Stage 2 Scientific Studies: Assessment Type 2: Collaborative Inquiry

**Collaborative Inquiry (20%)**

***“Working together: water for the future”***

The purpose of this task is to collaborate with colleagues in solving the impending food crisis whilst reducing the effects of climate change.

**Introduction**

Water is life. Without it we die. This is why the discovery of water ice in Mars is so exciting – it hints at the possibility of Martian life either existing or having existed in the past. It was water that enabled Matt Damon to grow crops on the surface of Mars in ‘The Martian’.

Human survival is dependent on the water cycle. For a planet whose population is growing exponentially, our requirement for food will, at some point soon, outstrip the existing farmland and its capacity to produce it. If we add climate change to the equation, it gets even more complicated.

Another factor is the growing global appetite for meat and the ever-decreasing levels of fish in the ocean. If we are to feed the world and combat climate change at the same time, we need new solutions engineered to overcome these multi-faceted global problems. We must think global and act local. Water is central to all of this and innovative ways of managing the water cycle is what is required.

**Task and Assessment Conditions**

Work in groups of 2 or 3 to design and conduct a scientific investigation to work out a way of producing some kind of food efficiently using permaculture, aquaculture or a similar technique in a way that could be implemented in a low rainfall area. Where possible, this should use recycled materials.

Evidence for assessment is in the form of two individual submissions:

* Personal journal
* Evaluation (recorded presentation)

**Part 1 – Personal journal**

You are to maintain, then submit a journal where you record work and critical thinking individually. The journal will demonstrate:

1. initial thinking and ideas as you deconstruct the problem – a hypothesis or design brief
2. evidence of your contribution to the project and supporting documentation on the application of the group’s collaborative skills (this can include pictures and linked video/audio evidence by QR code)
3. representation(s) of the data collected by the group
4. analysis and interpretation of data
5. connections between results and relevant scientific concepts
6. an evaluation of the procedures and their effect on data
7. a conclusion with justification and the consideration of possible limitations

The personal journal may include, but is not limited to:

1. planning strategies
2. methods trialled
3. suggestions for improvements
4. ideas or questions investigated or posed
5. reflection on progress
6. pictorial record of experiments
7. analysis of data
8. future planning, and
9. peer review (rate-your-mates)

The personal journal is limited to 12 A4 pages, single-sided, with a minimum font size of 10. Students are encouraged to submit their personal journal in an electronic format.

**Part 2 – Evaluation (recorded presentation)**

Students individually evaluate the effectiveness of the group’s collaborative skills, in the form of a recorded presentation. It should be a maximum of 5 minutes per student if oral or the equivalent if multimodal and can include, for example, a recorded conversation with their teacher and/or other students, an oral or multimodal equivalent.

This evaluation should include:

1. a statement about the inquiry, that includes:
   * the title
   * the problem, need or opportunity that your group was addressing (maximum of **1 minute**).
2. an evaluation of the effectiveness of collaboration and its impact on results/outcomes (maximum of **4 minutes**).

**Assessment Design Criteria**

Your journal and pitch will be assessed against the following Performance Standards

* Investigation, Analysis, and Evaluation: IAE 1, 2, 3, 4, 5
* Knowledge and Application: KA 2

**Submitting your evidence**

Use the following naming protocol when submitting your evidence:

*SACE registration number-2STU20-AT2-collaborative inquiry journal*

*SACE registration number-2STU20-AT2-collaborative inquiry evaluation*

**Considerations**

* Collaboration and communication are key aspects of science investigations. The crucial part of this task is to rely on collaboration and communication to achieve together what would be impractical to achieve individually.
* You are encouraged to use teamwork and imagination to dream up and construct a viable and functional solution in the time you have allocated. You should experiment with prototypes, building and testing out your ideas; this is a key part of the Engineering Design Process. When something does not work, analyse why and improve on your design.
* Communication is also important in your evaluation (recorded presentation) sharing what happened during the investigation. You will need to be able to explain how the contributions of all team members impacted the outcome of the investigation.

**Performance Standards for Stage 2 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. | |