Province of the
EASTERN CAPE
EDUCATION

NATIONAL SENIOR CERTIFICATE

GRADE 10

NOVEMBER 2020

LIFE SCIENCES P2 (EXEMPLAR)

MARKS: **150**

TIME: **2½ hours**

This question paper consists of 16 pages.

INSTRUCTIONS AND INFORMATION

Read the following instructions carefully before answering the questions.

1. Answer ALL the questions.
2. Write ALL the answers in your ANSWER BOOK.
3. Start the answer to EACH question at the top of a NEW page.
4. Number the answers correctly according to the numbering system used in this question paper.
5. Present your answers according to the instructions of each question.
6. Do ALL drawings in pencil and label them in blue or black ink.
7. Draw diagrams, tables or flow charts ONLY when asked to do so.
8. The diagrams in this question paper are NOT necessarily drawn to scale.
9. Do NOT use graph paper.
10. You may use a non-programmable calculator, protractor and a compass where necessary.
11. Write neatly and legibly.

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SECTION A

QUESTION 1

1.1 Various options are provided as possible answers to the following questions. Choose the correct answer and write only the letter (A–D) next to the question numbers (1.1.1–1.1.10) in the ANSWER BOOK, for example 1.1.11 D.

1.1.1 Which ONE of the following blood vessels supply the heart with blood?

A Aorta
B Coronary artery
C Superior vena cava
D Pulmonary veins

1.1.2 Which ONE of the following statements are correct about the heart?

A The pulmonary circuit pumps blood from the right side of the heart to the lungs
B The pulmonary circuit pumps blood from the left side of the heart to the lungs
C The systemic circuit pumps blood from the right side of the heart to the lungs
D The systemic circuit pumps blood from the right side of the heart to the body

1.1.3 The typical weather conditions that exist in a particular area:

A Ecosystem
B Biome
C Environment
D Climate

1.1.4 Which of the following groups of plants and animals are found in the fynbos biome?

A Grass, trees, lion, elephant, cheetah
B Yellowwood, ferns, Knysna turaco, bushbuck, duiker
C Shrubs, trees, elephant, kudu, Vervet monkey
D Ericas, Proteas, Geometric tortoise, sugarbird

1.1.5 Sino wants to give his mom a pot with magnolias for her birthday. He knows that magnolias need soil with good water-holding capacity and nutrients. Which of the following should he use to fill his pot with?

A Only small soil particles alone
B Small soil particles with some added humus
C Sandy soil with some added humus
D Loamy soil with lots of gravel for drainage

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1.1.6 Melting ice caps and rising sea levels have occurred as a result of humans disrupting the … cycle.

A water
B nitrogen
C oxygen
D carbon

1.1.7 Thorn decides to test the effect of salt concentration on the activity of his tropical sea fish. He has two tanks. One he fills with normal sea water he collected from the beach. The other tank he fills with 80% sea water and 20% fresh water.
Which of the following represent ways that Thorn can ensure the validity of his experiment?

(i) Use the same species of fish in both tanks
(ii) Use the same size tanks
(iii) Use the same type of water in both tanks
(iv) Put both tanks in the same location at his house

A (i), (ii) and (iii)
B (i), (ii) and (iv)
C (i) and (ii) only
D All of the above

1.1.8 Organisms in an ecosystem that break down the bodies of dead organisms:

A Producers
B Primary consumers
C Secondary consumers
D Decomposers

1.1.9 A type of fossil showing the movement (e.g. footprints) of animals:

A True form fossils
B Moulds and impressions
C Casts
D Trace fossils

1.1.10 The super continent made up of all of the continents joined together, is called …

A Laurasia.
B Gondwanaland.
C Pangea.
D Pandora. (10 x 2) (20)

1.2 Give the correct BIOLOGICAL TERM for each of the following descriptions. Write only the term next to the question numbers (1.2.1–1.2.9) in the ANSWER BOOK.

