



KWAZULU-NATAL PROVINCE

EDUCATION
REPUBLIC OF SOUTH AFRICA

CURRICULUM GRADE 10-12 DIRECTORATE

NCS (CAPS)

TEACHER SUPPORT DOCUMENT

GRADE 10



LIFE SCIENCES

JUST IN TIME

APRIL

2026

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Solutions

TOPIC: Chemistry of Life

Activity 1

No.	Description	Biological Term
1.1	The smallest building blocks of matter	Cell
1.2	A substance made up of only one type of atoms	Molecule
1.3	A substance made up of two or more elements chemically joined together	Compound
1.4	The name given to a substance containing the elements Carbon, Hydrogen and Oxygen	Organic compounds
1.5	Substances that are protein in nature and help speed up chemical reactions in living cells.	Enzymes
1.6	Condition caused by deficiency of Iodine in the diet	Goitre
1.7	Element required to form part of haemoglobin molecule in blood	Iron
1.8	An element that is a constituent of cell membranes and ATP	Phosphorus
1.9	A condition in humans caused by deficiency of calcium in the diet.	Rickets
1.10	The collective name for the simplest single sugars	Monosaccharides
1.11	Monomers or building blocks of proteins	Amino acids
1.12	Made up of fatty acids and glycerol	Lipids
	(14 x 1)	(14)

Activity 2

2

2.1 Carbohydrates ✓ (1)

2.2 - an excess of cholesterol would accumulate in blood vessels ✓ (2)

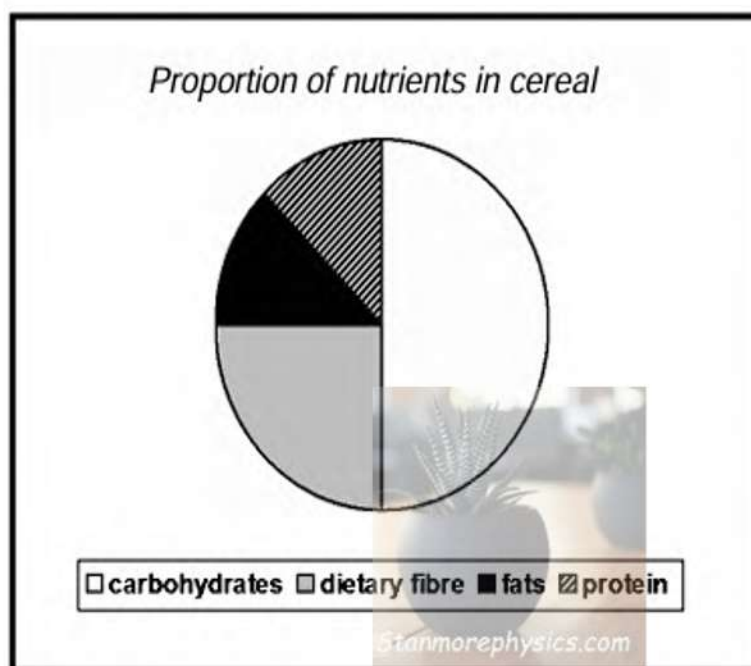
- thus clogging them ✓ /causing heart defects (Mark first ONE only)

2.3

$$\frac{100 \times 5\,500}{2\,000} \checkmark \quad (3)$$

$$= 275 \checkmark \text{ g/0,275 } \checkmark \text{ kg } \checkmark$$

2.4



Rubric for marking Pie chart

Criteria	Mark
Correct type of graph	1
Correct caption	1
Correct Calculations for each segment	1
Correct size of each segment	1-2 correct = 1 mark 3 to 4 correct = 3 marks Total= 6 marks

(6)

(12)

Activity 3

3

3.1 Enzyme activity ✓ (1)

3.2 40°C ✓ (1)

3.3 - High temperature ✓
- denatures the enzyme ✓ / changes the shape of the enzyme. (2)

3.4 - Human internal body temperature is about 37°C. ✓
- Optimum activity for this enzyme is 40°C ✓ / close to human body temperature. (2)

(6)

4.

4.1 Enzymes are substrate-specific ✓ (1)

4.2 (a) **N** – substrate ✓ (1)

(b) **O** – enzyme ✓ (1)

(c) **P**- products ✓ (1)

4.3 - The enzyme and substrate join together at the active site of the enzyme ✓

- to form an enzyme-substrate complex ✓

- The substrate is broken down to form the products ✓

- The enzyme remains unchanged ✓

- This is called the Lock-and-Key theory ✓ (4)

Mark the first four only

(8)

[14]

Activity 5

4

- 5.1 Millon's reagent ✓ / Biuret Solution (1)
- 5.2 Remained blue ✓✓ (2)
- 5.3 Apple juice contains sugar/fructose ✓; that provides energy✓ (2)
- (5)

Topic: Cell - The basic unit of life

Activity 1

No.	Description	Biological Term
1.1	A basic unit of life	Cell
1.2	An organelle in a cell that contains digestive enzymes	Lysosome
1.3	The membrane around a vacuole	Tonoplast
1.4	An organelles that controls all the activities of a cell	Nucleus
1.5	A structure that provides plant cells with support	Cell wall
1.6	The movement of water molecules from a region of higher water potential to a region of lower water potential across a semi-permeable membrane.	Osmosis
1.7	A liquid consisting of water, mineral salts, sugars and amino acids within a vacuole	Cell sap
1.8	The movement of substances from a region of high concentration to that of low concentration	Diffusion
1.9	A model that describes the structure of a cell membrane as a fluid structure with various protein and carbohydrate components diffusing freely across the membrane	Fluid Mosaic model
1.10	An organelle in a cell that release chemical potential energy (ATP) for the cell during cellular respiration	Mitochondrion
1.11	An organelle in a plant cell that mainly stores starch	Leucoplast

1.12	The transport of molecules in which the energy is needed	Passive transport
1.13	The state of a cell once it has developed unique characteristics and abilities to perform a specific role within the organism	Cell specialisation
1.14	The liquid component of the nucleus	Nucleoplasm
1.15	The process by which cells become specialised in order to perform different functions	Cell differentiation
1.16	A picture of a cell or an organelle taken under a microscope	Electron micrograph/micrograph
		(1x16) (16)

Activity 2

2

- 2.1 (a) 10 ✓ ☐ - Fine adjustment knob ☒ (2)
- (b) 5 ✓ ☐ - Stage ☒ (2)
- 2.2 The objectives are responsible for magnifying the objects ✓ ☐ (1)
- 2.3 Rudolph Virchow ☒ (1)
- 2.4 10 X 40 ☒ = 400x ☒ (2)
- (8)**



Activity 3

3

- 3.1 Distributes and secretes materials ☒ (1)
- 3.2 Mitochondrion ☒ (1)
- 3.3 Both ☒ (1)
- 3.4 Photosynthesis ☒ (1)
- 3.5 Plants only ☒ (1)
- 3.6 Store food/starch ☒ (1)
- 3.7 Plants only ☒ (1)
- (7)**

Activity 4

4

4.1 Plant cell. ☐✓ (1)4.2 Both a cell membrane and cell wall are visible. ☐✓Several large chloroplasts can be seen. ☐✓The cell has a large vacuole. ☐✓**Mark the first two only** (2)

4.3

Plant Cell	Animal Cell
Cell wall✓	No cell wall✓
Regular shape✓	Irregular shape✓
Chloroplasts✓	No chloroplasts✓
Large vacuole	Small or no vacuole✓
Lysosome	No lysosome✓
No Centrosomes/centrioles	Centrosome/centrioles

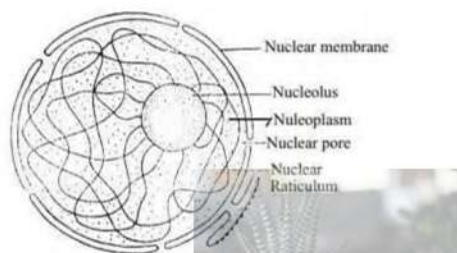
Mark any first THREE only

1 mark for table

(7)

4.4

A structure of a nucleus



Feature	Mark Allocation
Caption (C)	01
Correct diagram (D)	01
Any 2 correct labels (L)	02

(4)

4.5

$$\text{Actual size} = \frac{2 \text{ mm} \times 5 \mu\text{m}}{3.5 \text{ mm}} \checkmark$$

$$= 2.86 \mu\text{m} \checkmark$$

(2)

4.6 - The cell has a high water potential/dilute solution✓

- The salt solution has low water potential/concentrated solution. ✓

- Water will move from the cell to the surrounding salt solution ✓

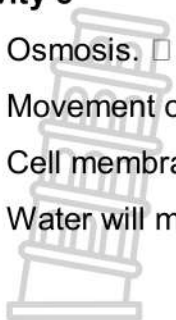
- The cell will become flaccid.✓

(4)

(20)

Activity 5

- 5.1 Osmosis. ☐ ✓ (1)
- 5.2 Movement of water through a semi-permeable membrane ☐ ✓ (1)
- 5.3 Cell membrane ☐ ✓ (1)
- 5.4 Water will move from the beaker to the visking tubing ☐ ✓ (1)
- (4)



Activity 6

- 6.1 Animal cell ☐ ✓ (1)
- 6.2 (a) B ☐ ✓ – Chromatin network ☐ ✓ (2)
- (b) C ☐ ✓ – Golgi apparatus ☐ ✓ (2)
- 6.3 Releases chemical potential energy (ATP) for the cell during cellular respiration ☐ ✓ (1)
- (6)



Topic: Cell Division: Mitosis

Activity 1

No.	Description	Biological Term
1.1	The phase in mitosis that results in two identical cells	Telophase
1.2	The division of the cytoplasm	Cytokinesis
1.3	The process in which DNA molecule form the identical copy of itself.	DNA Replication
1.4	Cell division process that results with two identical daughter cells	Mitosis
1.5	The growth or tumour that forms as a result of uncontrolled mitosis.	Cancer
1.6	A part of chromosome that attaches the two chromatids	Centromere
1.7	An organelle that forms spindle fibres	Centriole
1.8	One of the two identical halves of chromosomes that are replicated in preparation for cell division	Chromatid
		(8 X1) (8)

Activity 2

- 2.1 Plant cell. ✓ (1)
- 2.2 Regular shape✓/ presence of a cell plate (1)
- 2.3 a) Telophase✓ (1)
- b) Anaphase✓ (1)
- c) Metaphase✓ (1)
- 2.4

