



Unit: Cooking with the Sun and Solar Ovens

Lesson #12: Individual Independent Projects (Culminating Lesson)

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DESCRIPTION: The purpose of this lesson is to allow students to choose an area of interest regarding solar power and research it further in a manner of their choice. Students will produce a final product to display or share at the “Salute to the Sun” culminating event at the end of the school year.

GRADE LEVEL(S): 3-8

SUBJECT AREA(S): Individual projects, student research, solar energy, sun

ACTIVITY LENGTH: 2-3 weeks, mostly out of the classroom

LEARNING GOAL(S): Students will plan, gather research materials and create a project of their choice. In doing so student will learn proper research methods (i.e., reliable sources) and how to categorize and translate information. In addition students will become comfortable and familiar presenting information to others. Lastly, students will also learn how to create a rubric for self evaluation.

STANDARDS MET:

Common Core:

- W.3.7. Conduct short research projects that build knowledge about a topic. (3-PS2-1), (3-PS2-2)
- W.3.8. Recall information from experiences or gather information from print and digital sources; take brief notes on sources and sort evidence into provided categories. (3-PS2-1), (3-PS2-2)
- 4.R.1.7 Interpret information presented visually, orally or quantitatively and explain how the information contributes to an understanding of the text in which it appears.
- W.4.7. Conduct short research projects that build knowledge through investigation of different aspects of a topic.
- W.4.8. Recall relevant information from experiences or gather relevant information from print and digital sources; take notes and categorize information, and provide a list of sources.

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- W.5.7. Conduct short research projects that use several sources to build knowledge through investigation of different aspects of a topic.
- W.5.8. Recall relevant information from experiences or gather relevant information from print and digital sources; summarize or paraphrase information in notes and finished work, and provide a list of sources.
- W.5.9. Draw evidence from literary or informational texts to support analysis, reflection, and research.
- RRI.5.9. Integrate information from several texts on the same topic in order to write or speak about the subject knowledgeably.
- RST.6-8.1. Cite specific textual evidence to support analysis of science and technical texts, attending to the precise details of explanations or descriptions
- RST.6-8.7. Integrate quantitative or technical information expressed in words in a text with a version of that information expressed visually (e.g., in a flowchart, diagram, model, graph or table).
- RST.6-8.8
- WHST.6-8.7. Conduct short research projects to answer a question (including a self-generated question), drawing on several sources and generating additional related, focused questions that allow for multiple avenues of exploration.
- WHST.6-8.8. Gather relevant information from multiple print and digital sources; assess the credibility of each source; and quote or paraphrase the data and conclusions of others while avoiding plagiarism and providing basic bibliographic information for sources.
- SL.8.5. Integrate multimedia and visual displays into presentations to clarify information, strengthen claims and evidence, and add interest.

Next Generation Science Standards:

- 4-ESS3-1. Obtain and combine information to describe that energy and fuels are derived from natural resources and their uses affect the environment.
- 5-ESS3-1. Obtain and combine information about ways individual communities use science ideas to protect the Earth’s resources and environment.

Student Background:

This is a culminating activity in a solar cooking unit. Thus, students should already have a strong background in solar energy topics, encompassing both the science of solar cooking and the potential benefits of solar cooking in the developing world. See the unit “Solar Cooking” for more details.

Other Materials:

- Student handout #1, “Example Rubric”
- Student handout #2, “Solar Power Research Ideas”
- Student handout #3, “Project Learning Contract”

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Lesson Details:

Activity:

- Explain to students that they will be planning and implementing their own individual projects. Tell them how long they will have to work on them, what the expectations will be and the evaluation process (i.e., that they will develop their own evaluation tool).
- Provide each student with
 - “Solar Power Research Ideas”
 - “Project Learning Contract”
 - “Example Rubric”
- Once each student has received all three handouts, review them as a class. Be sure to remind students they are encouraged to brainstorm their own research project ideas.
- Review the “Project Learning Contract” pointing out that both the student and their parent must sign the document.
- Discuss with the class what a rubric is and review the “Example Rubric” making sure that they understand the language/vocabulary and how the rubric is used. Ask students to find how each level (Expert, Proficient, Apprentice, and Novice) differ from one another. Brainstorm other parts of the research project that they might want to evaluate.

Evaluation:

Students will help in the writing of an individual rubric to evaluate their particular project. Writing rubrics is challenging. It is valuable to engage students in this kind of higher-level thinking while encouraging ownership of their research projects. A suggestion would be to start with a generic rubric template (“Example Rubric”), explain what a rubric is and how it’s used, and then help students fill it in further to reflect the work they do on their chosen project.

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