Assessment Task for Stage 6: Preliminary

Subject: Biology

THIS TASK NOTIFICATION CAN BE FOUND ON THE COLLEGE WEBSITE UNDER THE LEARNING AND TEACHING TAB

Instructions

- This is an in-class practical task that will be completed during Periods 4 & 5.
- You will be given 100 minutes to complete the task. The task must commence at 1:00pm sharp.
- Penalty for non-attendance
  - On the date of the assessment will immediately receive a 50% mark penalty of the achieved mark pending Illness/Misadventure certification.
  - On the day following the assessment will receive a zero mark pending Illness/Misadventure certification.

Outcomes being Assessed

- P2 applies the processes that are used to test and validate models, theories and laws of science, with particular emphasis on first-hand investigations
- P11 identifies and implements improvements to investigation plans
- P12 discusses the validity and reliability of data gathered from first-hand investigations and secondary sources
- P13 identifies appropriate terminology and reporting styles to communicate information and understanding in biology
- P14 draws valid conclusions from gathered data and information
- P15 implements strategies to work effectively as an individual or as a team member
# TASK DETAILS

## 1. Description of the Task

### Background Information

A model is a representation of something real. Scientists use models to better understand real objects or events. However, models are only a representation and have their limitations. An example is the model of the cell to be used for this task (an agar cube). A real cell is much more complex, but the agar cube does serve the purpose of demonstrating:

- the change in Surface Area/Volume ratio with cell size
- the effect of changing Surface Area/Volume ratio on the rate of diffusion of materials into and out of cells

### Task

*You are asked to ……*

(i) Use the materials supplied to perform a first-hand investigation which demonstrates the effect of Surface Area/Volume ratio on rates of diffusion. You will be provided with an experimental procedure.

(ii) Write an experimental report of your findings which includes a/an:

- Aim
- Hypothesis
- Risk Assessment
- Results
- Discussion
- Conclusion

* You will have 100 minutes to complete the task.
* You will need to bring a ruler marked with cm and mm, and a calculator to complete the task
* You should revise the concept of Surface Area/Volume ratio and experimental report writing techniques
* You should revise how to substitute values into mathematical formulae

## 2. Classroom Learning:

Students will be prepared to effectively complete this task through:

- **Learning to (skills)**
  - Follow a procedure
  - Safely carry out first-hand investigations
  - Write experimental reports
  - Calculate the Surface Area/Volume ratio of cubes

- **Learning about (knowledge)**
  - How the Surface Area/Volume ratio of cells affects the rate of diffusion of materials into and out of cells
  - The importance of high diffusion rates to the correct functioning of cells and the organism as a whole

- **Terms used in the completion/assessment of this task**
  - **Calculate** - ascertain/determine from given facts, figures or information
  - **Discuss** - identify issues and provide points for and/or against
  - **Evaluate** - make a judgement based on criteria; determine the value of
  - **Identify** - recognise and name
Marking Criteria

*Below are the criteria on which your final assessment result will be based. Please follow them carefully.*

<table>
<thead>
<tr>
<th>ELEMENTARY ACHIEVEMENT</th>
<th>SATISFACTORY ACHIEVEMENT</th>
<th>SUBSTANTIAL ACHIEVEMENT</th>
<th>HIGH ACHIEVEMENT</th>
<th>EXCELLENT ACHIEVEMENT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mark Range (0-6)</td>
<td>Mark Range (7-12)</td>
<td>Mark Range (13-18)</td>
<td>Mark Range (19-24)</td>
<td>Mark Range (25-30)</td>
</tr>
</tbody>
</table>

**Present some information.**
- Present a scientific report using some key components appropriately.
- Present a scientific report using most key components appropriately.
- Present a scientific report using all key components appropriately.
- Present a detailed scientific report using all key components appropriately.

**Identify a hazard or suggest a strategy to minimise risk.**
- Identify more than one potential hazard and/or identify a strategy to minimise risk.
- Identify more than one potential hazard in the experiment and suggest strategies to minimise risk.
- Identify most of the potential hazards in the experiment and suggests strategies to minimise risk.
- Identify the potential hazards in the experiment and suggests the most appropriate strategies to minimise risk.

**Write one observation about the experiment.**
- Record a number of measurements from the experiment.
- Record a number of measurements from the experiment and present them in an appropriate format.
- Present results in an appropriate format and comments on trends within the data.
- Present results in an appropriate format and relate trends in the data to movement of substances into and out of cells.

**Comment on the success of the experiment.**
- Comment on the success of the experiment in relation to experimental design.
- Correctly comment on the validity or reliability or accuracy of the results obtained.
- Correctly evaluate at least two of the following - validity, accuracy or reliability - of the results.
- Correctly evaluate the validity, accuracy and reliability of the results.

**Comment on the agar cube.**
- Comment on the agar cube as a model.
- Describe one strength or limitation of the agar cube as a model.
- Discuss the strengths and limitations of the agar cube as a model.
- Correctly evaluate strengths and limitations of the agar cube as a model.

**Use a subject specific term.**
- Use a subject specific term.
- Use some subject specific terminology correctly.
- Use most subject specific terminology correctly.
- Use all subject specific terminology correctly.