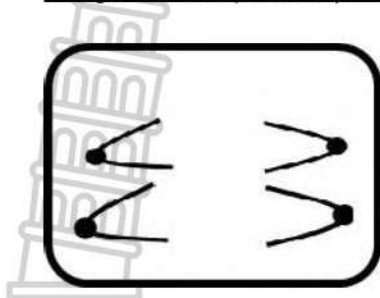
Plant Cell	Animal Cell
In a plant cell, a cell plate forms to separate the two new daughter cells✓,	In an animal cell, a cleavage furrow occurs that separates the two new daughter cells✓

(Mark first ONE only)

+1 Mark for table*

(3)

2.5 Stage B/ Anaphase (of a cell with 2 chromosomes)



Mark allocation for diagram:

Caption✓

Correct diagram ✓/ (anaphase displayed)

2 chromosomes drawn ✓

3)

(11)

Activity 3

3

3.1 Anaphase ✓ (1)

3.2 Spindle fibres had contracted ✓
Chromatids are pulling towards opposite poles ✓ (2)

3.3 (a) cell membrane ✓ (1)

(b) spindle fibre ✓ (1)

3.4 D ✓ – Centriole✓ /Centrosome (2)

3.5 Chromosomes arrange themselves along the equator ✓ (3)

Chromosome attach to spindle fibres✓ by centromeres ✓

3.6 - Responsible for growth and development ✓ (3)

- Responsible for asexual reproduction ✓

- Replacement of dead ✓ / lost cells

- Repair of damaged cells✓ / worn-out cells (Mark the first THREE only)

(13)



Activity 4

4

4.1 Mosquito ✓

(1)

4.2 64 ✓

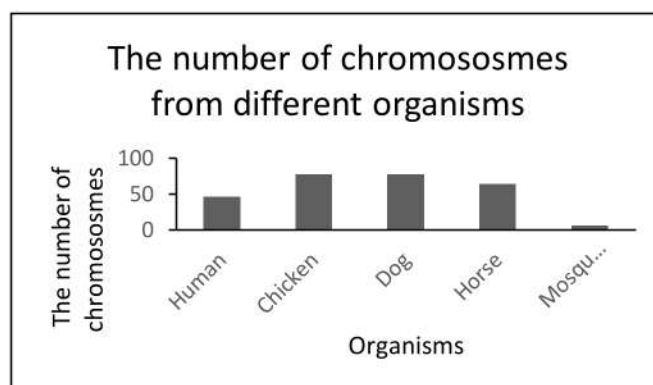
(1)

4.3 78- 46 ✓

(2)

= 32 ✓

4.4



Correct type of Graph (T)		1
Caption (C)		1
X- axis with label and correct units		1
Y-axis with label and correct units		1
Plotting	1-4 correct points plotted	1
	All correct sectors	2

(6)

(10)

Activity 5

5

- 5.1 A disease caused by abnormal and uncontrolled cell division in the body✓ (1)
- 5.2 (a) It is caused by abnormal stem cells in the bone marrow producing defective/immature blood cells✓ (1)
- (b) To replace the diseased and damaged bone marrow✓ (1)
- (c) It destroys healthy bone marrow. ✓ (1)
- (4)**

Activity 6

- 6.1 B- Nuclear membrane✓ (1)
- C- Chromatid✓ (1)
- 6.2 Part B transport substances in and out of the cell ✓ (1)
- 6.3 Telophase✓ (1)
- 6.4 Two daughter cells are present✓
- OR
- Nucleolus reforms✓
- OR
- Nuclear membrane reforms
- (MARK FIRST ONE ONLY)** (1)
- 6.5 (a) 2✓ / two (1)
- (b) There is a cleavage furrow indicating the division of cytoplasm✓/ there is no cell plate dividing the cytoplasm✓
- (MARK FIRST ONE ONLY)** (1)
- 6.6 -It doubles genetic material ✓
- To ensure that there are two copies of genetic material to be shared between the two resulting daughter cells✓ (2)
- (9)**

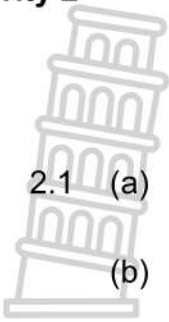
Topic: Plant tissues and Plant organs

Activity 1

No.	Description	Biological Term
1.1	Specialised cell in ciliated columnar epithelial tissue which produce mucus	Goblet cell
1.2	The plastids that gives red ,yellow and orange pigments to plants	Chromoplast
1.3	Connective tissue containing a dense network of collagen fibres	Fibrous connective tissue
1.4	Conducting tissue that transport manufactured food from the leaves to all part of the plant	Phloem
1.5	Plant organ that has vascular bundles arranged in a ring	Stem
1.6	Cells formed from epidermal cells in the root to absorb water	Root hairs
1.7	Transparent covering of the epidermis of the leaf	Cuticle
1.8	A pore in the epidermis of the leaf surrounded by two guard cells	Stoma /stomata
1.9	Tissue in plants that conducts water and mineral salts	Xylem
1.10	A permanent tissue that lines the surfaces of the roots, stems and leaves	Epidermis
		10x1 (10)

Activity 2

2



2.1 (a) X-Guard cells ✓ (1)

(b) Y- Stoma ✓ (1)

(c) Z- chloroplast ✓ (1)

2.2 Photosynthesis ✓ (1)

2.3 The cuticle and epidermis are transparent ✓ to allow light to pass through for photosynthesis ✓

- It is flattened ✓ to provide large surface area ✓ for maximum light absorption

- Epidermal tissue lacks organelles ✓ thus allowing light to pass through ✓

- There are no intercellular air spaces ✓ increasing maximum absorption of light ✓



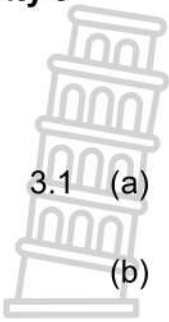
(Mark the first ONE only)

(2)

(6)

Activity 3

3



3.1 (a) A ✓ (1)

(b) E ✓ (1)

3.2 Mesophyll ✓ (1)

3.3

Epidermal cell	Guard cell of stomata
No chloroplast ✓	Has chloroplast ✓
Brick- shaped cells ✓	Bean-shaped cells ✓

4+1 table

(5)

(8)

**Activity 4**

4

4.1 (a) B ✓ -Xylem ✓ (2)

(b) C ✓ - Sclerenchyma ✓ (2)

4.2 - Cells are elongated and non-living ✓ / joined and forming continuous tubes ✓

- Contains thickened / lignified walls ✓ to withstand pressure of water ✓

- Perforated with pits ✓ for lateral water transport ✓ (4)

(Mark first TWO only)

(8)

Activity 5

5

5.1 (a) Rate of transpiration in leaves ✓ (1)

(b) Different light intensities ✓ (1)

5.2 It increased the rate of transpiration ✓ (1)

5.3 There might be other limiting factors ✓ that became short in supply that lead to no further increase in transpiration rate ✓ (2)

5.4 Temperature ✓

Wind ✓ (2)

5.5 Group B acts a control this shows that the results of group B are due to the presence of light ✓ ✓ (2)

5.6 The rate of transpiration increases with an increase in light intensity ✓ ✓ up to a point where it no longer increases (2)

(11)



Activity 6

6

6.1 Meristematic tissue, is the tissue that is actively dividing to (2)

form new cells ✓ ✓

6.2 - Healing ✓

- Repair ✓ (2)

6.3 - To provide a source of meristematic cells ✓

- in case the plant is attacked again ✓ (2)

(6)

Activity 7

7.1 To measure the rate of transpiration under different environmental conditions ✓ ✓ (2)

7.2 Humidity ✓ (1)

7.3 Same leafy twig was used ✓ (1)

7.4 (a) Leafy twig should be cut at oblique angle ✓ (2)

To increase surface area for water absorption ✓

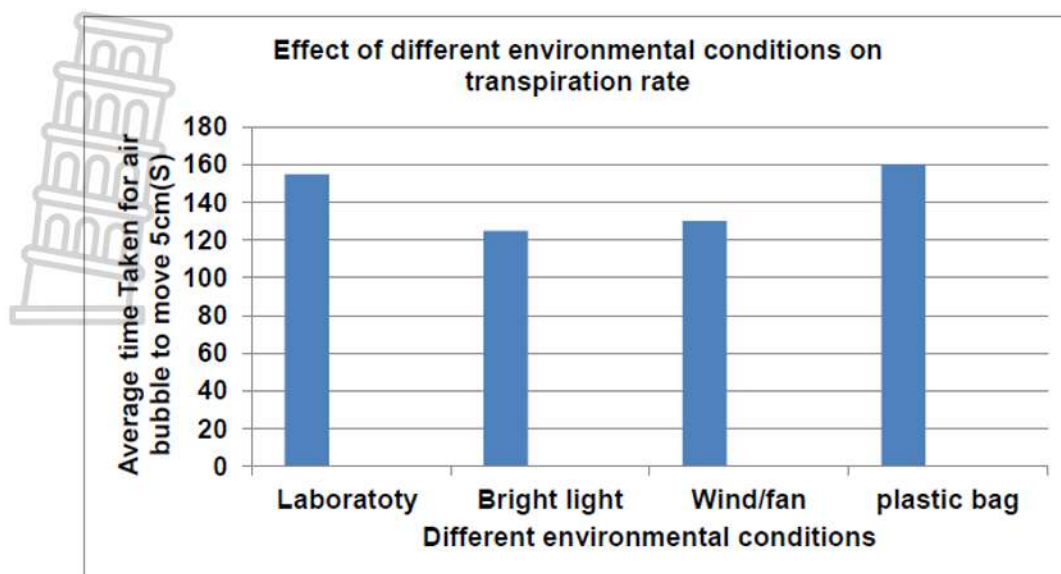
(b) - The stomata would be clogged ✓ /blocked

- Causing the leaf to retain water ✓

- and stopping transpiration ✓ (3)



7.5



Criteria	Marking allocation
Bar graph drawn (T)	1
Caption of the graph includes both variables (C)	1
Correct labels on the X- axis and Y-axis with correct units of Y-axis (L)	1
Correct scale for Y – axis and bars of equal width and equal spaces in between bars on X-axis (S)	1
Plotting (P) correctly done for: 1-3 points	1
All four points	2