1.2.1 The type of muscle that the heart consists of

1.2.2 Pigment found in red blood cells

1.2.3 Lymph fluid when it leaves the blood vessels and bathes the cells

1.2.4 Slowing down of body processes when temperatures drop

1.2.5 Height above sea level

1.2.6 A rise in the average temperature on Earth

1.2.7 The removal of trees from a particular area

1.2.8 Massive sections of the Earth's crust that move as a single piece

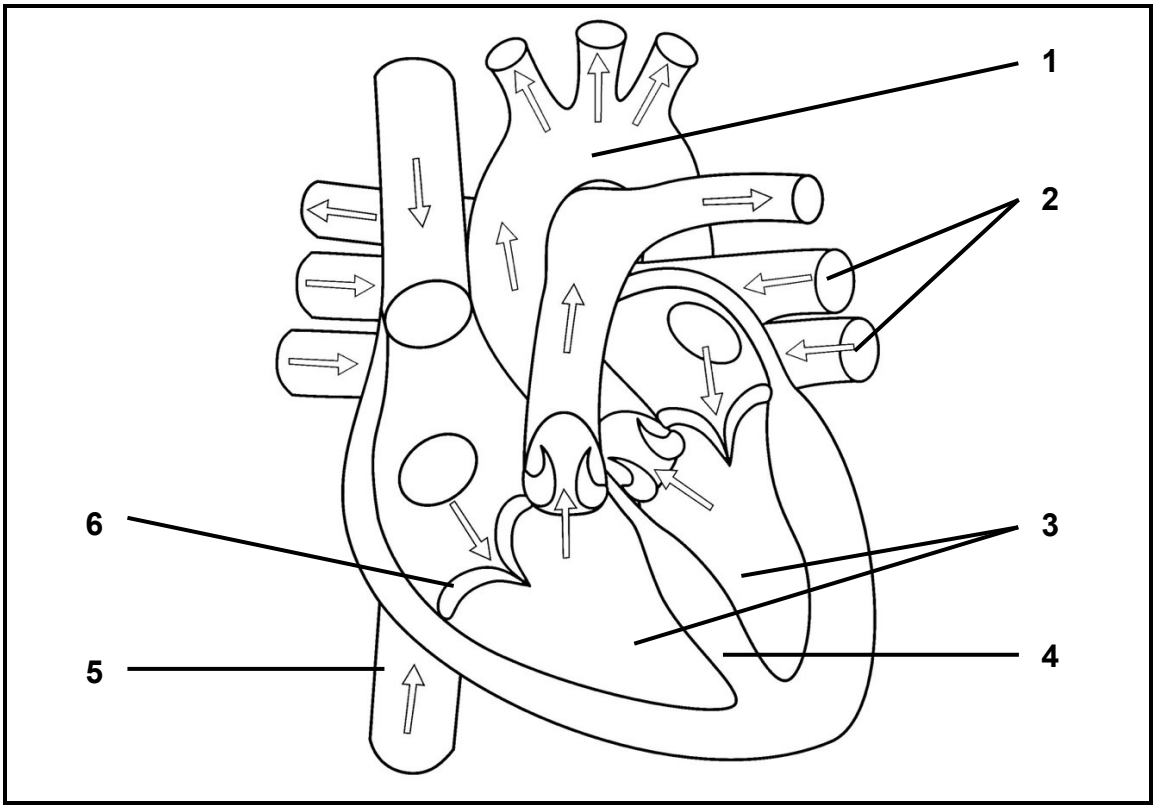
1.2.9 Fossil plants thought to be responsible for the coal deposits in Southern Africa (9 x 1) (9)

1.3 Indicate whether each of the statements in COLUMN I, applies to **A ONLY**, **B ONLY**, **BOTH A and B**, or **NONE** of the items in COLUMN II. Write **A only**, **B only**, **both A and B**, or **none** next to the question numbers (1.3.1–1.3.4) in the ANSWER BOOK.

COLUMN I		COLUMN II
1.3.1	Blood vessel with walls only one cell layer thick	A: Vein B: Artery
1.3.2	Abiotic factors	A: Predation B: Aspect
1.3.3	Ethical ecotourism	A: Buy illegal wildlife products B: Pick up litter
1.3.4	Evidence for continental drift	A: Transition fossils B: Biogeography

(4 x 2) (8)

1.4 The diagram below shows the internal structure of a human heart.



1.4.1 Identify parts **1**, **4** and **6**. (3)

1.4.2 Where is the blood at **2** coming from? (1)

1.4.3 Name the process that occurs when the structures at **3** contracts together. (1)

1.4.4 Describe the oxygen content of the blood in structure number **5**. (1)

1.5 The table below shows the timescale of a part of Earth's history.

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

1.5.1 Which …

(a) period saw the arrival of the first land plants? (1)

(b) group of animals survived the longest in this era? (1)

1.5.2 What do we call a timescale like the one above? (1)

1.5.3 In which period above did an explosion (a large increase) in the number and diversity of fossils in the fossil record occur? (1)

