.	(2)
	(b) Blood vessel that transports oxygenated boool directly to the kidney.	(2)
	(c) Tube that transports urine from the kidney to part E .	(2)
2.4	Explain the consequences of part D being blocked.	(3)
		(16)

Activity 3

3	The diagram below shows a part an excretory system.		
			
	3.1	Name the organ represented in the diagram.	(1)
	3.2	Give THREE functions of the organ named in QUESTION 3.1 .	(3)
	3.3	Identify region A .	(1)
	3.4	Identify part:	
		(a) B	(1)
		(b) D	(1)
	3.5	Give the function of each of the following parts:	
		(a) E	(1)
		(b) F	(1)
			(9)

Activity 4

4.1	The diagram below shows the structure of a Malpighian corpuscle.		
			
4.1	Name parts labelled:		
	(a) A		(1)
	(b) B		(1)
	(c) C		(1)
4.2	Name the physiological process that takes place in the diagram shown above.		(1)
4.3	Explain how the difference in diameter of the parts labelled A and B responsible for the process that occurs in the Malpighian body		(6)
4.4	Name the specialised cells found at D .		(1)
4.5	Describe how these cells mentioned in QUESTION 4.3 are structurally suited for their function.		(2)
4.6	Describe TWO structural adaptations of part C to perform its function.		(4)
			(17)

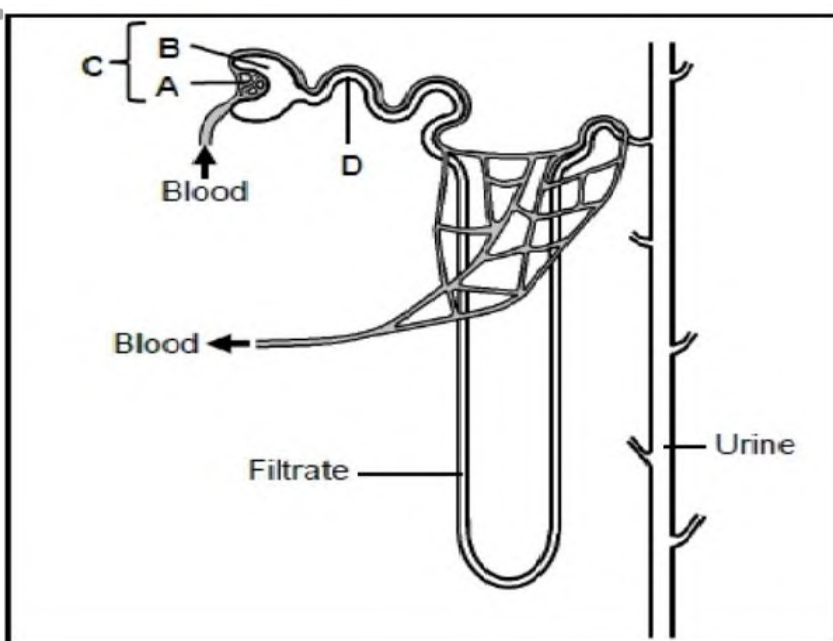
Activity 5

5	Read the following passage and answer the questions that follow.		
	<p>Hypernatremia is the medical term having too much sodium in the blood. Sodium is an important nutrient for proper functioning of the body. Most of the body's sodium is found in the blood.</p> <p>Hypernatremia can occur when there is too much water loss or too much sodium gain the body. The result is too little body water for the amount of total body sodium.</p>		
5.1	With reference to the extract, state TWO possible reasons for a person developing hypernatremia.		(2)
5.2	Explain why sodium ions are actively pumped out at certain regions of the loop of Henle into the medulla region of the kidney.		(3)
5.3	Describe how constant sodium concentration in the blood of a healthy human is maintained, when the level of sodium is decreased below the normal level.		(4)
5.4	Explain why the levels of antidiuretic hormone (ADH) remains high in a patient who is severely dehydrated with diarrhoea and vomiting.		(2)
			(11)