(6)

(14)

Activity 8

8

- 8.1 (a) B ✓ - Xylem ✓ (2)
- (b) C ✓ - Phloem ✓ (2)
- (c) A ✓ Parenchyma ✓ (2)
- 8.2 To strengthen the wall ✓ so that they do not collapse ✓ (2)
- (8)

Activity 9

9

9.1 (a) Parenchyma ✓ (1)

(b) Collenchyma ✓ (1)

9.2 - No movement of food from one cell to another ✓ (2)

- No movement of food from the leaves to other parts of the plant

9.3 -Has thin cell wall ✓ allowing movement of water and mineral salts (4)

- Has a large vacuole to store water ✓

- Has large intercellular air spaces to allow gaseous exchange □

9.4 - Has thick cell wall ✓ (2)

-For strength and support ✓

(8)**Activity 10**

10

10.1 (a) Root hair ✓ (1)

(b) Epidermis ✓ (1)

10.2 (a) E ✓ – Pericycle ✓ (2)

(b) F ✓ – Phloem ✓ (2)

(c) G ✓ - Parenchyma ✓ (2)

(d) D ✓ - Xylem ✓ (2)

(10)

Activity 11

11

11.1 (a) Root ✓ (1)

11.2 (a) 2- parenchyma cortex ✓ (1)

(b) 5 - Tonoplast ✓ (1)

(c) 8 – Cell wall ✓ (1)

11.3 (a) 3 – direct water into the xylem of the stem ✓ (1)

(b) 4 – transport water and minerals from the roots to the stem and to the leaves ✓ / it also give strength to the plant ✓ (1)

11.4 - cross walls are perforated or completely absent P ✓

- xylem of the roots forms continuous tubes with xylem of stem and leaves P ✓

- xylem vessels have no living contents P allowing water to flow freely inside ✓

- walls of vessels tracheids not completely thickened P that allow pits water to move across the roots and stem P ✓ (4)

(10)

Activity 12

12

12.1 A - Epidermis ✓ (1)

D – Sclerenchyma ✓ (1)

E – Xylem ✓ (1)

12.2 In stems the arrangement of vascular bundles form a ring ✓ while in roots it is in a star shape ✓ (2)

12.3 B -support and strengthens the plant ✓✓ (2)

C- Packaging tissue ✓

-Stores food ✓

(7)



Activity 13

13

13.1 (a) Meristematic ✓

(b) Lateral ✓

(c) Phloem ✓ (c) to (f) can be in any order

(d) Chlorenchyma ✓

(e) Sclerenchyma ✓

(f) Parenchyma ✓

(6)

13.2

Apical meristematic	Lateral meristematic
Located at the tip of the plant✓	Located at the lateral part (lower branches) of the plant✓
Leads to the upward growth of the plant✓	Leads to the development of lower branches✓

4 + 1 table

(5)

(11)



Activity 14

14

14.1 - To anchor the plant firmly to the soil ✓ (2)

- Absorb water and mineral salts from the soil ✓

14.2 - They store food and water ✓

- They transport food from the leaves to the roots ✓

- They hold the flowers in a favourable position for pollination

(Any 2) (2)

14.3 Xylem ✓ (2)

Phloem ✓

(6)



Topic: Transport and support system in plant

Activity 1

No.	Description	Biological Term
1.1	A group of similar cells adapted for a particular function	Tissue
1.2	Movement of particles from a high to a low concentration	Diffusion
1.3	Tissue in plants that conduct water and mineral salts	Xylem
1.4	Movement of water from a high concentration to a low concentration across a differentially permeable membrane until dynamic equilibrium is reached	Osmosis
1.5	Apparatus used to measure the rate of transpiration	Potometer
1.6	The force that moves water into the leaf cells from the xylem vessels to replace the water lost due to transpiration	Root pressure
1.7	Conducting tissue that transport manufactured food from the leaves to all parts of the plant	Phloem
1.8	Cells formed from epidermal cells in the root to absorb water	Root hairs
1.9	A factor that is manipulated in an investigation	Indepenent variable
1.10	A waterproof band found in the cell walls of the endodermis that direct water into the xylem	Casparian Strip
		10x1 (10)

Activity 2

2.

2.1 Vacuole ✓ (1)

2.2 - Controls all the activities of the cell ✓ (1)

- Contains DNA which controls hereditary characteristics ✓

(Mark the first ONE) (Any ONE)

2.3 Root ✓ (1)

2.4 - Root pressure ✓

- Transpiration pull ✓

- Capillary ✓ (3)

2.5 (a) - Part C/ cell wall of a root hair is fully permeable ✓ and allows both salt and water to pass through ✓

- Part D/ cell membrane of a root hair is semi-permeable ✓ and does not allow dissolved salt molecules to pass through ✓ (4)

(b) Has:

- finger like projections ✓

to increase surface area for absorption of water ✓

- Thin cell wall/without cuticle

to absorb water from the soil ✓

- Low water potential in cell sap ✓

increases the absorption of water ✓

Any(2x2)**(Mark the first TWO) (4)****(14)**

Activity 3

3

- 3.1 Rate of transpiration✓ (1)
- 3.2 When the rate of light ✓intensity increases the rate of transpiration also increases ✓ (1)
- 3.3 -Too much light causes the stomata to close✓
-Which prevent too much water loss through transpiration✓
-Rate of transpiration decreases✓ (3)
- 3.4 Temperature✓ (2)
Same plant species✓
- 3.5 To increase validity✓ (1)
- (8)**

Activity 4

4

- 4.1 Osmosis ✓ (1)
- 4.2
- | Passive transport | Active transport |
|--|--|
| Does not require energy/ carrier molecule✓ | Requires e✓nergy/carrier molecule |
| Movement along concentration gradient✓ | Movement against concentration gradient✓ |
- (3)
- 4.3 (a) - To serve a baseline/ ✓reference point (2)
- where the results will be compared ✓after two hours
- To see how much water the beaker lost ✓after two hours
Any (TWO) ✓
- (b) There is an increase in the amount of solution in the visking tubing ✓
Since the water has moved from the beaker into the visking tubing. ✓
Through the selectively permeable membrane✓
and the visking tubing increased in size✓ (4)
- (c) They are large ✓to pass through the selectively permeable membrane ✓of the visking tubing (2)
- (12)**

Activity 5

5

5.1 - Decide on measuring tools✓ (1)

- Decide on the duration of the investigation✓

- Decide on the recording tool✓

5.2 Serves as a selective membrane ✓through which water molecules pass✓ (2)

5.3 - Level of water in the beaker decreases✓ (2)

- Level of sugar solution increases ✓

5.4 - Diffusion refers to the movement of gas particles ✓whereas in osmosis refers to the movement of water molecules ✓ (4)

- Diffusion no membrane required ✓whereas in Osmosis requires a selectively permeable membrane for water molecules to pass through✓

(9)

Activity 6

6

6.1

(a) 1 ✓a✓and 4 ✓ (2)

(b) 2 ✓ and 3 ✓ (2)

6.2

(a) Temperature✓/Light intensity (1)

(b) Humidity✓ (1)

(6)

Topic: Animal tissue and support systems:Animals

Activity 1

No.	Description	Biological Term
1.1	A neuron that transports impulses towards the central nervous system	Sensory neuron
1.2	Undifferentiated animal cells that can become any cell in the body.	Stem cells
1.3	Structure that connects a bone and muscle.	Tendon
1.4	Flattened animal cells that line the oral cavity.	Squamous epithelium
1.5	The nerve fibre that transports impulses towards the cell body.	Dendrite
1.6	Finger bones	Phalanges
1.7	Protein found in the exoskeleton.	Chitin
1.8	Skeletal structure that protects the brain.	Cranium
1.9	Specialized internal, living skeleton.	Endoskeleton
1.10	Large opening at the base of the skull through which the spinal cord emerges	Foramen magnum
		10x1 (10)

Activity 2

2

- 2.1 (a) Y- parenchyma ✓ (1)
- (b) Z – columnar epithelium✓ (1)
- 2.2 (a) Thin✓/ flat /single layer of cells (2)
- lining blood vessels✓mouth / lungs
- (b) Long ✓/elongated/ single layer of cells (2)
- lining the stomach✓/intestines/ parts of respiratory tracts
- 2.3 - Act as a packaging tissue✓ (1)
- Store food in the form of starch and other sugars✓
- Allows for movement of water and gases through their intercellular spaces ✓

(Mark Any ONE)

(15)

Activity 3

3

3.1 Ligaments connect bone to bone ✓ and tendons connect muscle to bone ✓ (2)

- 3.2
- (a) D ✓ (1)
 - (b) C ✓ (1)
 - (c) F ✓ (1)
 - (d) B ✓ (1)

(6)**Activity 4**

j

4.1 Ciliated columnar epithelium ✓ (1)

4.2 A – Cilia ✓ B - Nucleus ✓ (2)

4.3 Lining the intestines ✓ ,stomach ✓ and the respiratory tract ✓ (2)
(mark the first TWO)

- 4.4
- Provides support to other cell types. ✓ (2)
 - Absorbs food, water and minerals. ✓
 - Goblet cells secrete mucus ✓

(Mark the first TWO)

4.5 • Has goblet cells ✓ (2)

• That produces mucus to trap the germs/moisten the surface ✓

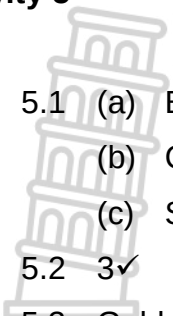
• Has cilia ✓

• Remove dust particles ✓

(Mark first TWO)**(9)**

Activity 5

5

- 
- 5.1 (a) Basement layer✓ (1)
 (b) Columnar✓epithelium (1)
 (c) Squamous✓epithelium (1)
 5.2 3✓ (1)
 5.3 Goblet cell✓ (1)
 5.4 - Dust particles/ micro-organisms/mucus will not be removed from the trachea✓ (2)
 - causing lung infection✓/ person to cough (2)
(7)

Activity 6

6

- 6.1 B,C,D,F,I ✓✓ (2)
 6.2 (a) B✓ (1)
 (b) F✓ (1)
 (c) D✓ (1)
 (d) C✓ (1)
 5.4 – Platelets✓ (3)
 – Red blood corpuscles✓/Red blood cells/Erythrocytes
 – White blood cells✓/ Leukocytes
 - Keeps ducts open✓ (1)
 - Form permanent structures✓
 - Prevent friction between bones✓
 (Any 1)
(10)
- 

