

UNIVERSITY OF FORT HARE

PMS 411

Bachelor of Education

Final Assessment final task

June 2023

Module: Physical Sciences Method

Marks: 100

Internal Examiner

External Examiner

Ms B. Mzilikazi

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Duration 3 hours

Instructions

- **The assessment consists of 4 questions**
- **Answer ALL questions**
- **Provide suitable examples wherever needed to support your answers**
- **Write neatly and legibly**
- **Plagiarism is a serious offence that can lead to serious consequences.**
- **Manage your time well.**

Question 1 (25 marks)

1.1: Nature of Science and Philosophy of Science (NOS) (15 marks)

- 1.1.1. Write a paragraph of approximately 5-6 lines to illustrate your understanding of the nature and philosophy of science education. (5)
- 1.1.2 Discuss how you would include NOS principles in your teaching/lesson. (4)
- 1.1.3. List any three Big Ideas in Science for teaching/lesson? (3)
- 1.1.4. Discuss any one of the Big Ideas in detail, use any physical sciences topic to support your discussion that you would include in your teaching/lesson. (3)

1.2: Decolonization, Gender, Class, and Science (10 marks)

- 1.2.1 Explain the term Decolonization as used in South African context. (2)
- 1.2.2. How does the current curriculum and classroom practice contribute to the problem under achievement in science with respect to class in SA society? (2)
- 1.2.3. Is there any evidence of under achievement with respect to gender? Explain. (2)
- 1.2.4. How do the current curriculum and classroom practice contribute to this problem? (2)
- 1.2.5. What suggestions do you have that may assist in alleviating the problem of underachievement in science with respect to class and gender? Support your response. (2)

[Total: 25 marks]

Assessment Rubric for question 1 Total: 25 marks

Question 1.1. Nature and Philosophy of Science (15 marks)

Marks	0	1	2	3-4	5
1.1.1 and 1.1.2	No discussion has been provided.	A vague discussion has been provided no evidence of the use of lecture notes.	A satisfactory discussion has been provided no evidence of the use of lecture notes.	A meaningful discussion has been provided no evidence of the use of lecture notes. The assessment has been edited to a certain extent for language/grammar/technical aspects.	A detailed, comprehensive discussion has been provided. Evidence of the use of lecture notes is present in the discussion. The assessment has been well edited for language/grammar/technical aspects.
1.1.3	No Big Ideas in science has been provided.	2/3 Big Ideas in science has been provided.			
1.1.4	No discussion has been provided.	A vague discussion has been provided. No example from own teaching has been provided.	A satisfactory discussion has been provided. No example from own teaching has been provided.	A detailed, comprehensive discussion has been provided. Examples from own teaching have been provided. The assessment has been well edited for language/grammar/technical aspects.	

Question 1.2: Gender, Class, and Science (10 marks)

Marks	0	1	2
1.2.1	No discussion has been provided.	A vague discussion has been provided. No examples of how learners engaged with the issue of race have been provided.	A satisfactory discussion has been provided. No examples of how learners engaged with the issue of race have been provided.
1.2.2	No discussion has been provided.	A vague discussion has been provided.	A detailed, comprehensive discussion has been provided.
1.2.3	No discussion has been provided.	A vague discussion has been provided. No examples of how learners engaged with the issue of gender have been provided.	A satisfactory discussion has been provided. No examples of how learners engaged with the issue of gender have been provided.
1.2.4	No discussion has been provided.	A vague discussion has been provided.	A detailed, comprehensive discussion has been provided.
1.2.5	No discussion has been provided.	A vague discussion has been provided. No examples of how learners engaged with the issue of race or gender have been provided. No reference has been made to relevant research.	A satisfactory discussion has been provided. No examples of how learners engaged with the issue of race or gender have been provided.