Activity 6

6		
6.1	Describe how constant water concentration in the blood of a healthy human is maintained, when the level of water is decreased below the normal level.	(4)

Activity 7

7	The diagram below represents the structure of the nephron.																					
																						
7.1	Identify the parts labelled:																					
	(a) A	(1)																				
	(b) B	(1)																				
7.2	Name the process that takes place at C .	(1)																				
	The concentration of various substances in the blood, filtrate and urine are given below:																					
	<table><tr><th>Location</th><th>Urea g/100 cm³</th><th>Glucose g/100 cm³</th><th>Proteins g/100 cm³</th><th>Salts g/100 cm³</th></tr><tr><td>Blood at part A</td><td>0.03</td><td>0.10</td><td>8.00</td><td>0.72</td></tr><tr><td>Filtrate</td><td>0.03</td><td>0.10</td><td>0.00</td><td>0.72</td></tr><tr><td>Urine</td><td>2.00</td><td>0.00</td><td>0.00</td><td>1.50</td></tr></table>	Location	Urea g/100 cm ³	Glucose g/100 cm ³	Proteins g/100 cm ³	Salts g/100 cm ³	Blood at part A	0.03	0.10	8.00	0.72	Filtrate	0.03	0.10	0.00	0.72	Urine	2.00	0.00	0.00	1.50	
Location	Urea g/100 cm ³	Glucose g/100 cm ³	Proteins g/100 cm ³	Salts g/100 cm ³																		
Blood at part A	0.03	0.10	8.00	0.72																		
Filtrate	0.03	0.10	0.00	0.72																		
Urine	2.00	0.00	0.00	1.50																		
7.3	State which of the substances given:																					
	(a) Did not move from the part labelled A to B .	(1)																				
	(b) Is present in the filtrate, but is completely reabsorbed at the part D ?	(1)																				
	(c) Reaches the highest concentration in the urine.	(1)																				
7.4	Explain TWO structural adaptations of the part labelled D .	(4)																				
		(10)																				

