

**STEM Lesson Plan  
Second Grade**

<b>Grade:</b>	2
<b>Title:</b>	Solar Powered Oven
<b>Duration:</b>	55 minutes
<b>Grade Level Standards:</b>	<p>PS1.A: Structure and Properties of Matter Different kinds of matter exist and many of them can be either solid or liquid, depending on temperature. Matter can be described and classified by its observable properties. (2-PS1-1) Different properties are suited to different purposes. (2- PS1-2),(2-PS1-3) A great variety of objects can be built up from a small set of pieces. (2-PS1-3)</p> <p>PS1.B: Chemical Reactions Heating or cooling a substance may cause changes that can be observed. Sometimes these changes are reversible, and sometimes they are not. (2-PS1-4)</p> <p>ET S1.A: Defining and Delimiting Engineering Problems A situation that people want to change or create can be approached as a problem to be solved through engineering. (K-2- ETS1-1) Asking questions, making observations, and gathering information are helpful in thinking about problems. (K-2-ETS1-1) Before beginning to design a solution, it is important to clearly understand the problem. (K-2-ETS1-1) ET S1.B: Developing Possible Solutions Designs can be conveyed through sketches, drawings, or physical models. These representations are useful in communicating ideas for a problem's solutions to other people. (K-2-ETS1-2) ET S1.C: Optimizing the Design Solution Because there is always more than one</p>

	<p>possible solution to a problem, it is useful to compare and test designs. (K-2-ETS1-3)</p>
<p><b>About the Project:</b></p> 	<p>Students will build their very own simple, solar oven out of a pizza box. Using the heat of the sun to cook a tasty treat. Making use of solar power to directly cook food. This is a low cost, ecologically friendly technology.</p>
<p><b>The Challenge:</b></p>	<p>To cook smores, using only the materials available to them. (Listed ) Finding an economical way to cook food. The students will have to research solar power and consider the most effective way to design and create a solar-powered oven.</p>
<p><b>Science:</b></p>	<ul style="list-style-type: none"> <li>→ What is solar power?</li> <li>→ How does solar power work?</li> <li>→ How can the energy of the sun be harvested to generate free electricity?</li> <li>→ Why have I been given these materials to use?</li> </ul>
<p><b>Maths:</b></p>	<ul style="list-style-type: none"> <li>★ Does the size of the oven have an effect on the amount of heat generated?</li> <li>★ What shape oven would be best suited for a solar-powered oven?</li> </ul>

<b>Engineering:</b>	Design a prototype of the oven to be presented. Using the design process.
<b>Technology:</b>	Design an advert for the product using CANVA or similar.
<b>21st Century Skills</b>	<ul style="list-style-type: none"> <li>● Critical thinking</li> <li>● Communication</li> <li>● Collaboration</li> <li>● Creativity</li> </ul>
<b>Differentiation:</b>	Support material for lower ability children will be provided.

### **The Lesson: Solar Power**

#### **Materials:**

- ❖ Different sized pizza boxes
- ❖ Pencil
- ❖ Ruler
- ❖ White glue
- ❖ A sheet of black paper
- ❖ Utility knife (for Adult use)
- ❖ Aluminum foil
- ❖ Plastic Wrap
- ❖ Black electrical tape
- ❖ Wooden skewer

#### **Introduction:**

Children will watch a video about solar power. *What is Solar Power* ([What is Solar Power](#))

Children will be presented with the Challenge.

#### ***To Cook a Tasty Treat Using Solar Power***

They will be working in groups (ability groups, see notes on differentiation)

1. At first they will be discussing and defining the problem. Students will ask themselves what the challenge is and what constraints they have. Teacher to lead a short discussion so that students can define the challenge together.
2. They will be shown the materials they have available for them to use.
3. The next stage of the lesson is brainstorming their ideas. Considering all options. This will be done collaboratively. As a group they select the most promising solution.
4. They will design their prototype, either using an app or drawing the idea, then making it. They will imagine what the oven looks like by looking over books on Epic or Kiddle.
5. Students will use pencil and paper to 'plan' a sketch of their solar oven, labeling each part to show where the materials will be used.
6. The prototype will be put to the test.
7. Discussions will follow on how the prototype could be improved.
8. Finally, they will communicate their solution, in the form of a presentation to the class.
9. The final step is to design a promotional advertisement for their solar oven.