**Stage 1 Scientific Studies: Collaborative Inquiry**

**Solar Dehydrator**

In many countries the preservation of food is a challenge. Sometimes food is preserved by drying it out in the open. This leads to the possibility of contamination and food poisoning.

In this task, you will work in a small group and based on the engineering design process, design and construct a safe, solar food dehydrator using recycled materials.

**Part A**

As a *group*, you will need to:

* deconstruct the problem to determine possible factors that are likely to affect the problem
* determine criteria for success
* research what others have done
* investigate the recycle materials that are available and consider their suitability
* create a range of possible designs
* consider the advantages and disadvantages of the designs
* select one design and construct a prototype
* test the prototype and compare results with the criteria for success
* continue to modify, test, and evaluate the prototype until the final product is completed.

*Individually*, you will need to maintain a personal journal in which you record:

* the deconstruction of the problem, the initial thinking and ideas
* evidence of your contribution to the project with supporting documentation including the application of your collaborative skills (this may include, for example, minutes of group meetings)
* representation(s) of the data collected by the group
* preliminary analysis and interpretation of the results/outcome
* connections between results and scientific concepts.

The journal can be no more than eight A4 pages if written or the equivalent in multimodal form.

Pages should be single-sided A4 with minimum font size 10. Page reduction, such as two A4 pages reduced to fit on one A4 page is not acceptable.

**Part B**

Your *group* will collaborate to undertake the testing of your hypothesis or proposed solution.

**Part C**

You will *individually* evaluate the collaborative inquiry.

This evaluation should include:

* a summary of the design and hypothesis
* an evaluation of the procedures and results/outcome
* an evaluation of the effectiveness of collaboration and its impact on results/outcomes
* a conclusion with justification and the consideration of possible limitations.

When thinking about the effectiveness of the collaboration within your group, you may wish to consider:

* what went well because of collaboration (with reasons)?
* what aspect of the collaboration would you change (and why)?
* what problem the group needed to solve and how the group went about solving the problem?

You may choose to:

* record the evaluation
* prepare a multimodal presentation

This should be a maximum of 3 minutes if oral or the equivalent if multimodal.

The pitch, defence, or justification should be a maximum of 3 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.

**Assessment conditions**

If you are submitting your evidence electronically, use the following naming protocol:

*SACE registration number-2STU20-AT1-collaborative inquiry journal*

*SACE registration number-2STU20-AT1-collaborative inquiry evaluation*

**Assessment Design Criteria**

Your report will be assessed against the following Performance Standards

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

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. |