# Table of Specifications for Solar Cooking Unit

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<tr>
<th>Objectives</th>
<th>Know</th>
<th>Com</th>
<th>Appl</th>
<th>Anal</th>
<th>Syn</th>
<th>Eval</th>
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<td>1: Given a lab sheet outlining the scientific method, a flashlight, pencil, ruler, clay, and flat surface, working initially in small groups conducting the experiment as demonstrated by the teacher and with prior knowledge of the components of the scientific method, the student will use the question &quot;how does the shadow of a gnomon change as the light shining on it changes angles?&quot; to form the basis of his/her hypothesis, and will correctly complete each step of the scientific method to document findings on the individual lab sheets to demonstrate 100% mastery of the essential steps of the scientific method.</td>
<td>A.3</td>
<td>A2</td>
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<td>D1</td>
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| 2: Given a lab sheet outlining the scientific method, two identically sized empty soup cans (one covered in white paper, the other covered in black), thermometers and pencils, with prior knowledge of the components of the scientific method and working in pairs the students will place the cans in direct sunlight and monitor, compare and record the temperatures in the containers every two minutes for ten minutes, the students will use the question "Does color affect heat energy absorption?" to form the inquiry for his/her individual hypothesis, and will correctly analyze their findings by completing each step of the scientific method to record the findings on the individual lab sheet to demonstrate 100% mastery of the essential steps of the scientific method. | A3 | A2 | A4 | D1 | A1 |

| 3: Given a solar cooker, 1 liter of water in a black pot, thermometer, and a lab sheet outlining the scientific method, with prior knowledge of pasteurization temperature levels and prior knowledge of the components of the scientific method, working in groups of four, the students will place the water in the solar ovens in direct sunlight for two hours before measuring temperature readings, the students will use the question "can solar cookers pasteurize water?" to form the inquiry for his/her hypothesis, and will correctly complete each step of the scientific process to record the findings and verify conclusions on the individual lab sheet to demonstrate 100% mastery of the essential steps of the scientific process. | A3 | A2 | A4 | D1 | B1 |
| | G1 | | | D1 | B1 |
| | | | | C2 | E1 |
| | | | | C3 | E2 |
4: Given a lab sheet outlining the scientific method, a solar cooker, two pie tins, two bowls of equal amounts of salt water, two oven bags, and two hangers for constructing domes, after watching the teacher create a desalinization model and with further coaching when necessary, and with prior knowledge of the scientific process, the students will work in groups of four to construct two desalinization models, placing one in the solar cooker and one next to the solar cooker and measure the fresh water collected in the pie tins after 24 hours, the students will use the question "can solar cookers speed up the desalinization process" to form the inquiry for his/her hypothesis, and will correctly document the test results on the individual lab sheet to demonstrate mastery of the essential steps of the scientific process.

5: Given two solar box cookers without heat traps, an oven roasting bag, a sheet of polypropylene, two oven thermometers, and a lab sheet outlining the scientific method, with prior knowledge of the scientific method and working in groups of four after watching the teacher demonstrate heat trap construction, the students will use the two materials to form two different heat traps and compare and record their oven temperatures every fifteen minutes for an hour using the question "which material, oven bag or polypropylene, forms a better heat trap?" to form the inquiry for his/her hypothesis, and will correctly complete each step of the scientific process to record the results on the individual
lab sheet to demonstrate 100% mastery of the essential steps of the scientific process.

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6: Given two box cookers without insulation, torn newspaper, two oven thermometers, and a lab sheet outlining the scientific method, with prior knowledge of the components of the scientific method and working in groups of four, the students will fill in the insulation cavity of one cooker with torn newspaper and leave the other one empty, place them in the sun for an hour and record the temperatures every fifteen minutes, using the question "does air or newspaper make a better insulator?" to form the inquiry for his/her hypothesis, and will correctly complete each step of the scientific process to critique the results on the individual lab sheet to demonstrate 100% mastery of the essential steps of the scientific method.

### Sunshine State Standards

A. *Benchmark SC.H.1.2.2.* The student knows that a successful method to explore the natural world is to observe and record, and then analyze and communicate results.

1. Plans and investigates experiments in which hypotheses are formulated based on cause and effect relationships: distinctions are made among observations, conclusions/inferences and predictions; a limited number of variables are controlled, and numerical data that are contradictory or unusual in experimental results are recognized.
2. Uses standard tools to measure, record, and interpret data
3. Understands that scientist use different kinds of investigations depending on the questions they are trying to answer.
4. Understands the importance of accuracy in conducting measurements and uses estimation when exact measurements are not possible.

B. **Benchmark SC.H.1.2.3**: The student knows that to work collaboratively, all team members should be free to reach, explain, and justify their own individual conclusions.

   1. Works collaboratively to collect, share, and record information for a scientific investigation.

C. **Benchmark SC.H.1.2.4**: The student knows that to compare and contrast observations and results is an essential skill in science.

   1. knows that comparisons between experiments can be made when conditions are the same
   2. uses strategies to review, compare and contrast, and critique scientific investigations
   3. knows that an experiment must be repeated many times and yield consistent results before the results are accepted.

D. **Benchmark SC.H.1.2.5**: The student knows that a model of something is different from the real thing, but can be used to learn something about the real thing.

   1. uses sketches and diagrams to propose scientific solutions to problems
   2. constructs models to compare objects in science

E. **Benchmark SC.H.2.2.1** The student knows that natural events are often predictable and logical.

   1. makes a prediction for a new investigation using the data from previous investigation
   2. understands that change is constantly occurring and uses strategies to analyze different patterns of change

F. **Benchmark SC.H.3.2.1**: The student understands that people, alone or in groups, invent new tools to solve problems and do work that affects aspects of life outside of science.

   1. knows areas in which technology has improved human lives (for example: nutrition, sanitation, health care, etc)
   2. knows that new inventions often lead to other new inventions and ways of doing things

G. **Benchmark SC.h.3.2.3**: The student knows that before a group of people build something or try something new, they should determine how it may affect other people.

   1. understands how scientific discoveries have helped or hindered progress regarding human health and lifestyles.
   2. Uses criteria to understand and analyze the impact of scientific discoveries (for example, determines whether or not scientific claims are backed by sufficient evidence and logical arguments0.

H. **Benchmark SC.H.3.2.4**: The student knows that, through the use of science processes and knowledge, people can solve problems, make decisions, and form new ideas.
1. extends and refines knowledge of ways that, through the use of science processes and knowledge, people can solve problems, make decisions, and form new ideas.