**2023**

**Year 12 Earth and Environmental Science – Unit 4**

**Task 12: Solar Oven Experiment**

**Assessment Type: Science Inquiry**

**Weighting: 8%**

**Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**Due Date: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

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| **Total Mark** |  |

*Please see SEQTA for teacher feedback and comments.*

**Task:**

Design and build a solar oven to investigate the effectiveness of solar energy as a method of cooking with a renewable resource.

Part A: Research and Development

1. How do solar ovens work?

Research how a solar oven works to collect, concentrate and trap solar energy. You will need to describe the important elements of a solar oven which help it achieve this goal.

2. Design and Built a solar oven.

Design a solar oven which utilises as many of these elements as possible given the materials provided. Each student will need to submit this design along with the justification of your design choices.

Part B: Plan and Conduct experiment

Use your knowledge of the Scientific Method to design an experiment which investigates the effectiveness of your solar oven.

You will need to identify your

• Aim and hypothesis

• Independent, dependent, and controlled variables

• Suitable control/experimental group and experimental layout

Part C: Scientific Report

Complete a Scientific Report which combines the research and experimental findings.

• Introduction: Background information and outline the reasons for your investigation. Finish with the aim and hypothesis of your experiment.

• Materials – List and quantity of materials used to conduct experiment.

• Method – this is a step by step instruction of how to setup apparatus and make your measurements, must be written in 3rd person – you do not have to include how you built your model (you can simply refer to the diagram section in your method)

• Results – Present all of your observations and measurements in full written sentences as well as tables and graphs where appropriate.

• Discussion – Discuss your results with reference to your hypothesis and background research. Attempt to identify and explain any of the trends your results may (or may not) show. Explain any problems that arose as well as any potential improvements that could be made

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| **Part A: Research** | **4** | **3** | **2** | **1** |
| How do solar ovens function? | Clearly outlines the important elements and functions of a solar oven. Namely to collect, concentrate, and trap solar energy. Explains how these functions are achieved through the use of specific design elements and materials. | | Briefly outlines the elements and function of a solar oven. General explanation of how these functions are achieved through design elements and materials. | |
| Design and build a solar oven | Includes clear but detailed diagram of your solar oven design. Includes measurements and lengths and should be drawn to scale. Design includes annotations of materials used as well as explanation of purpose of specific elements.  Final oven construction resembles original design. Any major deviations from the design have been addressed. | | Includes detailed diagram of your solar oven design. Drawing does not include measurements lengths, nor drawn to scale. Design only includes some annotations of materials used, explanation of purpose of specific elements.  Final oven construction barely resembles original design. Major deviations from the design have been not been addressed. | |
| **Part B and C: Practical Investigation** | **4** | **3** | **2** | **1** |
| Includes method | Includes clear and complete method used for in-class practical experiment to measure effectiveness of solar ovens | | Method included is either unclear or incomplete. | |
| Includes experimental diagrams | Includes clear, correctly labelled diagram of experimental layout. | | Diagram is included but unclear or unlabelled. | |
| Includes results | The results are explained in text in clear and concise language. There is an appropriate graph included to illustrate the data collected. | | Results are only briefly explained in text. Graph is missing or incomplete. | |
| Includes discussion | Trends in the data are identified and explained with reference to design goals and background research. | | Trends in the data are briefly explained. There is no connection made to the oven design or background research. | |