Activity 7

7

- 7.1 (a) Radius✓ (1)
 (b) Humerus✓ (1)
 7.2 Tarsals✓ (1)
 7.3 (a) Ligament✓ (1)
 (b) Cross-straisted muscular tissue✓/ Striated muscle fibre (1)
 /Voluntary muscular tissues
 7.4 Attaches muscles to bone ✓ (1)
 7.5 Provides support✓ (4)
 Movement of the body (with muscles)✓
 Stores minerals (calcium/vitamin D)✓
 Gives shape to the body✓
 Protects sensitive/vital parts (brain, lungs, etc)✓
 Produces blood cells✓
 (Bone in ear) enable hearing ☐ ☐

Any 4

(Mark first FOUR only)

(10)

Activity 8

8

- 8.1 (a) Lumbar✓ vertebrae NOT lower back vertebrae (1)
 (b) Ilium✓ NOT hipbone (1)
 (c) Sacrum✓/ coccyx (1)
 8.2 Cranium✓ (1)
 8.3 A✓,B✓,D✓ (1)
 8.4 Foramen magnum✓ (1)
 8.5 Allows (vertical) entry of the spinal cord into the skull✓ (1)

(7)

Activity 9

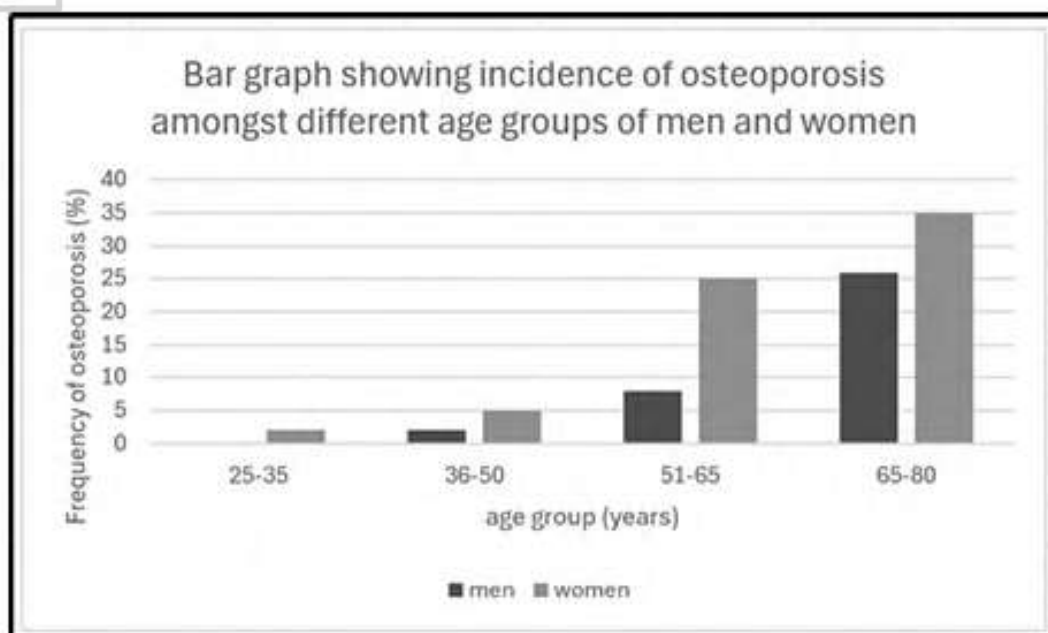
9

9.1 (a) Frequency of Osteoporosis✓ (1)

(b) 20- 35✓years (1)

9.2 Women✓ (1)

9.3



(6)

RUBRIC TO ASSESS GRAPH

CRITERIA	MARK
Caption- (C)	1
Correct graph- (T)	1
Correct label on Y- and X-axes- (L)	1
Correct scale on Y- and X-axes- (S)	1
Plotting- (P)	1: 2 sets plotted correctly 2: ALL sets plotted correctly

(9)

Activity 10

10

10.1 (a) Number of back injuries✓ (1)

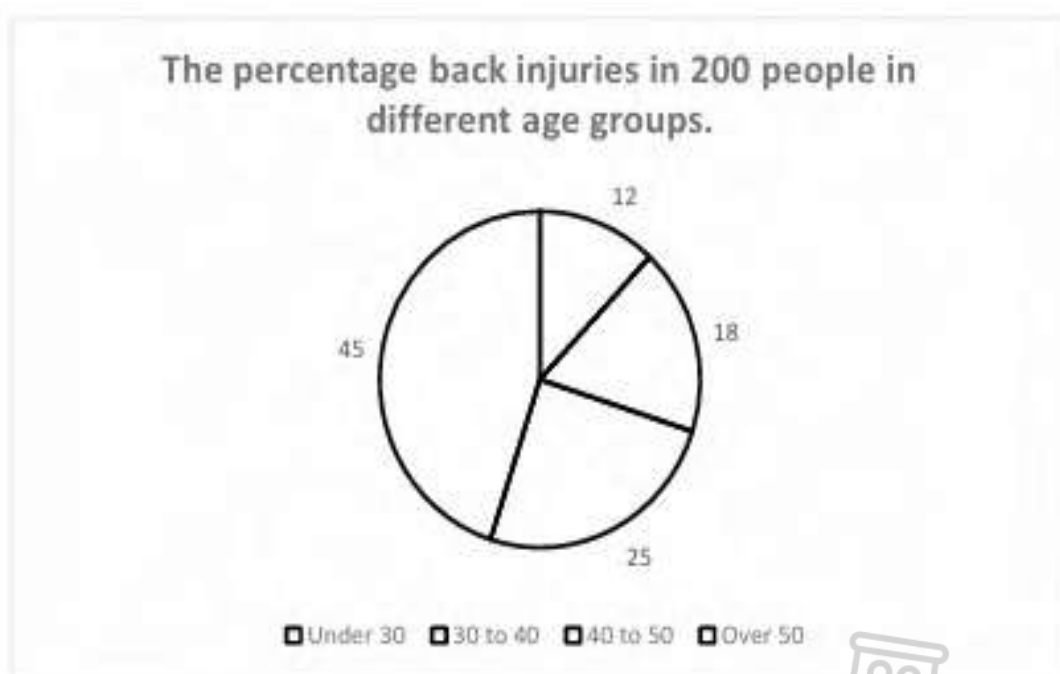
(b) Different age groups✓/Age groups of people (1)

10.2 To improve the reliability✓ of the investigation. (1)

10.3 As the age of a person increase the percentage back injuries increase✓✓ (2)

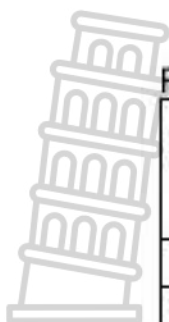
10.4

$$\frac{12}{100} \} \times 200 = 24 \quad (3)$$



Calculations:

Under 30:	$12/100 \times 360^{\circ} = 43,2^{\circ}$
30 to 40:	$18/100 \times 360^{\circ} = 64,8^{\circ}$
40 to 50:	$25/100 \times 360^{\circ} = 90^{\circ}$
Over 50:	$45/100 \times 360^{\circ} = 162^{\circ}$



Rubric for marking of pie chart:

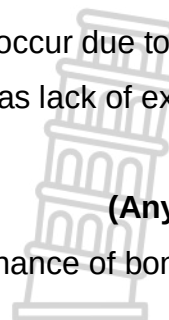
Heading of pie chart with both variables (% back injuries and different age groups) (H)	1
Type of graph (pie chart)(T)	1
Calculations(C): All 4 correct 1 – 3 correct	2 1
Proportion and label of sectors(S): All 4 sectors correct proportioned and labelled correct 1 – 3 sectors correct proportioned and labelled correct	2 1

(6)

(14)

Activity 11

- 11.1 (a) 25 years✓ (1)
 (b) 45 years✓ (1)
- 11.2 Osteoporosis is a bone disease that results in the thinning and weakening of bones resulting in the reduction on bone mass✓.Bones become porous and crack due to aging but can also occur due to lifestyle factors such as poor nutrition and absorption as well as lack of exercise, increasing the risk of fractures✓ (2)
- 11.3 Pregnancy✓,breastfeeding ✓and menopause✓ (Any TWO) (2)
- 11.4 Oestrogen is required for the formation✓ and maintenance of bone.✓ (2)
- (8)



Activity 12

12

- 12.1 Motor neuron✓ (1)
- 12.2 Axon✓ (1)
- 12.3 The motor neuron transports impulses from the central nervous system ✓to the effector organ ✓e.g (muscle or gland) (2)
- 12.4 It is covered by myelin sheath✓ (1)
- 12.5 The impulse will not be trans from the Central nervous system to the effector organ(muscle or gland), there will be no response to the stimulus.✓ (2)
- (7)

Activity 13

13

- 13.1 Sensory neuron✓ (1)
- 13.2 (a) Dendrites✓ (1)
- (b) Axon✓ (1)
- (c) Cell body✓ (1)
- 13.3 Myelin sheath✓ (1)
- 13.4

Motor neuron	Sensory neuron
Transmits impulses from the central nervous system to the effector organs(muscle or gland)✓	Transmits impulses from the receptors to the central nervous system✓

2 +1mark for table

(8)

Activity 14

14

14.1 (a) Metatarsal✓ (1)

(b) Tibia✓ (1)

14.2 Vertebral column✓ (1)

14.3 -Protects the spinal cord.✓ - Provides support and shape to the body✓ (2)

14.4 Provides support✓ (4)

Movement of the body (with muscles)✓

Stores minerals (calcium/vitamin D)✓

Gives shape to the body✓

Protects sensitive/vital parts (brain, lungs, etc)✓

Produces blood cells✓

(Bone in ear) enable hearing□

Any 4

(Mark first FOUR only)

(9)

Activity 15

15

15.1 (a) radius✓ (1)

(b) ulna✓ (1)

15.2 A ✓and B✓ (2)

(4)

Activity 16

16

16.1 Axial skeleton✓ (1)

16.2 Foramen magnum✓ (1)

16.3 Atlas✓ (1)

16.4 Cranium✓ (1)

(4)

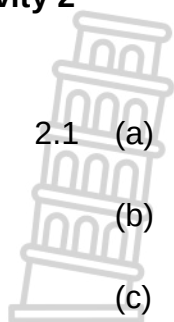
Topic: Transport in Animals

Activity 1

No.	Description	Biological Term
1.1	The upper chambers of the heart that receives blood	Atria
1.2	The largest artery in the body, which leaves the left ventricle	Aorta
1.3	The organs in the body into which deoxygenated blood flows from the right ventricle	Lungs
1.4	The type of blood cells that transports carbon dioxide	Red Blood Cells
1.5	The double walled membrane that surrounds the heart	Pericardium
1.6	The blood vessel that supplies the heart tissue with oxygen	Coronary artery
1.7	Relaxation of the heart muscles during the cardiac cycle	Diastole
1.8	Lower chambers of the heart	Ventricles
1.9	Part of the heart that separates oxygenated and deoxygenated blood	Septum
1.10	Chamber of the heart that pumps blood to all parts of the body	Left ventricle
		10x1 (10)

Activity 2

2



2.1 (a) A✓ - Aorta ✓ (2)

(b) C✓ - Left ventricle✓ (2)

(c) D✓ - Inferior vena cava✓ (2)

2.2 Part E contains deoxygenated blood✓

Part C contains oxygenated blood✓ (2)

2.3 (a) Lungs✓ (1)

(b) Oxygenated blood✓ (1)

2.4 Part C would not be able to pump blood out of the heart✓

The person will suffer from a heart attack✓ (2)

(12)

Activity 3

3.