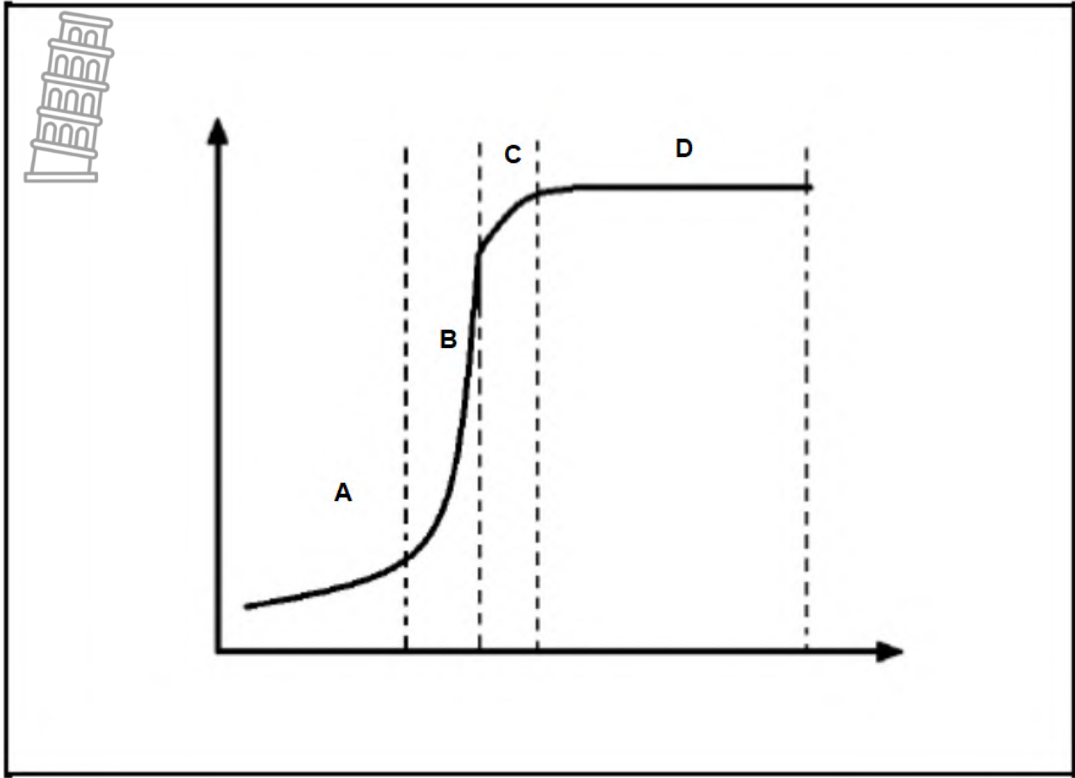
Topic: Population Ecology

Activity 1

No.	Description	Biological Term
1.1	A group of organisms of the same species occupying the same habitat at the same time.	
1.2	A group of organisms that share similar characteristics and are capable of interbreeding to produce fertile offspring.	
1.3	A group of different species or populations that occupy the same habitat.	
1.4	A percentage increase of a population as a result of a number of births in a given season or year.	
1.5	The permanent movement of organisms out of a specific area.	
1.6	The death of all member of a particular species.	
1.7	A movement of individuals into a habitat.	
1.8	The type of relationship between two organisms where one completely outcompetes the other.	
1.9	The type of competition between two members of different species.	
1.10	The position an organism occupies in an ecosystem.	
1.11	The general term which describes the plant species which is first to inhabit an environment.	
1.12	The maximum number of individuals that can be accommodated by the resources of a particular habitat.	
1.13	A removal of animals from a flock when the population size exceeds the carrying capacity.	
1.14	The kind of competition when individuals of the same species living in the same habitat compete for the same food sources.	
1.15	The rate at which individuals die in a population.	
1.16	A illegal hunting and killing of animals.	
1.17	A symbiotic relationship where one organism benefit and the other one is harmed.	
1.18	A symbiotic relationship where both organisms benefit from the relationship.	
1.19	A symbiotic relationship where one organisms benefit and other one does not benefit and does not get harmed.	
1.20	An animal that hunts, kills and eat other animals.	
		(20 X 1) (20)