1.5.4 Scientists may use different layers of rock to work out if a new fossil was formed before or after a particular geological event. What do we call this method of dating fossils? (1)

1.5.5 Scientists may use fossils like Ammonites to help them date other fossils found in the same layer. What do we call fossils like the Ammonites and others that help scientists to do this? (1)

1.5.6 What do we call a scientist who studies fossils? (1)

TOTAL SECTION A: 50

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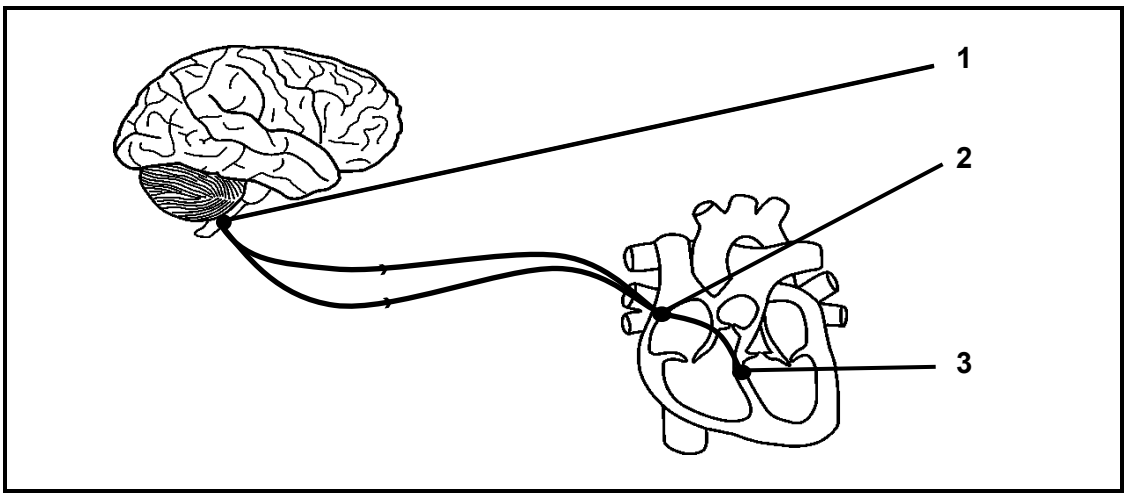
SECTION B

QUESTION 2

2.1 The diagram below shows the brain and the heart.

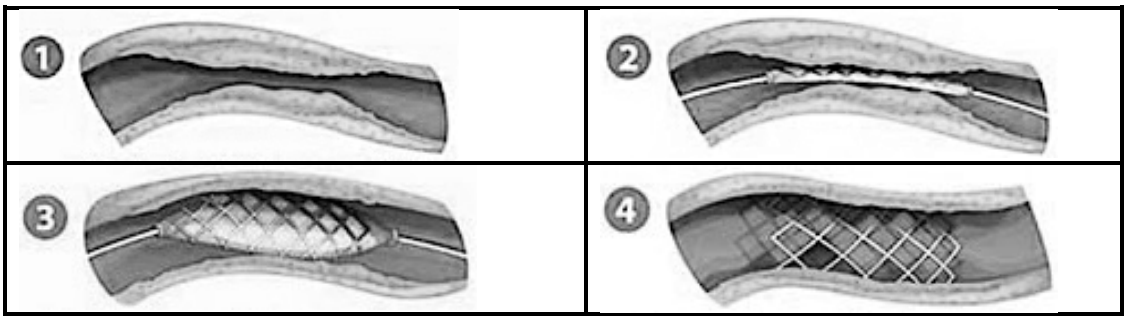


2.1.1 Name the TWO patches of tissues, **2** and **3**, that help control the heart rate. (2)

2.1.2 Where in the heart is part **3** located? (2)

2.1.3 Explain how part **1**, **2** and **3** functions together to increase heart rate. (4)

The diagram below shows four steps of an operation to insert a wire cage into a blocked artery.



