**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

| - | Investigation, Analysis, and Evaluation | Knowledge and Application |
| --- | --- | --- |
| A | Critically deconstructs a problem and designs a logical and coherent scientific investigation with detailed justification.  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 scientific 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 with reasonable justification.  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 scientific 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 with some justification.  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 scientific 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.  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.  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. |

Performance Standards for Stage 1 Scientific Studies