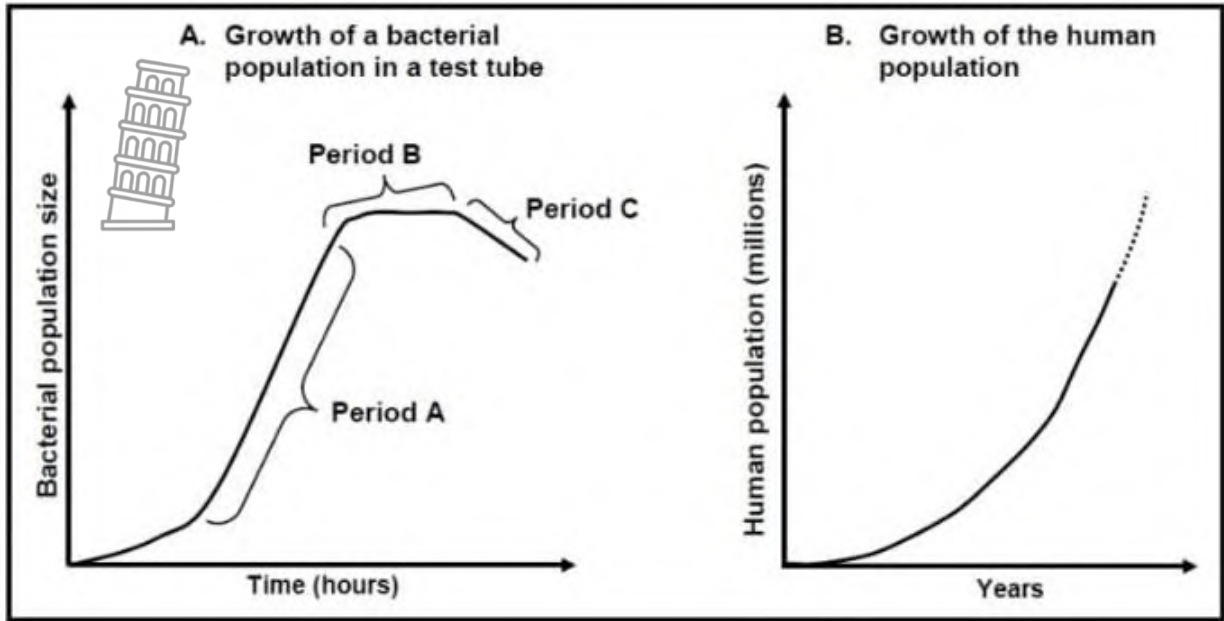


Activity 2

2	<p>The graph below shows the growth pattern of a rabbit population in specific habitat over 20 years</p> <div data-bbox="317 349 1396 1124">  </div>		
	2.1	Identify the growth pattern illustrated in the above graph.	(1)
	2.2	Name the phases A , B , C and D .	(4)
	2.3	Give the LETTER of the phase during which:	
		(a) Natality equals mortality.	(1)
		(b) Is population growth the fastest.	(1)
		(c) The natality exceeds mortality in the greatest extent.	(1)
		(d) The environmental resistance comes into effect.	(1)
			(9)