2.1.4 What causes arteries to block? (1)

2.1.5 What is the wire cage called? (1)

2.1.6 Explain how the wire cage helps a person with a blocked artery. (2)

2.1.7 Name THREE things people can do to help prevent blockages in their blood vessels. (3)

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2.2 Study the list of organisms below which may be found in the thicket biome.

grass; kudu; locust; aloe; sunbird; lizard; Adder (snake); spekboom; hawk

2.2.1 What is a *biome*? (2)

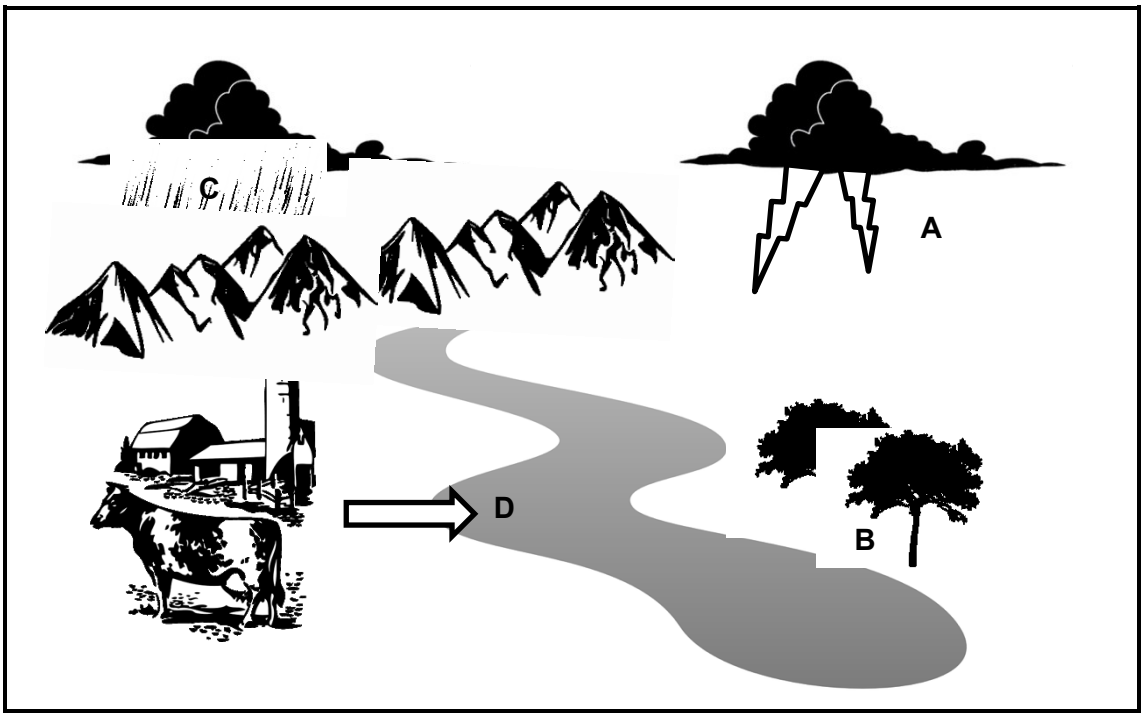
2.2.2 Identify TWO producers from the list above. (2)

2.2.3 Identify ONE primary consumer from the list above. (1)

2.2.4 Identify ONE tertiary consumer from the list above. (1)

2.2.5 Draw a feasible food web using ALL of the organisms in the list above. (4)

2.3 The diagram below shows part of the nitrogen cycle and the water cycle.



2.3.1 Name the process of removing nitrogen from the atmosphere at **A**. (1)

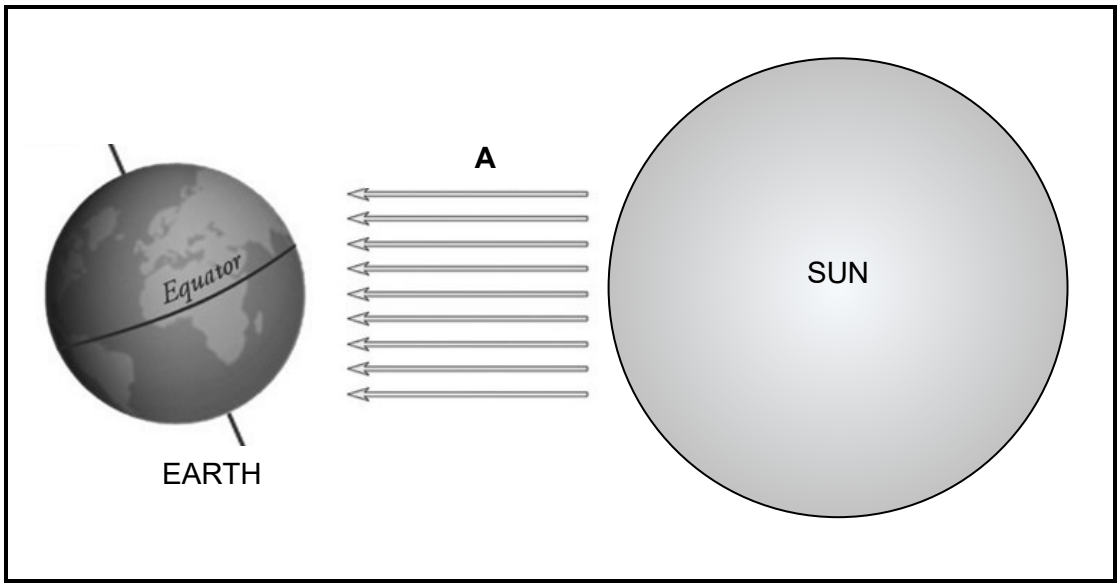
2.3.2 In which form is nitrogen absorbed by plants out of the ground at **B**? (1)