Question 2 (25 marks)

Decolonization, Indigenous Knowledge Systems (IKS) and Science Education

- 2.1 In your own words explain the meaning of indigenous knowledge. (2)
- 2.2 Discuss the nature of Decolonization, IKS and tensions between Science and IK. (8)
- 2.3 Construct a task that incorporates an activity/resource/game that learners will need to engage in for the duration of one Science lesson. The activity/resource/game/artifact ought to incorporate some form of indigenous knowledge together with a Science section/topic/concept and take the average learner at least 15-20 minutes to complete. (15)

Total: [25 marks]

Assessment Rubric for question 2 Total: 25 marks

Question 2: Indigenous Knowledge and Science Education (25 marks)

Marks	1-2	3-4	5-6	7-8
2.1	0 No explanation provided	1 Vague explanation	2 A clear detailed explanation	
2.2	No discussion has been provided.	A vague discussion has been provided. No examples of how learners engaged with the issue of race have been provided.	A satisfactory discussion has been provided. No examples of how learners engaged with the issue of race have been provided.	A detailed, comprehensive discussion has been provided. Examples of how learners engaged with the issue of race have been provided. The assessment has been edited for language/grammar/technical aspects.
Marks	1-3	4-8	9-11	12-15
2.3	No activity/resource/gam	An activity/resource/game that incorporates indigenous	An activity/resource/game that incorporates indigenous	An activity/resource/game that incorporates indigenous knowledge

	e has been submitted. A vague discussion is provided regarding the activity/resource/game.	knowledge has been submitted. A satisfactory discussion is provided regarding the activity/resource/game. No reference to other research is provided.	knowledge has been submitted. A meaningful discussion is provided regarding the activity/resource/game. The assessment has been edited to a certain or language/grammar and technical aspects.	has been submitted. A detailed and comprehensive discussion is provided regarding the activity/resource/game. The assessment has been well edited for language/grammar and technical aspects.
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Question 3 (25 marks)

Inquiry-based teaching and learning approach.

An inquiry-based learning approach is more than the content versus process debate. This approach assists learners in developing new understandings and meanings. Write an essay in which you outline the characteristics of a classroom which uses inquiry processes.

Your essay should answer the following questions:

- What are the key features of an inquiry-based classroom? (3)
- How are the learners engaged in the inquiry process? (2)
- What is the role by the teachers in an inquiry-based classroom? (3)
- Discuss five benefits of inquiry-based learning in teaching science. (5)
- Explain how you would implement an inquiry-based approach when teaching the relationship between voltage and current in grade 10 physical sciences. (12)

Assessment rubric for question 3 (25 marks) Inquiry-based teaching and learning approach.

Marks	0	1-2	3		
Key features	No explanation provided	Explanation provided is satisfactory	A detailed comprehensive discussion has been provided on the features on an inquiry-based classroom		
Learner engagement	No explanation provided	Has provided a detailed report on the how learners should be engaged in inquiry classroom			
Role of a teacher	No explanation provided	1 Vague discussion has been provided	2-3 Clearly explained the role of a teacher		
Benefits	0 No explanation provided	1-2 The student has provided a vague discussion.	3-4 Satisfactory discussion.	5 Has clearly stated and discussed five benefits of inquiry learning and has supported the	

				discussion with examples	
Implementation	0	1-3	4-6	7-9	10-12
	No explanation provided	Very partial details are provided. Nothing clearly discussed on how the topic can be taught using inquiry	A satisfactory discussion	Meaningful discussion is presented	A clear detail on the implementation of inquiry in a specific topic is provided

Question 4 (25 marks)
Physical sciences content

One of the topics in Grade 11 Physical sciences is Gas Laws

4.1 The following warning appears on an aerosol can:

"Do not heat or expose to high temperatures."

Use kinetic molecular theory of gases to explain the reason(s) for the warning. (5)

4.2 Discuss five benefits of a demonstration lesson. (5)

4.3 Explain how you would teach Charles' Law using demonstration method (10)

4.4 As part of showing the application of the gas equation, you have chosen the following problem:

At a temperature of 298 K, a certain amount of CO₂ gas occupies a volume of 6 L.

What temperature will the gas be at if its volume is reduced to 5.5 L? The pressure remains constant.

Explain, with necessary workings, how you will guide your learners to solve the problem. (5)

[TOTAL: 100]