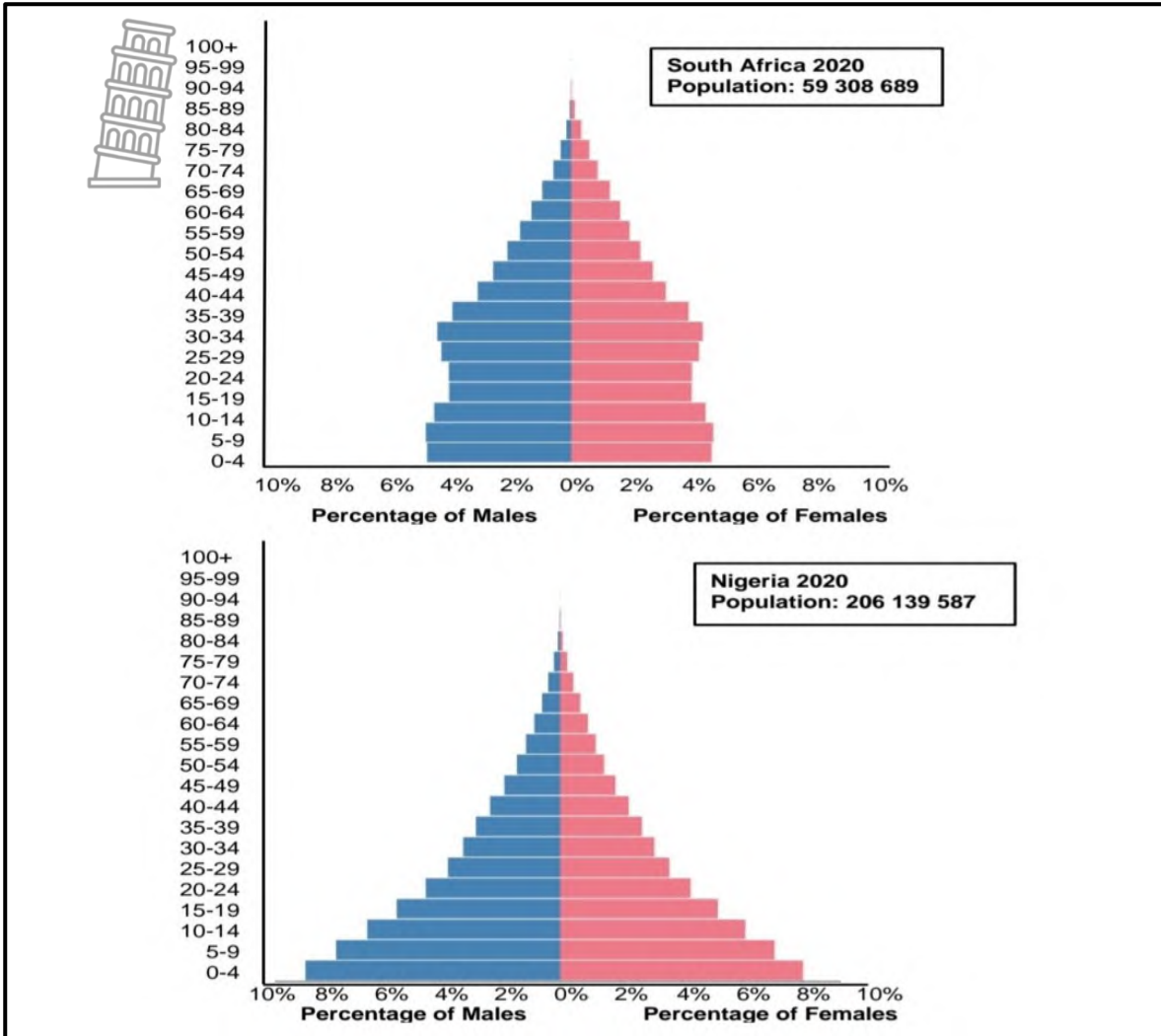


Activity 3

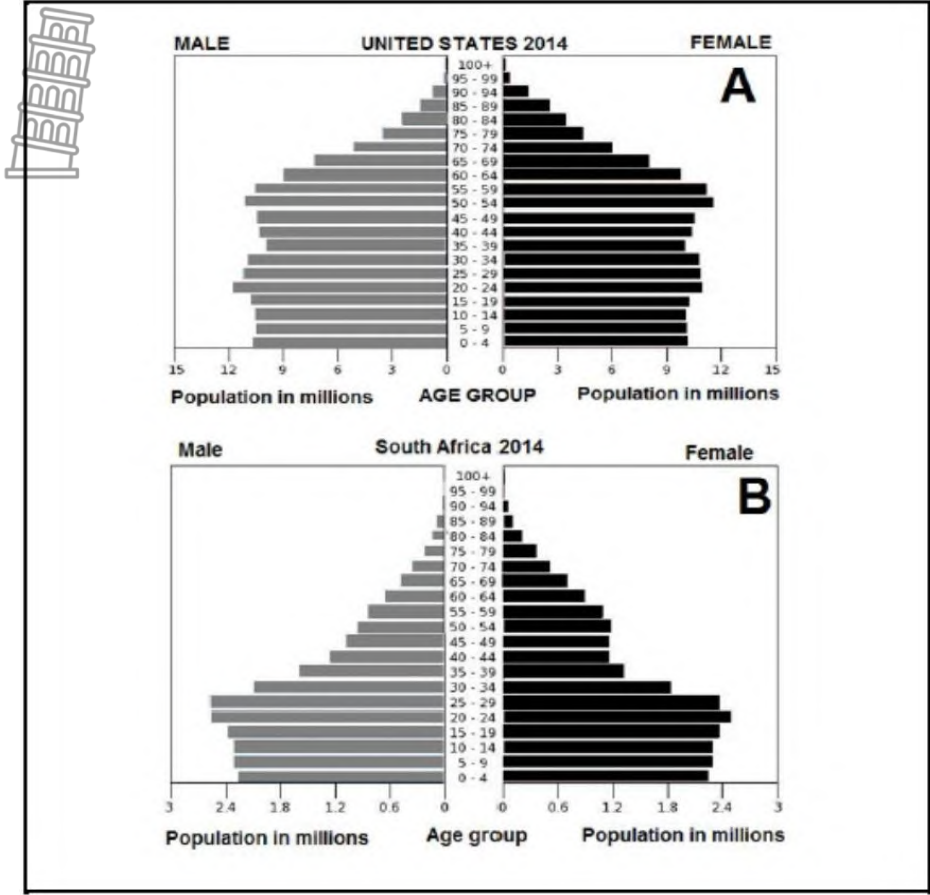
3	The diagram below		
	 <p>A. Growth of a bacterial population in a test tube</p> <p>B. Growth of the human population</p>		
	3.1	During which period (A , B or C) did natality exceeded mortality for many hours?	(1)
	3.2	Account for the pattern of growth during period B .	(3)
		Use GRAPH B to answer the following questions.	
	3.3	State in what way is the growth of the human population similar to that of the bacterial population.	(1)
	3.4	Explain why it may take the human population longer to reach the type of growth shown by the bacterial population in period B .	(4)
	3.5	State TWO precautionary measures that may be implemented in South Africa to slow down the growth in the population.	(2)
			(11)



