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| **Lesson Plan Template** | |
| **Teacher:** | Stansberry |
| **Grade/Subject:** | 3rd Grade |
| **Course Unit:** | Solar Energy |
| **Lesson Title:** | Cooking with a Solar Oven |

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| **LESSON OVERVIEW** | Summary of the task, challenge, investigation, career-related scenario, problem, or community link |
| Students will have a scenario to build a solar oven to cook a S’more. The teacher and students will discuss renewable versus non-renewable resources and the importance of solar energy. We use solar panels on houses now to help with the electricity to certain houses. The teacher will give the students the challenge of building a solar oven to be able to cook a S’more. The student teams will create a solar oven with the materials given and a budget to “build” the oven. As the students finish, they will cook their S’mores and watch how the temperature rises with the temperature probe. They will also see how their chocolate and marshmallow have melted. | |

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| **STANDARDS** | Identify what you want to teach. Reference State, Common Core, ACT College Readiness Standards and/or State Competencies. |
| GLE 0307.T/E.2 Recognize that new tools, technology, and inventions are always being developed.  GLE 0307.T/E.5 Apply a creative design strategy to solve a particular problem generated by societal needs and wants.  GLE 0307.10.2 Design and conduct an experiment to investigate the ability of different materials to conduct heat. | |

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| **OBJECTIVE** | Clear, Specific, and Measurable – NOT ACTIVITIES  Student-friendly |
| Students learn about solar energy and build a solar oven that can cook a S’more. | |

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| **INTRODUCTION** | Should Include: Any prior knowledge that the students need to complete the lesson, approximately how long the lesson is predicted to take (Ex. 1 Day or 2 Days), and a short summary of the entire lesson plan. |
| The students will first be learning about what renewable and non-renewable resources consist of. The class will discuss the importance of why we need to find renewable resources for electricity. Teacher and students will discuss how a solar oven work with using materials for insulation and conduction. After the introduction, the class will be 3 45-minute classes. | |

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| **MATERIALS LIST** | A bullet list of materials.  The materials need to be specific and include quantities |
| * Boxes (pizza boxes or shoe boxes) * Temperature probe * Black construction paper * Newspaper * Fabric * Clear plastic wrap * Aluminum foil * Scissors * Tape * Rulers * Heat lamps if not able to use the sun for project and have to work only in the classroom. | |

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| **RESOURCES** | Should Include: A bullet list of any links to videos, names of worksheets, names of projects, names of PowerPoints, links to online articles, links to interactive websites, names of reading materials, etc (All worksheets, PowerPoints, projects, and reading materials should be attached to the back of the lesson plan).  Specify whether they will be used before, during, or after the lesson. |
| <https://www.youtube.com/watch?v=wMOpMka6PJI>  This video can be used before to discuss renewable/non-renewable resources. | |

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| **ACTIVATING STRATEGY** | Motivator / Hook  An Essential Question encourages students to put forth more effort when faced with complex, open-ended, challenging, meaningful and authentic questions. |
| Can you cook a S’More using only the sun? | |

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| **INSTRUCTION** | Step-By-Step Procedures – Sequence  Discover / Explain – Direct Instruction  Modeling Expectations – “I Do”  Questioning / Encourages Higher Order Thinking  Grouping Strategies  Differentiated Instructional Strategies to Provide Intervention & Extension |
| The teacher will discuss with the students about why we need to use the sun for solar energy. The teacher will briefly review the items previously learned about renewable and non-renewable sources and the conductor/insulators. The students will be assigned their small groups and the teacher will discuss the scenario and design challenge. The teacher will pass out the rubric and discuss how the points will be earned. The teacher will pass out the solar oven STEM challenge page to each group and discuss what is expected. The students will discuss the available materials they wish to use for their oven and then draw a sketch of their design (with labels). The teacher will walk around and answer any questions that may arise and look over the design. Once the design has been finalized, teams are allowed to go the to supply store and “purchase” the items they will need. The teams are to keep an accurate record of the money the have spent. The teams then work on creating their design, testing it and revising as needed. They need to record any changes they make on their journal. Once the team is satisfied with their design, it’s evaluation time. They will bring their solar oven outside and set it up in an area that will remain undisturbed. The teacher will put the thermometer probe into the oven to record the temperature. The team will watch if the temperature rises and whether the chocolate melts. The team will have a computer recording of their “cooking” that they will analyze with each other as to if the oven worked. Upon completion of the cooking, the students can enjoy eating their S’more. The team will then return to their table and complete the evaluate portion. | |

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| **GUIDED & INDEPENDENT PRACTICE** | “We Do” – “ You Do”  Encourage Higher Order Thinking & Problem Solving  Relevance  Differentiated Strategies for Practice to Provide Intervention & Extension |
| Once the teacher has given the instructions of what is to be done, the student teams work together with support from the teacher only. The teams are to problem solve any problems they occur together without the teacher. The teacher is only there to facilitate the student learning and guide the teams. | |

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| **CLOSURE** | Reflection / Wrap-Up  Summarizing, Reminding, Reflecting, Restating, Connecting |
| The teams show and discuss with the class how their oven worked and why/why not it cooked their S’more. The class with summarize what they learned about solar energy and how it can be used in the future. | |

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| **ASSESSMENT /**  **EVALUATION** | Students show evidence of proficiency through a variety of assessments. Aligned with the Lesson Objective  Formative / Summative  Performance-Based / Rubric  Formal / Informal |
| The teacher will use the rubric discussed as the teams work and write comments as the teacher walks around. The teams will show evidence of what they learned in their design and the discussion of what went right or wrong with the cooking process. | |

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| **CITATIONS** | Any websites that were used to gather information. |
| web.stanford.edu/group/sciencebus/**Lessons**/.../**Solar**%20**Oven**.doc  Used this site then made changes need for my classroom. | |

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| **NOTES:** | Purchasing information for non-typical items  Tips & Tricks that may help |
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