



<u>FACULTY</u>	: Education
<u>DEPARTMENT</u>	: Childhood Education
<u>CAMPUS</u>	: SWC
<u>MODULE</u>	: INTRODUCTION TO SCIENCE AND TECHNOLOGY FOR THE INTERMEDIATE PHASE 1A. (SATINA1)
<u>SEMESTER</u>	: First
<u>EXAM</u>	: June 2021

<u>ASSESSOR(S)</u>	: MRS M PENN		
<u>MODERATOR</u>	: DR L MAVURU (UJ)		
<u>DURATION</u>	: Take-home exam	<u>MARKS</u>	: 100

NUMBER OF PAGES: 5 PAGES

INSTRUCTIONS:

1. Answer ALL THE QUESTIONS.
 2. Number your answers clearly.
 3. This paper will be released on blackboard in the assessment folder 72 hours before the due date.
 4. Your work should be typed in Times New Romans/Arial font, 1.5 spacing and must include a cover page with your details.
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QUESTION 1: The Nature of Science and Science process skills

Read the short story: “The evolution of living things”

Ideas aimed at explaining how organisms change, or evolve, over time date back to Anaximander of Miletus, a Greek philosopher who lived in the 500s B.C.E. Noting that human babies are born helpless, Anaximander speculated that humans must have descended from some other type of creature whose young could survive without any help. He concluded that those ancestors must be fish, since fish hatch from eggs and immediately begin living with no help from their parents. From this reasoning, he proposed that all life began in the sea.

Anaximander was correct; humans can indeed trace our ancestry back to fish. His idea, however, was not a theory in the scientific meaning of the word, because it could not be subjected to testing that might support it or prove it wrong. In science, the word “theory” indicates a very high level of certainty. Scientists talk about evolution as a theory, for instance, just as they talk about Einstein’s explanation of gravity as a theory.

A theory is an idea about how something in nature works that has gone through rigorous testing through observations and experiments designed to prove the idea right or wrong. When it comes to the evolution of life, various philosophers and scientists, including an eighteenth-century English doctor named Erasmus Darwin, proposed different aspects of what later would become evolutionary theory. However, evolution did not reach the status of being a scientific theory until Darwin’s grandson, the more famous Charles Darwin, published his famous book *On the Origin of Species*. Darwin and a scientific contemporary of his, Alfred Russel Wallace, proposed that evolution occurs because of a phenomenon called natural selection.

(Story Courtesy of: <https://www.nationalgeographic.org/encyclopedia/theory-evolution/>)

From the short story above, some of the tenets of the nature of Science (NOS) can be understood. Using excerpts from the story above discuss the following

tenets of the NOS.

- 1.1 Knowledge is accepted as being scientific only if it is empirically formulated. (3)
 - 1.2 Observations are different from inferences. (3)
 - 1.3 There is difference between scientific law and theory. (4)
 - 1.4 Design an investigation in the Natural Sciences and Technology and discuss at least three (3) basic and two (2) integrated science process skills that learners will develop as they take part in the investigations. (Tip: In answering this question, you will have to write out the full investigation then proceed to describe the process skills thereafter). (20)
- [30]

QUESTION 2: Origin and diversity of the universe

According to the International Astronomical Union (IAU), a planet is a celestial body that meets certain defined characteristics.

- 2.1 What are the three (3) main criteria that classify celestial bodies as planets? (3)
 - 2.2 Explain why asteroids are not considered as dwarf planets. (3)
 - 2.3 Discuss some of the evidences that support the big bang theory. (8)
 - 2.4 Explain the role of gravitational interactions in the universe as a whole and the earth in particular. (16)
- [30]

Question 3: Diversity and classification of living things

There are several theories that have been provided by scientists to explain the

origin of life on earth.

3.1 With the exception of the theory of special creation, describe three (3) theories, which explain the origin of life on earth. (12)

3.2 Since the 1940s, fungi have been used for the production of antibiotics, and, more recently, various enzymes produced by fungi are used industrially. Fungi are also used as biological pesticides to control weeds, plant diseases and insect pests; However, Fungi may be very harmful to the world. Critically discuss the negative impacts that fungi have in the world. (8)

[20]

Question 4: Evolution

Evolution is the process of change over time. It is believed that, modern organisms descended from ancient organisms through the process of evolution.

4.1 In an essay of maximum one and a half pages (1.5) pages, discuss the factors that support the process of evolution by natural selection as proposed by Charles Darwin. (The rubric in annexure 1 provides guidelines for the marks you will attain) (20)

[20]

TOTAL: 100

Annexure 1: Rubric for Question 4					
Criteria	5 points	4 points	3 points	2 points	1 point
Content: Evidence of content knowledge with provision with majority of the	Extensive Evidence	Much Evidence	Sufficient Evidence	Some Evidence	Little Evidence

expected concepts and ideas, using diagrams where relevant.					
Credibility: Used a variety well cited of sources to outsource relevant ideas, backing with examples where necessary.	Extensive Evidence	Much Evidence	Sufficient Evidence	Some Evidence	Little Evidence
Evidence of critical thinking: Information and ideas carefully organized and nicely presented; information flows logically and well	Extensive Evidence	Much Evidence	Sufficient Evidence	Some Evidence	Little Evidence
Grammar and Writing: Spelling and grammar are correct; material has been proof-read and edited	Extensive Evidence	Much Evidence	Sufficient Evidence	Some Evidence	Little Evidence