



<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. (SATINA1)
<u>SEMESTER</u>	: First
<u>EXAM</u>	: July 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: Science process skills and the limitations of science

Science process skills refer to the logical operations of thinking that are employed when conducting scientific investigations.

1.1 Describe four (4) basic process skills used in scientific investigations. **(8)**

1.2 Lerato and Jason decided to investigate the factors that affect the rate of photosynthesis. In their curiosity, they asked the question; How does light intensity affect the rate of photosynthesis?

Lerato predicted that, there is a directly proportional relationship between light intensity and the rate of photosynthesis.

After assembling the required laboratory equipment the pair followed the following procedure;

- Place a boiling tube 10cm away from LED light source.
- Fill the boiling tube with sodium hydrogen carbonate solution (Sodium hydrogen carbonate plus water)
- Put a piece of pondweed in the boiling tube with a cut end at the top.
- Leave for 5 minutes to acclimate to the conditions in the boiling tube.
- Start stopwatch and count number of bubbles of oxygen produced in one minute.
- Repeat two more times and calculate mean number of bubbles produced in one minute.
- Repeat whole experiment again from the start placing the boiling tube at 10 cm, 20cm, 30cm and then 40 cm away from the light source.

After completing their investigation they observed that the closer the boiling tube was to the light source the faster the rate of photosynthesis and vice versa.

1.2.1 In a tabular format identify the different basic and integrated science process skills that Lerato and Jason must have used in this investigation and state how they used these process skills during the investigation process. **(20)**

1.2.2 Propose a way through which Lerato and Jason may communicate the findings of their investigation. **(2)**

[30]

QUESTION 2: The universe and our solar system

Before the birth of the universe, it is believed that time and matter did not exist. However, due to the innovations in specific science disciplines, today we define the universe as the totality of all matter, energy, space and time.

- 2.1 What is an alternative name for the universe? (2)
- 2.2 Define cosmology. (2)
- 2.3 Discuss the composition of the universe. (16)
- 2.4 With a focus on gravitational interactions and distance. Explain the role of the sun and the moon in tidal changes on earth. (10)
- [30]

QUESTION 3: Diversity and classification of living things.

In science, for any organism to be considered as a living organism, it must possess certain characteristics.

- 3.1 Provide a comprehensive description of five (5) characteristics of living things. (10)
- 3.2 Using diagrammatic representations, critically analyse the following ecological organisations;
- Ecosystems
 - Trophic levels
 - Food Webs
 - Food chains
- (The rubric below provides guidance on the mark allocations).* (20)

[30]

QUESTION 4: Evolution

In the world today, there are many applications of evolutionary theories in how society and technology have developed.

- 4.1 In an essay of maximum page (1) page, critically analyse some of the applications of evolution theories and methods in the 21st century. **(10)**
[10]

TOTAL: 100

**** The rubric below provide the general guideline for the essay type questions in sections 3.2**

Rubric

Criteria	5 points	4 points	3 points	2 points	1 point
Content: Evidence of content knowledge with provision with majority of the expected concepts and ideas, using diagrams where relevant.	Extensive Evidence	Much Evidence	Sufficient Evidence	Some Evidence	Little Evidence

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