Activity 4

4	The population pyramids below show the population percentages of South Africa and Nigeria in 2020.		
	 <p>South Africa 2020 Population: 59 308 689</p> <p>Nigeria 2020 Population: 206 139 587</p>		
	4.1	Define the term 'population'.	(2)
	4.2	State the percentage of the male population in South Africa is between 15 and 19 years old.	(1)
	4.3	State the age group that makes up the greatest percentage of the population in South Africa.	(1)
	4.4	State which group, between males or females, has a higher life expectancy in both countries.	(1)
	4.5	Identify the pyramid that represents a developing country (South Africa or Nigeria).	(1)
	4.6	Give TWO reasons for your answer in QUESTION 4.5 .	(2)
	4.7	Name ONE density dependant factor that normally stops populations from growing in animals.	(1)
	4.8	Explain why the factor mentioned in QUESTION 4.7 has failed to control of human population.	(2)
			(11)

Activity 5

5	<p>The diagram below shows the age-gender pyramids representing two countries and answer the questions that follow.</p>  <p>United States 2014 (Graph A): The pyramid shows a relatively stable population structure. The male population (left) ranges from approximately 1.2 million in the 0-4 age group to 12.5 million in the 45-49 age group. The female population (right) ranges from approximately 1.2 million in the 0-4 age group to 12.5 million in the 45-49 age group. The population is relatively stable across most age groups, with a slight increase in the 20-44 age group.</p> <p>South Africa 2014 (Graph B): The pyramid shows a declining population structure. The male population (left) ranges from approximately 2.4 million in the 0-4 age group to 0.6 million in the 85-89 age group. The female population (right) ranges from approximately 2.4 million in the 0-4 age group to 0.6 million in the 85-89 age group. The population is declining across most age groups, with a large base in the 0-14 age group.</p>	
5.1	Name the source of information required to plot the above graph	(1)
5.2	Which population pyramid (A or B) shows an increasing population?	(1)
5.3	Explain your response to QUESTION 5.2 .	(4)
5.4	Describe the trend of population growth on Graph A .	(3)
5.5	Does the graph A represent increasing, declining or stable population?	(1)
		(10)