3.1 (a) Transports gases (carbon dioxide / oxygen) / nutrients / wastes

Any 1 ✓ (1)

(b) Prevents clotting✓ (1)

(c) Acts as the body's defence system / immune system✓ (1)

3.2 Haemoglobin✓ (1)

3.3 -It would not contain haemoglobin

-gases would not be transported efficiently

-person would look pale-and experience constant fatigue / tiredness

Any 3✓✓✓ (3)



Activity 4

4



4.1 (a) Zhandalee✓ (1)

(b) Vastheek✓ (1)

(c) Nceba✓ (1)

4.2 (a) $\frac{8\,350\,000}{2\,200\,500} \checkmark = 3.79 \checkmark$ times more (2)

(b) $\frac{6\,950 - 5\,300}{5\,300} \checkmark \times \frac{100}{1} \checkmark = 31\% \checkmark$ (3)

(8)

Activity 5

5

5.1 60 bpm / beats per minute✓ (1)

5.2 60✓ minutes (1)

5.3 After 60 minutes✓ heart rate begins to decrease✓ (2)

5.4 Atria systole✓

Ventricular systole✓

Atrial and Ventricular diastole✓ (3)

(7)



Activity 6

6

6.1 (a) Caffeine✓ (1)

(b) Heart rate✓ (1)

6.2 Decide on which caffeine drink to use

Decide how long to monitor the heart rate for

Decide how to monitor the heart rate / how to collect the data

Decide how to analyse the data collected Any 3✓✓✓ (3)

6.3 Repeat the investigation

Increase the time frame for the investigation

Increase the sample size for the investigation Any 1 ✓ (1)

6.4 All healthy individuals

All males

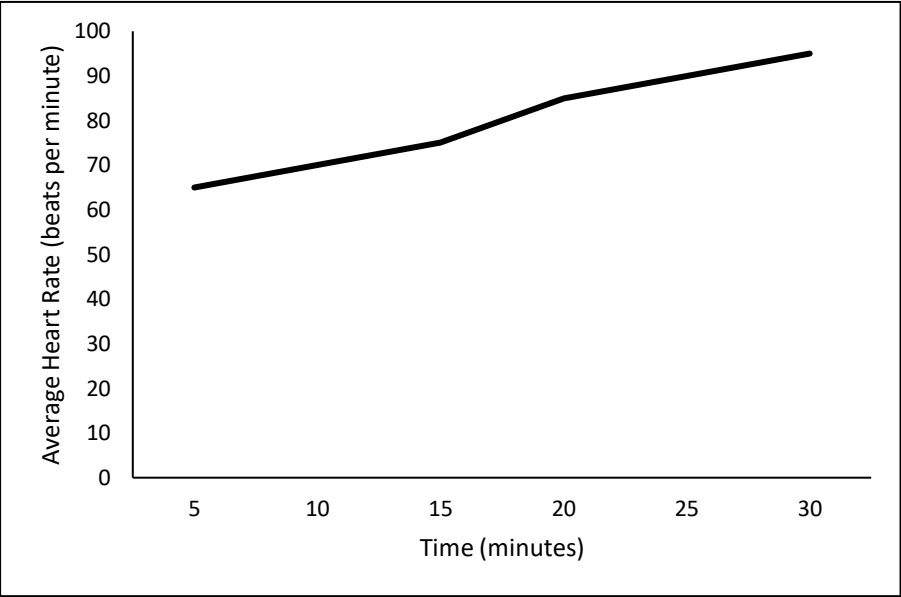
All given the same amount of caffeine drink

Same brand/type caffeine drink used

Same amount of time to monitor heart rate Any 2✓✓ (2)



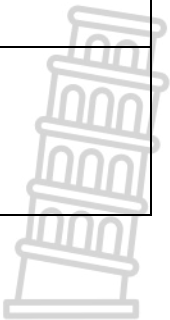
6.5 The effect of caffeine on average heart rate over 30 minutes



Criteria	Mark Allocation
Correct type of graph (T)	1
Caption of the graph include both variables (C)	1
Correct labels for X and Y axis and correct units (L)	1
Scale in both X and Y axis (S)	1
Correct Plotting (P)	
2-4 points plotted	1
All 6 points plotted	2

(6)

(13)



Activity 7

7

7.1 Heart disease ✓ Stroke ✓ (2)

7.2 Smoking ✓ Alcohol Consumption ✓ (2)

7.3 Increased cost to the healthcare system ✓

Decreased productivity ✓ therefore decreasing economic wealth (2)

7.4 Campaigning

Using social media to educate people on heart related diseases

Educate at school level to create awareness

Provide more healthcare facilities for regular check ups Any 2 ✓ ✓ (2)

7.5 Obesity

Diabetes

Hypertension Any 2 ✓ ✓ (2)

(10)

Activity 8

8

8.1 (a) Artery ✓ (1)

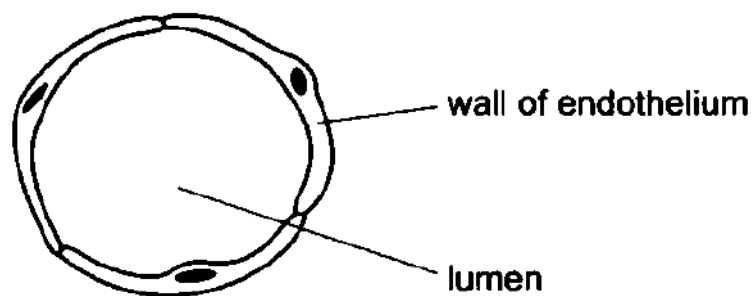
(b) Capillary ✓ (1)

(c) Vein ✓ (1)

8.2 Blood Vessel A contains oxygen ✓ and nutrients ✓ going to the tissues

Blood Vessel C contains carbon dioxide ✓ and wastes ✓ coming from the tissues (4)

8.3



Cross Section Through Blood Vessel B / Capillary

Criteria	Mark Allocation
Correct Caption (C)	1
Correct Diagram (D)	1
Correct Labels (L)	
1 correct label	1
2 correct labels	2

(5)

(12)



Activity 9

9

9.1 C ✓ (1)

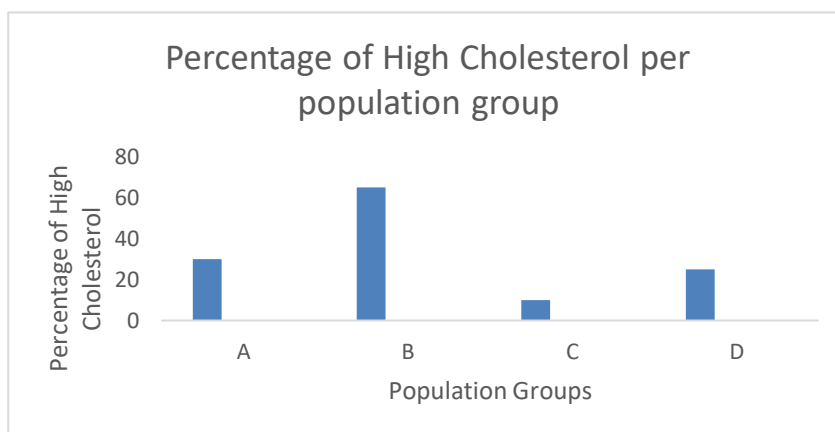
9.2 -blocks arteries ✓ (2)

-increasing blood pressure ✓

-resulting in a heart attack ✓

9.3 They have a diet low in fats and lipids ✓ (1)

9.4



Criteria	Mark Allocation
Correct type of graph (T)	1
Caption of the graph include both variables (C)	1
Correct labels for X and Y axis and correct units (L)	1
Scale in both X and Y axis (S)	1
Correct Plotting (P)	
1 points plotted	1
All 4 points plotted	2

(6)

(10)

Activity 10

10

10.1 Atrial systole✓

(1)

10.2 0.3 seconds✓

(1)

10.3

Diagram A

Muscles of the atria contract✓

The tricuspid and bicuspid valves open to allow blood to flow from atria to ventricles ✓

(2)

10.4 (b)

Diagram B

Muscles of the ventricles contract ✓

Both tricuspid and bicuspid valves close ✓

Semi-lunar valves of the pulmonary artery and aorta open ✓ oxygenated blood from the right ventricle is forced up the pulmonary artery and moves to the lungs ✓

Oxygenated blood from the left ventricles is forced up the aorta and moves to all parts of the body✓

(Mark any Three only)

(3)

(c)

Diagram C

-Muscles of the atria and ventricles relax ✓

Semi-lunar valves in aorta and pulmonary artery close ✓

-Deoxygenated blood from the vena cava fills the right atrium oxygenated blood fills the left atrium✓

(3)

(10)