2.3.3 Which part of the water cycle is represented by **C**. (1)

2.3.4 Runoff water from the farm into the river at **D** can cause excess nutrients to flow into the water. What is this called? (1)

2.3.5 Explain how the process mentioned in QUESTION 2.3.4 above might cause organisms to die in the river. (3)

2.4 The diagram below shows the sun's rays hitting the earth.



2.4.1 Which abiotic factor is represented by **A** in the diagram above? (1)

2.4.2 Explain how the tilt of the Earth's axis causes seasons. (3)

2.4.3 Changes in the length of the day can affect seasonal temperatures.

(a) What do we call the number of hours of light a plant or animal receives every day? (1)

(b) What is *migration*? (2)

(c) Give ONE reason why an animal might migrate. (1)

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

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

2.5.1 Fill in the missing pieces of information from the table labelled **(a)** to **(d)**. (4)

2.5.2 What does *eukaryotic* mean? (1)

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

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

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

2.6.1 According to Linnaeus' system, which class does the lion belong to? (1)

2.6.2 The lion's scientific or binomial name, panthera leo, has been written incorrectly. Rewrite it correctly. (2)

2.6.3 Why is it necessary for organisms to have scientific names? (2)

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QUESTION 3

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

They decide to investigate how quickly different plants absorb CO_2.

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

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

The results are shown in the table below.

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

3.1.1 Identify the independent variable. (1)

3.1.2 Plot a bar graph of weight/mass increase of the three plants. (6)

3.1.3 What was the purpose of measuring the starting weight/mass of the plants? (1)

3.1.4 Identify TWO ways that Nathan and Nqaba ensured the validity of their investigation. (2)

3.1.5 How could they improve the reliability of their investigation? (1)

3.1.6 Calculate the percentage increase in mass from the start to the end of the investigation of the Spekboom plant. (2)

3.1.7 Explain how using the weight gain of the plants will give Nathan and Nqaba an idea of how much CO_2 the plants are absorbing. (2)

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3.2 The images below are two different fossils.

A	B
	

3.2.1 Identify:

(a) Fossil **A** (1)

(b) Fossil **B** (1)

3.2.2 Describe how these fossils may have formed in sedimentary rock. (4)

3.2.3 Name TWO other ways that fossils are formed, other than in sedimentary rock. (2)

3.2.4 Scientists use radioactive isotopes such as carbon-14 or potassium-40 to date fossils. What is this method of dating fossils called? (1)

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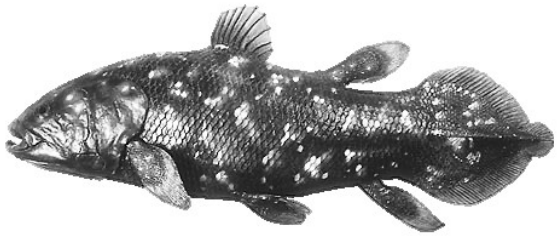
3.3 The diagram below shows a picture of a coelacanth.



3.3.1 Why are coelacanths thought to be living fossils? (2)

3.3.2 Where was the first live coelacanth caught? (1)

3.3.3 Coelacanths are thought to be the missing link between fish and amphibians.

What do we call the fossils that have common features of two different groups and show the change from one group to the other? (1)

3.3.4 Give ONE example of any other missing link that you have studied other than the coelacanth. (1)

3.4 Read the following extract and answer the questions that follow.

***DNA Sequencing* (analysis) *Reveals that Coelacanths Weren't the Missing Link Between Sea and Land,* published by the Smithsonian magazine.**

Genetic analysis suggests that the coelacanth doesn't appear to be the most recent shared ancestor between sea and land animals-so its lobed fins didn't make that first fateful step onto land after all, but that it was more likely a group of fish known as the lungfish.