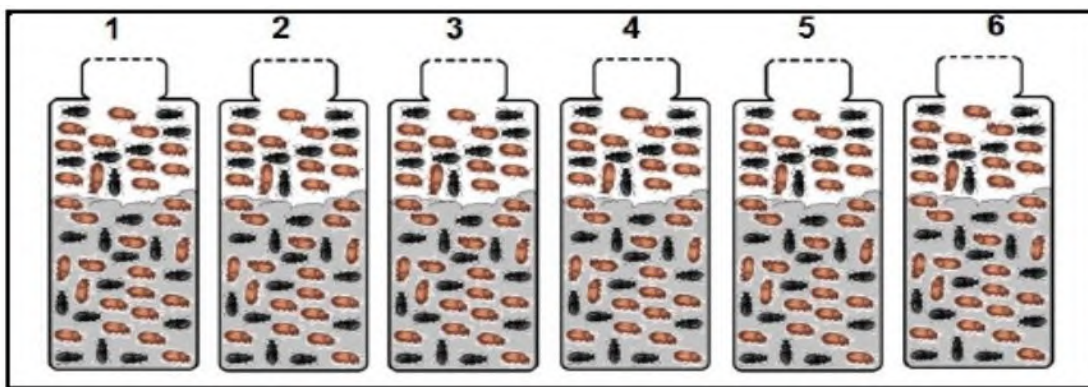


Activity 6

6 Learners at a certain school conducted an investigation to study the communal interaction to study the communal interaction between two different species in a particular ecological scale.

The investigation was set up as follows:

- Populations of two species of *Tribolium* (a flour beetle) were kept in six different bottles of flour numbered 1 – 6 shown in the table below. (The bottles of flour served as food and habitat)
- Each bottle contained approximately 100 beetles of each species.
- Each bottle was kept under different temperatures and humidity conditions.
- After a period of time the number of each species surviving in each of the bottles was determined and the results were recorded.



The results are shown below:

Bottle	Temperature (c)	Relative humidity in (%)	No: of <i>T. castaneum</i> surviving	No.of <i>T. confusum</i> surviving
1	34	70	100	0
2	34	30	10	90
3	29	70	86	14
4	29	30	13	87
5	24	70	29	70
6	24	30	0	100

6.1 Define the following terms:

(a) Community

(2)

(b) Ecological niche

(2)

6.2 Identify which ONE of the species is more tolerant to low temperatures and low humidity? State the reason for your answer.

(2)

6.3 State whether the factors being investigated are density-dependent or density independent.

(1)

6.4 From the above results, what conclusion can be made with regard to the type of competition that occurred.

(1)

(8)

Activity 7

7 Read the following extract and answer the questions that follow:

Khayelitsha was home to over half a million people in 2007. This area lies on the outskirts of Cape Town. Water comes from shared taps, as one in three people have no access to water at his or her home. The population is growing by 48 000 people every year. The area is divided into regions called Site A, Site B and Site C. Research in Site B and C shows that there is one toilet for every 105 people. The table below lists the top four causes of death for children under the age of one in the area. Note that diarrhoea did not feature as a cause of death in any of the middle-class or upper class suburbs of Cape Town.

The table shows the top four causes of death among children under one years old in 2008 and 2010 in Khayelitsha.

Category	2008	2010
Diarrhoea and gastro-enteritis	19,2%	21,3%
HIV/AIDS	11,7%	16,1%
Pneumonia	9,2%	6,6%
TB	8,9%	13,3%

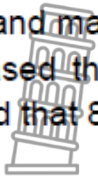
7.1	State which positive trend took place between 2008 and 2010 (according to the data).	(2)
7.2	Explain the link between HIV/AIDS and TB as suggested in this data.	(2)
7.3	State the scientific way in which this data could have been collected.	(1)
7.4	Draw a bar graph of the data provided.	(6)
		(11)

Activity 8

8			
	8.1	Tabulate TWO differences between developed countries and developing countries.	(5)



Activity 9

9	Read the following extract and answer the questions that following:		
	<div style="border: 1px solid black; padding: 10px;"><p>A researcher wanted to know how many fish were in a dam. She caught 20 fish and marked them by clipping out a small section of their tail fins. She then released them back into the dam. A few days later she caught 25 fish and found that 8 had been marked.</p></div> 		
	<p>Formula: $P = \frac{F \times S}{M}$</p> <p>P = Estimated total number of fish in the population. F = Number caught and marked in the first catch. S = Number caught in the second catch. M = Number marked in the second catch.</p>		
	9.1	Calculate the size of the fish population. Show ALL your workings	(3)
	9.2	Give the name of the technique described in the extract above.	(1)
			(4)