Activity 11

- 11
- 11.1 Heart beat✓ (1)
- 11.2 -Seeking permission from participants✓
 -Deciding on the venue, time, duration of the investigation✓
 -Deciding on the recording tool✓
 -Deciding on the sample size✓ (2)
- 11.3 -Learners of the same age and gender✓
 -Time interval of exercise (✓1 minute increase) (1)
- Mark the first ONE only**
- 11.4 -Learner C* ✓
 -His/ her heart beat is very high before and after exercise✓
 (*compulsory mark) (2)
- 11.5 They calculated the average✓ (1)
- (7)**

Activity 12

- 12
- 12.1 80 beats per minute✓ (1)
- 12.2 50 beats per minute✓ (1)
- 12.3 B✓ (1)
- 12.4 A – standing✓ (4)
 B- running✓
 C – sitting✓
 D - walking✓
- 12.5 - the heart pumps more blood to tissues✓ (3)
 -providing oxygen and glucose✓
 -to produce energy✓
 -by cellular respiration✓
- (10)**

Topic: History of life on earth

Activity 1

No.	Description	Biological Term
1.1	The study of plant and animal fossils	Paleontology
1.2	Complete organisms or the remains, imprints or traces of organisms preserved in rocks	Fossil
1.3	A scientist who studies fossils	Paleontologist
1.4	A timeline that represents the geological time units of the history of life on earth	Geological time scale
1.5	A living fossil that was originally caught near the mouth of the Chalumna River near East London	Coelacanth
1.6	The complete disappearance of many different species over a short period	Mass Extinction
1.7	Indirect method to determine the age of a fossil by studying sedimentary layers above and below the fossil	Relative dating
1.8	An act of walking on two legs	Bipedalism
1.9	A transitional fossil between reptiles and birds	Archeopteryx
1.10	The gradual change in structure or characteristics of organisms over time	Evolution
1.11	The act of walking on four legs	Quadrupedalism
1.12	The breakup of Pangea into the continents we know at present	Continental drift
1.13	Bipedal primates with both Ape-like and human-like characteristics	Australopithecus

1.14	Indirect method to determine the age of a fossil by studying sedimentary layers above and below the fossils	Relative dating
1.15	The period when dinosaurs were last seen on earth	Creataceous period
		10x1 (10)

Activity 2

2

2.1 (a) Trace ✓ (1)

(b) Ammonite ✓ (1)

2.2 - The organism dies and is rapidly covered ✓

- by sediment ✓ / silt

- As time passes layers of sediment build up over the body ✓

- The layers compress ✓ / are squashed

- by immense pressure building up ✓

- Minerals begin to replace animal tissues and the body petrifies ✓

OR

- The organism dies and is rapidly covered ✓

- by sediment ✓ / silt

- As time passes layers of sediment build up over the body ✓

- The layers compress ✓ / are squashed

- by immense pressure building up ✓

- Decompose and leaving an imprint on the rock ✓

- Sediment will fill up previously formed mould ✓ (4)

2.3 Radiometric✓ dating (1)

(7)

Activity 3

3

3.1 - Trilobites✓ (1)

- Corals✓

- Fish✓ (3)

3.2 A✓ (1)

3.3 They have become extinct✓ (1)

3.4 Fish✓ (1)

3.5 The chart is the widest for fish in this period✓ (1)

3.6 Trilobites✓ (1)



3.7 A possible mistake in dating procedure ✓

since trilobites became extinct 50 million years before ✓

OR

Extinction date is based on the youngest fossil of species found ✓

so maybe the trilobites became extinct 200 million years ago ✓

(2)

3.8 - Conditions for formation of fossils were not conducive ✓

- Soft bodied organisms/invertebrates do not fossilise easily ✓

- Not all fossils have yet been found ✓

- Mistakes in the dating process ✓

- Some fossils wrongly classified ✓

- No transitional/intermediate fossils ✓ if changes were rapid

(Any 2 x 1)

(Mark first TWO only)

(2)

(12)

Activity 4

4

4.1 5 000 years ✓✓ (2)

4.2 Accept any answer in the range 22500 - 25 000 years ✓ (1)

4.3 - ^{14}C has a very short half-life ✓/decays very quickly

- Since dinosaurs lived millions of years ago ✓ (3)

- the level of ^{14}C will be insignificant ✓/too low to be detected

4.4 - Radiometric dating can be used to determine the age of a fossil ✓

- whereas relative dating can only be used to determine the order of appearance of different organisms ✓ (2)

(8)

Activity 5

5

5.1 *Archaeopteryx* ✓ (and for underlining ✓ to show it is a scientific name) (2)

5.2 - A skull with teeth and jaws ✓ more similar to dinosaurs ✓

OR

- Had three claws on the end of the bones of each wings ✓ more similar to dinosaurs ✓

- Had feathers ✓ more similar to birds ✓

OR

Had three forward-pointing toes and one backward pointing toe ✓

more similar to birds ✓ (any 2x 2) (4)

5.3 - The organism had died next to the flood plain ✓

- Sediments ✓ piled up over the organism reducing oxygen flow ✓

- Soft parts decayed ✓

- Over time minerals seeped into the bones ✓ replacing the organic matter

(any 4)

(4)

5.4 *Trinaxodon* ✓ in the Karoo ✓

(2)

(10)

Activity 6

6

6.1 Radiometric dating ✓

Relative dating ✓

(2)

6.2 (a) $X = 28\,650$ ✓ mya ✓

(2)

(b) $Z = 3,125$ ✓ % ✓

(2)

6.3 After 60 million years ✓ there is no more carbon-14 remaining ✓ in the fossil

(2)

6.4 - Not all organisms become fossilised ✓

- Some fossils might not have been found ✓

(2)

(10)

Activity 7

7

7.1 (Accept any value from) 55–60 ✓ million years ago ✓/mya (2)

7.2 Permian ✓ extinction (1)

7.3 $400 \checkmark - 200 \checkmark = 200 \checkmark$ families of species **OR**

$400 \checkmark - (210 \text{ to } 230) \checkmark = (190 \text{ to } 170) \checkmark$ families of species (3)

7.4 The extinction of a large number of families resulted in the availability of empty niches ✓ that could be filled by surviving ✓ species. These species are able to survive ✓ best in these new niches and form new species ✓ (any 3) (3)

(9)

Activity 8

8

8.1 Extinction is the complete disappearance / death of all individuals of a species from Earth ✓ ✓ (2)

8.2 Chalumna river ✓ east coast of South Africa (1)

8.3 - They were thought to be extinct ✓
- Yet have existed unchanged ✓
- for millions of years ✓ (3)

8.4 - Coelacanths from the fossil record lived in environments favouring

fossilisation ✓

- Modern Coelacanths, both in the Comoros and Sulawesi were found in environments that do not favour fossil formation ✓ **(Mark the first TWO only)**

(2)

(8)

Activity 9

9.1 Gondwanaland ✓

(1)

9.2 Biogeography ✓

(1)

9.3 Flightless birds like the rhea and ostrich may have developed

from a common ancestor ✓

that lived on the same continent ✓ /Gondwanaland

Both birds became separated ✓

when South America and Africa broke apart ✓ due to continental drift ✓

(Any 3) (3)

9.4 - Looking at the continents through time we see that the arctic was never near the Antarctic ✓ ; Since they are both adapted to cold ✓

- they were both unable to cross ✓ the temperate / tropical / warm areas ✓

(4)

that separated them ✓ And so they remained separated ✓ (any 4)

(9)

Activity 10

10

10.1 Pangaea ✓ (1)

10.2 Continental drift ✓ (1)

10.3 Laurasia ✓ and Gondwanaland ✓ (2)

10.4 (a) X – Paleozoic ✓ (1)

(b) Y – Mesozoic ✓ (1)

(c) Z – Cenozoic ✓ (1)

10.5 (a) 4 ✓ (1)

(b) 2 ✓ (1)

(c) The ice ages reduced the number of species on earth ✓ /

reduced the biodiversity on earth

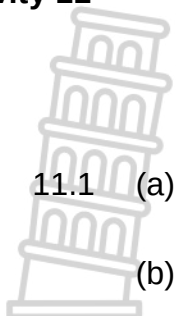
(Mark first TWO only) (1)

(10)



Activity 11

11



11.1 (a) Trilobite ✓ (1)

(b) Ammonite ✓ (1)

11.2 - The organism dies and covered rapidly ✓ by sediment ✓ / silt
- As time passes layers of sediment build up over the body ✓
- The layers compress ✓ / are squashed
- by immense pressure building up ✓
- Minerals begin to replace animal tissues ✓
- and the body petrifies ✓ (any 4) (4)

11.3 - Frozen in ice ✓
- trapped in tar ✓
- trapped in amber ✓ (any 2) (2)

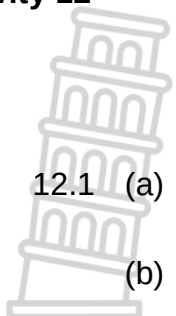
11.4 Radiometric dating ✓ (1)

(9)



Activity 12

12



12.1 (a) Ordovician ✓ (1)

(b) Trilobites ✓ (1)

12.2 Geological time scale ✓ (1)

12.3 Cambrian ✓ (1)

12.4 Relative dating ✓ (1)

12.5 Index fossil ✓ (1)

(6)

Activity 13

13

13.1 Palaeomastodon ✓ (1)

13.2 83 mya/ Eocene ✓ (1)

13.3 - Shorter trunk ✓

- Smaller in size ✓

- Small tusks ✓

(3)

13.4 Loxodonta Africana ✓ (1)

13.5 African elephant ✓ (1)

13.6 10 000 years ago ✓ (1)



13.7 - Yes. ✓ lack of suitable habitats ✓ / threatened by poaching for ivory tusks

OR

- No. ✓ many conservation parks established. ✓ / Elephants monitored and protected from poachers

(2)

(10)

Activity 14

14

14.1 Biogeography ✓ (1)

14.2 Gondwanaland ✓ (1)

14.3 The fossils of Mesosaurus/ Glossopteris/Cynognathus ✓ are found on both South America and Africa ✓ (2)

14.4 Glossopteris ✓ (1)

(5)

