



UNIVERSITY  
OF  
JOHANNESBURG

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| <b><u>FACULTY</u></b>    | : Education   |
| <b><u>DEPARTMENT</u></b> | : Science and Technology Education  |
| <b><u>CAMPUS</u></b>     | : APK   |
| <b><u>MODULE</u></b>     | : METHODOLOGY AND PRACTICUM: SENIOR PHASE<br>NATURAL SCIENCE<br>(MPSNAY1) |
| <b><u>SEMESTER</u></b>   | : YEAR MODULE   |
| <b><u>EXAM</u></b>       | : SSA January 2020  |

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**MODERATOR** : DR JITA (UFS)

**DURATION** : 2 HOUR **MARKS** : 100

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NUMBER OF PAGES: 5 PAGES

INSTRUCTIONS:

1. Answer ALL THE QUESTIONS.
  2. Number your answers clearly.
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**QUESTION 1**

1.1 Unlike NCS/RNCS, CAPS emphasised the importance of specific aims. We referred to it as guidelines on how to prepare learners to meet the challenges of society and they feature during teaching, learning and assessment (DoE, 2011). Choose any Natural Sciences topic and design a lesson that is in line with Specific Aim 1 'Doing Science'. In your response, consider the following:

1.1.1 Provide the topic and grade. (1)

1.1.2 Discuss the skills that are required for this specific aim and activity. (2)

1.1.3 Provide a summary of content knowledge. (3)

1.1.4 What is the purpose or objectives of the lesson? (2)

**[8]**

**QUESTION 2**

2.1 Science is different from other subjects. Identify one characteristic of science that you are aware of and provide an example.

2.2 Below is an example of a Natural Sciences experiment for Grade 9. The lesson objectives are to concentrate on the ability of water to absorb and release large quantities of energy as it undergoes a change of state and to discuss the role of the evaporation process in the regulation of the weather and climate. (2)

### **Volcanic activity**

Some scientists believe that volcanic eruptions may have caused the mass extinction event at the end of the Cretaceous period that led to the extinction of among others, the dinosaurs. The researchers, through examining a trail of dead particles floating in the sea, spanning half a million years, developed a timeline that links mass extinction to large-scale eruptions of the Deccan Traps, an ancient volcanic range in Western India. Evidence suggests that the massive volcanic eruptions pumped out massive quantities of carbon dioxide and sulphur dioxide into the air, thus altering the climate and contributing to the mass extinction event at the end of the Cretaceous period.

Plan an investigation to prove the above phenomenon with the data provided. Before you begin, plan your investigation (it must be a "fair test"! ) and write down the steps you will follow. Prepare a table to record your measurements.

**Aim:** To use an understanding of fossil evidence and the scientific method to demonstrate how each of the hypotheses for mass extinction arrives at its conclusion.

**Instructions:** What are the key requirements of a theory that attempts to explain the mass extinctions?

Choose one of the two hypotheses discussed and describe it in your own words. List the evidence that supports the theory.

Through your research on the Internet and by reading books in the library, list any other evidence that you found in support of your chosen hypothesis.

When you finish your investigation, discuss the result with your group. How do you explain this result? What does it mean? Prepare to report on the steps of your investigation and your conclusions.

Use the above activity to name/list the Nature of Science tenets that are addressed. In your response identify the tenets and briefly describe each tenet and provide an example for each from the activity. Below are guiding questions:

2.2.1 What NOS tenet(s) is/are addressed by the above activity? (6)

2.2.2 What is the specific aim addressed by the investigation?  
Substantiate your answer. (2)

2.2.3 What pre-requisite science knowledge and process skills are  
essential for learners to successfully accomplish the  
investigation? Justify. (4)

[14]

### **QUESTION 3**

Ostensive and heuristic teaching strategies are mutually important in teaching Science in the 4<sup>th</sup> industrial revolution. Critically discuss this statement.

[25]

### **QUESTION 4**

In grade nine, under the stand of Life and Living, learners are taught about the different systems that are essential for the functioning of the human body. Therefore healthy life style choices can help your body stay strong and work at its best. Your learners are required to produce a play to inform the school of the importance of following a healthy lifestyle.

4.1 Design a rubric to assess learners for the above assessment task. Criteria  
on your rubric must be clearly outlines. (12)

4.2 The above assessment is a formal assessment task.

4.2.1 Define formal assessment. (2)

4.2.2 Name and state the four (4) different types of assessment methods that  
teachers can use in their classes. (8)

4.2.3 How many forms of assessment are there? (1)

**[23]****QUESTION 5**

Ms Mazibuko is a Natural Sciences teacher at an elitist school in Gauteng. She is teaching Grade 8 Natural Sciences and her class has 20 students. Ms Mazibuko plans to do an investigation lesson on photosynthesis and she wants to investigate the factor of sunlight and how it affects the process of photosynthesis. There are only female learners in her class. The medium of instruction at her school is English and all her students are proficient in English.

Using the six (6) guiding question for planning a lesson carefully plan Ms Mazibuko's lesson. Then plot out this lesson on a lesson plan template.

**[30]**

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**TOTAL: 100**