The coelacanth has not existed unchanged all this time, it is actually still evolving-just very, very slowly, supporting the recent argument that it's time to stop calling the fish and other seemingly prehistoric creatures 'living fossils'.

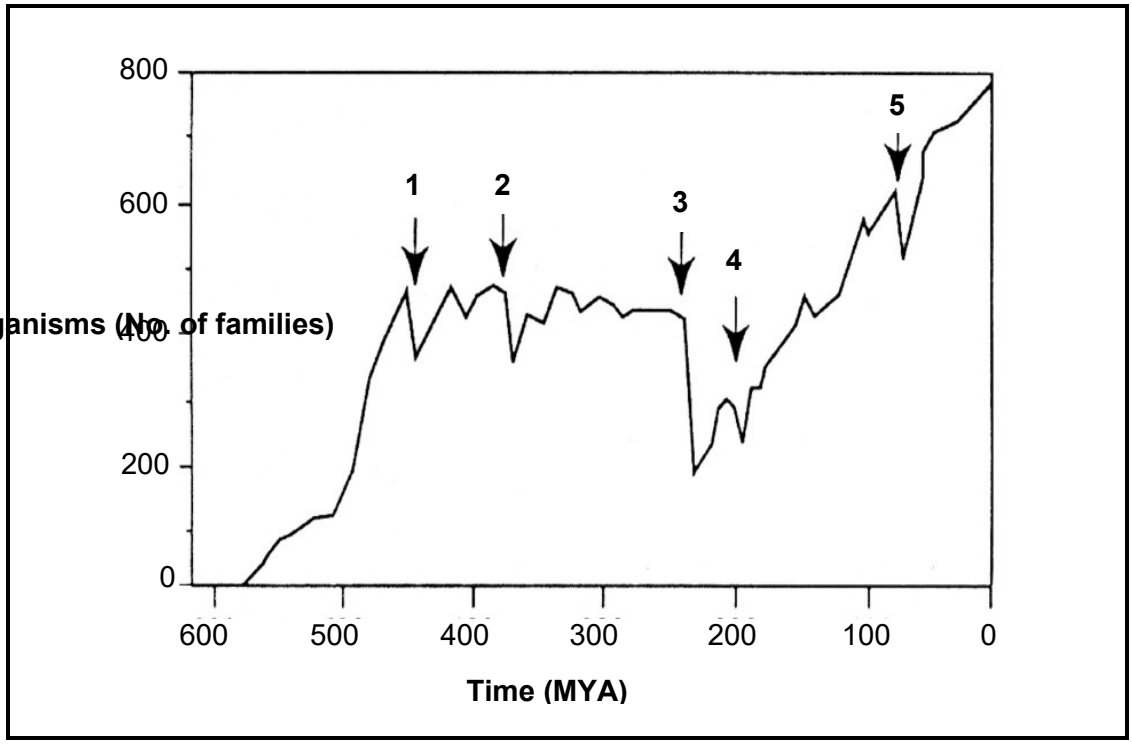
[Adapted from https://www.smithsonianmag.com/science-nature/dna-sequencing-reveals-that-coelacanths-werent-the-missing-link-between-sea-and-land-25025860/]

NOTE: Organisms with similar DNA are more closely related than organisms whose DNA differs a lot.

3.4.1 Does the article agree with classifying the coelacanth as a living fossil? (1)

3.4.2 Do you think scientists should reconsider how they have used other fossils as missing links between different animal groups? Justify your answer. (3)

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



3.5.1 What do we call the events on the graph marked **1–5**? (1)

3.5.2 According to the graph, which event caused the greatest decrease in the diversity of organisms? (3)

3.5.3 Scientists think that a volcano may have caused the decrease in diversity of organisms during the event marked **5**. Explain how a volcano could cause so many species to die out. (3)

3.5.4 Scientists have other theories about what may have caused the decrease in diversity of organisms at event marked **5**. Name TWO other theories. (2)

3.6 The picture below shows a fossilised skull. It belonged to a female of one of our human ancestors and was found at the Cradle of Humankind.

3.6.1 Name the skull in the image above. (1)

3.6.2 What do we call tourism to places like the Cradle of Humankind where people go specifically to see things like the skull in the image above? (1)

3.6.3 Name TWO places, other than the Cradle of Humankind, where people can go see things such as the skull in the image above. (2)

3.6.4 Explain how the local community around the Cradle of Humankind can benefit from tourists who visit the area. (4)

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TOTAL SECTION B: 100
GRAND TOTAL: 150

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