Topic: BIOSPHERE AND ECOSYSTEM

Activity 1

No.	Description	Biological Term
1.1	The region that is classified by species that live in it, having a certain climate and soil type	Biome
1.2	Organisms in an ecosystem that break down the dead organic matter	Decomposers
1.3	Non – living things in an ecosystem	Abiotic
1.4	Exotic species of plant or animal that do not naturally live in a particular habitat and can cause harm to the ecosystem	Alien
1.5	Species that are indigenous, found only in one specific area and nowhere else in the world	Endemic
1.6	A state of inactivity and reduced metabolism when temperatures drop and food become scarce	Hibernation
1.7	The part of the earth and its atmosphere where living organisms are found	Biosphere
1.8	The path taken by the energy as it passes from one organism to the other in an ecosystem	Food chain
1.9	Plants adapted to live in very dry conditions	Xerophytes
1.10	Height above sea level	Altitude
		10x1 (10)



Activity 2

2

- 2.1 (a) - Zebra✓
- Springbok✓

Any 1 (1)

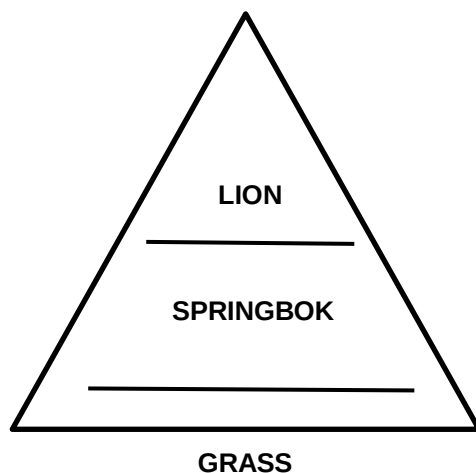
- (b) - Hyena✓
- Lion ✓

Any 1 (1)

2.2 Population size will increase✓

(1)

2.3



Marking Rubric:

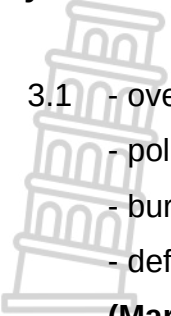
Feature	Mark allocation
Correct type of diagram (T)	1
Caption (C)	1
Correct order of trophic levels (O)	1

(3)

(6)

Activity 3

3

- 
- 3.1 - overpopulation✓
 - pollution✓
 - burning of fossil fuels✓
 - deforestation✓

(Mark the first TWO only)**(2)**

- 3.2 - more space is needed to build houses✓
- for human settlements✓
- and this results in urbanisation✓
- and clearing the land✓(removing trees)
- leading to fewer trees left✓

Any **(3)**

- 3.3 - issue penalties✓to those producing pollutants above the limit
- subsidise alternatives✓
- regulations to ban certain pollutants and pollution permits✓

(Mark the first TWO only)**(1)****(6)****Activity 4**

4

- 4.1 Nama Karoo✓
- 4.2 - very hot summers✓
- cold winters✓
- semi-desert with very little rain✓
- 4.3 - grasses✓
- small shrubs✓
- trees ONLY along rivers✓

(Mark the first TWO only)Any **(2)****(6)**

Activity 5

5

5.1 Carbon cycle✓ (1)

5.2 (a) C - decomposition✓ (1)

(b) A - respiration✓ (1)

(c) B - photosynthesis ✓ (1)

5.3 - Carbon occurs in the form of carbon dioxide✓ (CO_2) in the atmosphere✓/some is dissolved in water.
 - Green plants use carbon dioxide during photosynthesis✓ to produce Organic compounds✓/carbohydrates.
 - The carbon which forms part of organic compounds in plants is transferred to animals when they eat plant material✓
 - Sometimes dead plant and animal remains do not decompose but are fossilised to form fossil fuels✓ (coal and oil). Any (4)

5.4 (a) Animals release carbon dioxide✓ during respiration resulting in the increase of the levels of carbon dioxide✓ in the atmosphere (2)

(b) Plants use carbon dioxide✓ during photosynthesis resulting in the decrease of the levels of carbon dioxide✓ in the atmosphere (2)

(c) Plants and animals release carbon dioxide✓ during decomposition resulting in the increase of the levels of carbon dioxide✓ in the atmosphere (2)

5.5 - during respiration, oxygen is taken in by living organism✓
 - and carbon dioxide gas is given into the atmosphere✓
 - plant use carbon dioxide gas for photosynthesis✓
 - plants release oxygen as a by-product✓
 - and is used for respiration by other organisms✓ Any (3)
 (17)

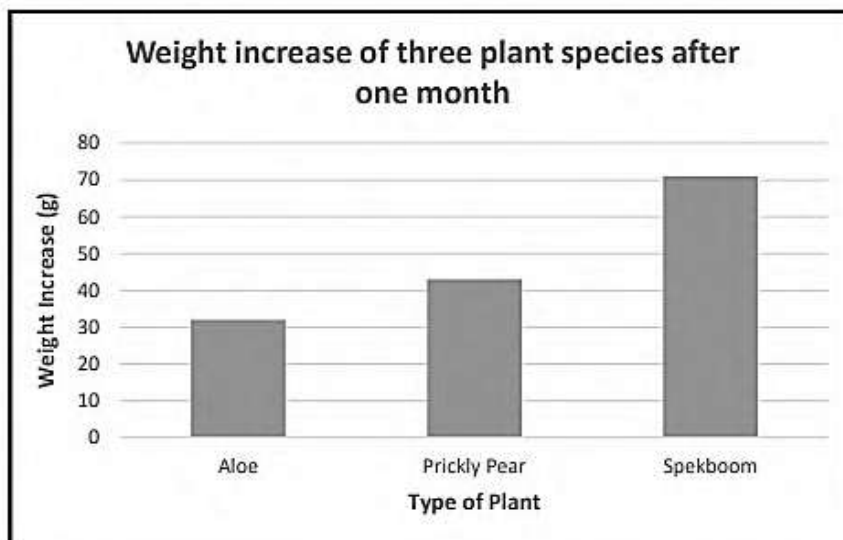
Activity 6

6

6.1 Type of plant✓

(1)

6.2



Mark allocation:

Type of Graph (T)	1
Caption (C) both variables included	1
X and Y labels and Y axis unit (L)	1
X and Y axis scales and bars same width (S)	1
Plotting of points (P) : 1 – 2 bars plotted correctly	1
All bars plotted correctly	2

(6)

6.3 So that they can know what the increase in weight is at the end✓

(1)

- 6.4
- the chose plants of the same height✓
 - they put the plants in equal sized pots✓
 - all plants had the same type of soil✓
 - all plants had the same amount of soil✓
 - all plants were in the same location✓
 - all plants received the same amount of water✓

(Mark First TWO only)

Any (2)

6.5 - increase the sample size✓

- repeat the experiment✓

Any (1)

6.6 $\frac{71}{800} \times 100 \checkmark = 8.88\% \checkmark$

(2)

6.7 - When plants absorb CO₂ out of the atmosphere they use it to create organic compounds✓/carbohydrates

- which they use to grow✓

- the more they grow the more they gain weight✓

Any (2)

(15)

Activity 7

7

7.1 Light✓

(1)

7.2 - the tilt of the Earth's axis causes one side of the planet to face towards the sun✓

- while the other side faces away from the sun✓

- the side that faces towards the sun receive more light✓

- and experience summer✓

- while the side that faces away receives less light✓

- and experiences winter✓

Any (3)

7.3 (a) Photoperiod✓

(1)

(b) - Seasonal movement of animals from one place to another✓

- in response to climatic conditions✓

(2)

(c) - to avoid cold conditions✓

- to find more food✓

- to find more water✓

(Mark first ONE only)

Any (1)

(8)

Activity 8

8

8.1 Food web ✓ (1)

8.2 An ecosystem is a particular area e.g. a pond, a forest etc. consisting of all different living organisms (biotic components) which interact with each other and their non-living environment (abiotic components). ✓ (2)

8.3 Rabbit, mice, grasshopper, and bird will lack food ✓ and die out ✓ and as a result the foxes and owls ✓ (2)

8.4 Carrots – rabbits - foxes ✓
Grasses - rabbits - foxes ✓
Grasses – rabbits – foxes ✓ Any (3)

(8)**Activity 9**

9

9.1 Plant and animal species that are found in one region and nowhere else in the world ✓ (1)

9.2 Fynbos ✓ (1)

9.3 There were several projects ✓ aiming at encouraging responsible travel to natural areas to conserve the environment ✓ (2)

9.4 $\frac{70}{100} \times 9000 = 6300$ ✓ species (3)

9.5 Vegetation: of this biome, which is mostly small bushes ✓ grows in nutrient poor soil ✓
Climate: they also survive the long dry summer ✓ conditions, as well as frequent fires ✓ Any (3)

(10)

Activity 10

10

- 10.1 (a) Number of Watsonia flowers that opened ✓ (1)
 (b) Light intensity ✓ (1)
 10.2 Give the Watsonias the same amount of water ✓

OR

Same type of soil / same amount of soil / count buds at same time of day ✓ (2)

He could have set up 5 more pots of Watsonias on the lawn ✓ with no shade cloth ✓ (1)

10.3 $\frac{9-5}{5} \checkmark \times \checkmark 100 \checkmark = 80 \checkmark \%$ (3)

10.4 The higher the light intensity ✓ more flower buds will open ✓

OR

The lower the light intensity ✓ fewer flower buds will open (2)

✓ (10)

Activity 11

11

- 11.1 Nitrogen fixation ✓ (1)
 11.2 As nitrates ✓ / NO_3 (1)
 11.3 Precipitation ✓ (1)
 Eutrophication ✓ (1)
 - Nutrient runoff / eutrophication causes
 - algae to grow rapidly ✓ / an algal bloom
 - which can block light ✓
 - Plants in the water may die as a result ✓
 - Decomposing bacteria remove oxygen from the water ✓
 - Causing other organisms to die too ✓

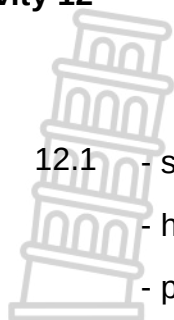
Any

(3)

(7)

Activity 12

12



- 12.1 - soil pH ✓
- humus content ✓
- permeability to water ✓ (2)

(Mark the first TWO only)

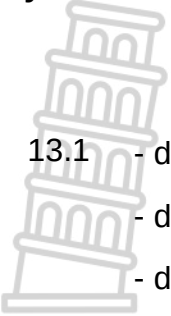
- 12.2 A ✓ (1)
- 12.3 - soil sample A is sandy soil ✓
- have large soil particles ✓
- that allow water to pass easily Any ✓ (2)
- 12.4 - the soil is infertile ✓
- and cannot plough most crops successfully ✓ (2)
- 12.5 - increase sample size ✓
- repeat the investigation several times ✓ (2)

