**Stage 1 Scientific Studies:**

**Assessment Type 1: Inquiry Folio**

**Science Inquiry Skills – Scientific Data Task**

The following is an online task.

In this task you will demonstrate your understanding of the representation and analysis of data.

You will gather and use data provided to formulate and justify conclusions.

1. The task can be accessed online through the school intranet using this link:

**Insert school link here**.

1. Create a new Word document and name it using the standard SACE convention:

*SACE registration number-1STU10-AT1-scientific data task*

1. Record your responses electronically in this word document.
2. Save your word document and email it to your teacher at the end of the lesson

Note: The maximum number of pages for your responses to this task is 2 A4 single-sided pages, minimum font size 10 point.

**Assessment Design Criteria**

Your work will be assessed against the following Performance Standards

* Investigation, Analysis, and Evaluation: IAE 3, 4
* Knowledge and Application: KA 1

**Advice for teachers:**

* If using this as an online task, you will need to add a link to where the task is located on your school network.
* If you are providing this task to students in hard copy form, you will need to alter the instructions.
* If you wish the students to record their responses electronically, you will need to provide the appropriate information for them to send their response to you or to store the response.
* If you wish the students to hand write their responses to the task you will need to indicate the 2 page limit for their responses is irrespective of the size of their handwriting.

Stage 1 Scientific Studies subject outline, Page 23:

For a 10-credit subject, the set of science inquiry skills tasks should be a maximum of 6 pages or the equivalent in multimodal form.

**You may wish to remove this list before printing the task**

**Question 1**

A student is undertaking an investigation on the effects of music on the growth of plants. Two tomato plants, Plant A and Plant B, are grown in a window and each receives the same amount of water. Plant A is exposed to classical music using headphones attached to the soil. Throughout the growth period, the student counts the number of tomatoes produced by each plant.

Plant A = 35 Tomatoes

Plant B = 55 Tomatoes

1. Identify the independent variable in this investigation?
2. Based only on the results obtained by the student, state one conclusion that can be made from this investigation.
3. Explain, with reasons, any limitations of this conclusion.
4. Re-design the method of this investigation so that the results are more reliable. Give reasons for the changes you suggest.

**Question 2**

Go to station A.

1. You will find 5 different measuring cups (A, B, C, D, E) used in the kitchen.
2. As accurately as you can, in each cup, measure out 250 ml of water.
3. Pour the water from the cup into a measuring cylinder.
4. Record the volume of water in the measuring cylinder.
5. Identify the cup that is the most accurate.
6. Explain any limitations for your conclusion.

Extensive laboratory tests on another set of measuring cups have shown that when the cups are used to try to measure out 250 ml of liquid, these were following results:

* Cup P 246 ml
* Cup Q 265 ml
* Cup R 257 ml
* Cup S 244 ml



All the measuring cups have graduations marked on the side, like in the image above.

1. Explain why there is such a large variation in the results when these cups are used to measure out the ‘same’ volume.

**Question 3**

Read the following information:

**Chewing Gum Kills Bad-Breath Germs**  
A particular company boasted that its mints had the ability to kill bad breath-causing bacteria. Advertisements claiming that a new ingredient in the mints, a tree bark extract, could kill the microorganisms that cause bad breath while other mints in the market could only mask the smell of bad breath. In their advertisements, the company said: ‘In a survey, seven out of ten dentists agree that these mints will protect people against bad breath.’

There are several claims made in this report.

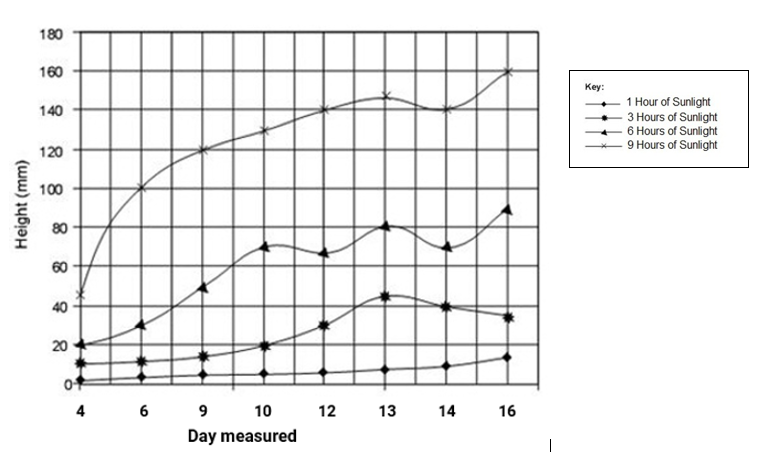
1. Construct a table that summarises:

* three claims made in the report
* how the evidence to support each claim could be collected
* what the outcome would be if each of the claims was supported

**Question 4**

A student was undertaking an investigation to determine the effect of the number of hours of sunlight on the growth of a plant.