(9)



Activity 13

13

- 
- 13.1 - decide on sample size ✓
 - decide on how to record results ✓
 - decide on apparatus to be used ✓
 - decide on duration of the investigation ✓
 - decide on the method ✓

(Mark the first TWO only)

(2)

13.2 Alkaline pH ✓

(1)

13.3 Plant type C ✓

(1)

- 13.4
- same amount of water ✓
 - same temperature ✓
 - same duration of investigation ✓
 - same species of plant ✓
 - same amount of light ✓

(2)

(Mark the first TWO only)

(6)

Activity 14

14

- 
- 14.1 (a) **A** - Decomposition ✓ (1)
 - (b) **B** - Combustion ✓ (1)
 - (c) **C** - Fossil fuel ✓ (1)
 - 14.2 Cellular respiration ✓ (1)
 - 14.3 $60 + 60 + 1,1 + 8,4 + 90 - 120 - 90 \checkmark = 9,5 \checkmark$ billion tons of CO₂ per year ✓ (3)
 - 14.4 Global warming ✓ (1)

(8)

Topic: Biodiversity and Classification

Activity 1

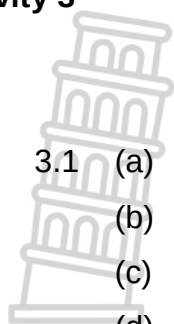
No.	Description	Biological Term
1.1	The variety of species in an area, or the entire earth	Biodiversity
1.2	Organisms that do not have a true nucleus	Prokaryotes
1.3	The group name given to the first life forms, such as bacteria, which developed on Earth about 3.8 billion years ago.	Monera
1.4	Complete disappearance of a species from Earth	Extinction
1.5	Grouping of organisms according to their similarities	Biological classification
1.6	Organisms not able to produce their own food but rely on other organisms for food	Heterotrophs
1.7	A species that occurs in a local region, but nowhere else in the world	Endemic
1.8	A list of paired descriptive statements as a guide to identify organisms	Dichotomus key
1.9	Organism with cell/s that have true nuclei, and true organelles occur in the cytoplasm	Eukaryotes
1.10	Organisms live together, and one benefits and the other is harmed.	Mutualism
		10x1 (10)

Activity 2

- 2
- 2.1 Mammalia✓ (1)
- 2.2 Panthera leo (2)
- Name: Panthera leo✓
- Underlined✓
- 2.3 - To avoid confusion✓/ be accurate (2)
- as common names vary from region to region✓
- (5)

Activity 3

3



- 3.1 (a) A✓ - Plantae✓ (2)
 (b) E✓ - Monera✓ (2)
 (c) B✓ - Fungi✓ (2)
 (d) C✓ - Animalia✓ (2)

3.2

Prokaryotes	Eukaryotes
No membrane bound nucleus ✓	Has a membrane bound nucleus ✓
Primitive organisms ✓	More advanced organisms ✓
Unicellular ✓	Unicellular or multicellular ✓
No membrane bound organelles ✓	Has membrane bound organelles ✓

(5)

Any (2 x 2) + (1) table

(13)

Activity 4

4

- 4.1 a-Protista✓
 b-Chitin✓
 c-Cellulose✓
 d-Autotrophic✓ (4)
 4.2 Has a true nucleus✓ (1)
 (5)



Activity 5

- 5
- 5.1 (a) Mammalia✓ (1)
- (b) Cactus✓ (1)
- 5.2 Felis catus✓ (1)
- 5.3 Homo✓ (1)
- (4)**

Activity 6

- 6
- A – Baboon✓
- B – African Penguin✓
- C – Leopard✓
- D – Elephant✓
- (4)**

Activity 7

- 7
- 7.1 Order – Carnivora✓ (2)
- Family – Felidae✓
- 7.2 Panthera uncia (lowercase 'u')☐✓ both underlined separately✓ (2)
- 7.3 Five ✓/ 5 (1)
- 7.4 It has cells with a true nucleus✓/ DNA enclosed in a membrane (1)
- organelles in the cytoplasm
- 7.5 Mode of nutrition – Heterotrophic ✓ (2)
- Method of reproduction – Sexual ✓
- 7.6 Dichotomous key ✓ / Biological key / Verbal key (1)
- (9)**

Activity 8

8

8.1 Carl Linnaeus✓ Binomial system ✓ (2)

8.2 Kingdom- Plantae✓ (3)

Order – Corniferales✓

Family – Pinaceae ✓

8.3 *Pinus ponderosa* ✓✓ (correctly written Genus first letter in caps and species first letter small) (2)

8.4 Monera✓ (1)

Protist✓

Fungi✓

Plantae✓

Animalia✓

(12)

Activity 9

9

Kingdom Animalia	Kingdom plantae
-Depend on other organism for food✓/do not have chloroplasts	-Do not depend on other organisms✓ for food✓/have chloroplasts
-Do not have cell walls✓	-Have cell walls✓
-Produce eggs✓/young one	-Produce seeds✓

Any (2 x 2) + (1) for table (5)

(5)

Activity 10

10

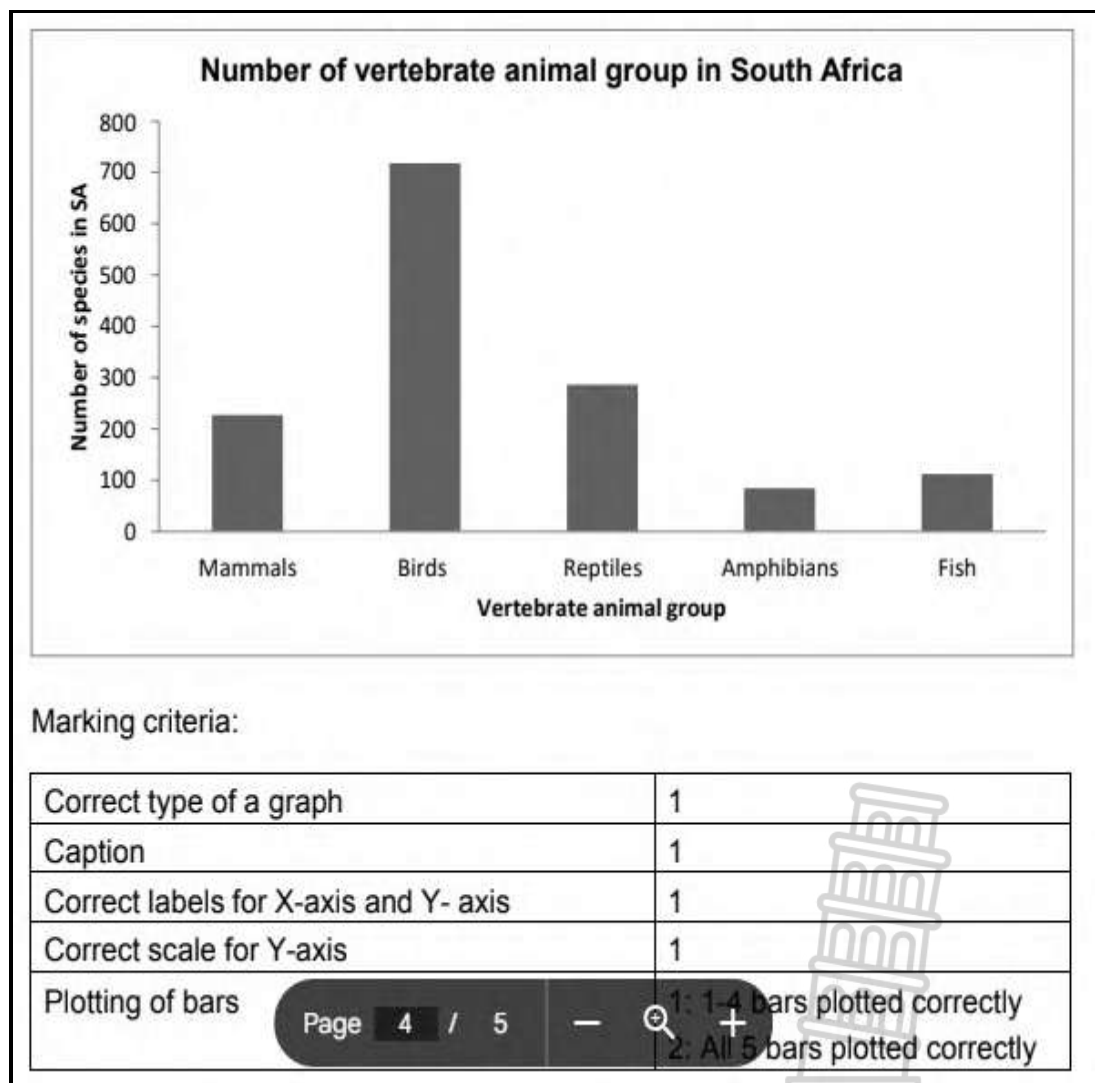
10.1 $227+718+286+84+112$ ✓ (2)

= 1427✓species

10.2 (a) Vertebrates✓ (1)

(b) Number of species✓ (1)

10.3



(6)

10.4 –They are unicellular and microscopically small✓.

- Others are simple multicellular organisms✓ and visible to the naked eye

- All protists have true nuclei✓ and are therefore eukaryotic✓

- Move by means of flagella, cilia and cyclosis✓

- Algae are autotrophic and others are heterotrophic✓

- Reproduction is mostly asexual (binary fission), ✓ some algae do reproduce sexually✓

- They in almost moist environment✓

(5)

(Any 5)

(15)

Activity 11

11

11.1 Monera✓ (1)

11.2 Plantae✓ (1)

11.3 Prokaryote✓ (1)

11.4 Eukaryote✓ (1)

11.5 Eukaryote✓ (1)

11.6 Unicellular✓ (1)

11.7 Multicellular✓ (1)

11.8 Saprophytic✓ (1)

11.9 Autotrophic✓ (1)

11.10 Paramecium cordatum✓ (MUST be underlined separately) (1)

(10)

Activity 12

12

12.1 Mammals✓ (1)

12.2 Pan troglodytes✓ (2)

12.3 Pan✓ (1)

12.4 -To avoid confusion✓/be accurate (2)

- common names vary from region to region✓
(6)