The student represented the results of the investigation as shown in the graph below.



1. Identify two errors in the way in which the student has represented the data.
2. State one factor that might be difficult to control in this investigation. Describe how this could have affected the data obtained.
3. What does the data show happened to the height of the plants between Day 13 and Day 14 for the plants receiving 6 hours of sunlight? Give a possible explanation for this result.

**Performance Standards for Stage 1 Scientific Studies**

| - | **Investigation, Analysis, and Evaluation** | **Knowledge and Application** |
| --- | --- | --- |
| **A** | **Critically** deconstructs a problem and designs a **logical**, **coherent**, and **detailed** scientific investigation using a scientific method and/or engineering design process.  Obtains, records, and represents data, using **appropriate** procedures, conventions and formats **accurately** and **highly** **effectively**.  **Systematically** analyses and interprets data and evidence to formulate **logical** conclusions with **detailed** justification.  **Critically** and **logically** evaluates procedures and their effect on data.  **Critically** and **perceptively** evaluates the effectiveness of collaboration and its impact on results/outcomes. | Demonstrates **deep and broad** knowledge and understanding of a **range** of science inquiry skills and scientific concepts.  Applies science inquiry skills and scientific concepts **highly** **effectively** in new **and** familiar contexts.  **Critically** explores and understands in **depth** the interaction between science and society.  Communicates knowledge and understanding of science concepts coherently, with **highly effective** use of **appropriate** terms, conventions, and representations. |
| **B** | **Logically** deconstructs a problem and designs a **well**-**considered** and **clear** scientific investigation using a scientific method and/or engineering design process.  Obtains, records, and represents data, using **appropriate** procedures, conventions and formats **mostly** **accurately** and **effectively**.  **Logically** analyses and interprets data and evidence to formulate **suitable** conclusions with **reasonable** justification.  **Logically** evaluates procedures and their effect on data.  **Critically** evaluates the effectiveness of collaboration and its impact on results/outcomes. | Demonstrates **some depth and breadth** of knowledge and understanding of a **range** of science inquiry skills and scientific concepts.  Applies science inquiry skills and scientific concepts **mostly effectively** in new **and** familiar contexts.  **Logically** explores and understands in **some depth** the interaction between science and society.  Communicates knowledge and understanding of science concepts with **mostly coherent and effective** use of appropriate terms, conventions, and representations. |
| **C** | Deconstructs a problem and designs a **considered** and **generally** **clear** scientific investigation using a scientific method and/or engineering design process.  Obtains, records, and represents data, using **generally** **appropriate** procedures, conventions and formats with **some** **errors** but **generally accurately and effectively**.  Undertakes **some** analysis and interpretation of data and evidence to formulate **generally appropriate** conclusions with **some** justification.  Evaluates procedures and **some** of their effect on data.  Evaluates the effectiveness of collaboration and its impact on results/outcomes. | Demonstrates knowledge and understanding of a **general range** of science inquiry skills and scientific concepts.  Applies science inquiry skills and scientific concepts **generally effectively** in new **or** familiar contexts.  Explores and understands **aspects** of the interaction between science and society.  Communicates knowledge and understanding of science concepts with **generally effective** use of appropriate terms, conventions, and representations. |
| **D** | Prepares a **basic** deconstruction of a problem and an **outline** of a scientific investigation using a scientific method and/or engineering design process.  Obtains, records, and represents data, using procedures, conventions, and formats **inconsistently**, with **occasional accuracy and effectiveness.**  **Describes** data and undertakes some **basic** interpretation to formulate a **basic** conclusion.  **Attempts** to evaluate procedures or **suggest** an effect on data.  **Attempts** to evaluate the effectiveness of collaboration and its impact on results/outcomes. | Demonstrates **some basic** knowledge and **partial** understanding of science inquiry skills and scientific concepts.  Applies **some** science inquiry skills and scientific concepts in **familiar** contexts.  **Partially** explores and **recognises** aspects of the interaction between science and society.  Communicates basic scientific information, using **some** appropriate terms, conventions, **and/or** representations. |
| **E** | **Attempts** a **simple** deconstruction of a problem and a procedure for a scientific investigation using a scientific method and/or engineering design process.  **Attempts** to use **some** procedures and record and represent some data, with **limited** accuracy or effectiveness.  **Attempts** to **describe** results **and/or** interpret data to formulate a basic conclusion.  **Acknowledges** that procedures affect data.  **Acknowledges** the effectiveness of collaboration and its impact on results/outcomes. | Demonstrates **limited** recognition and **awareness** of science inquiry skills **and/or** scientific concepts.  **Attempts** to apply science inquiry skills **and/or** scientific concepts in **familiar** contexts.  **Attempts** to explore and identify **an aspect** of the interaction between science and society.  **Attempts** to communicate **information** about science. |