PURPLE PLOW
Uncovering STEM Solutions

PUZZLERS #36 Solar Oven

1 HOUR

PUZZLE: CREATE A SOLAR OVEN

STANDARDS & CONNECTIONS: NGSS.3-5-ETSI, NGSS.MS-ETSI, NGSS.HS-PS3-3

SUGGESTED MATERIALS: Pizza box (or similar item), aluminum foil, glue, scissors, black paper, plastic wrap, food for cooking (s'more supplies, tortillas, etc)

BACKGROUND: From campfires to microwaves and modern-day ovens, we have learned there are multiple methods to preparing a hot meal, including using solar energy. Solar energy is the light and heat emitted from the sun.[i] It is the most abundant energy resource on earth. That energy can be used to power farms, cars, and even cook food! Solar ovens work by absorbing direct energy from the sun and reflected sunlight from the oven.[ii]

1. IDENTIFY: Share the background information with the students, then share the puzzle to be solved. Determine constraints (e.g., time alotted, space, materials provided, etc.) and divide students into small groups.

2. IMAGINE: Ask a series of questions to help students brainstorm solutions to the puzzle. Encourage students to list all ideas – don't hold back! Before moving on, make sure each group selects a solution that fits within the contraints.

- Ask: *How can you can solve this puzzle? Which of your ideas can you build a prototype for given the constraints?*

3. DESIGN: Students diagram the prototype, identify the materials needed to build the prototype, and write out the steps to take. Students describe the expected outcomes.

- Ask: *What steps will you take to create your solution? What do you expect your solution to look like and be able to do?*

4. CREATE: Students follow their design plan and build their prototypes. Monitor their progress and remind them about how much time they have.

5. TEST & IMPROVE: Students evaluate their creation and compare it with the expected outcomes. Students seek areas of improvement and make changes where needed.

6. SHARE: Students share their solution to the puzzle and communicate lessons learned.

- Ask: *What was your biggest takeaway? What would you do differently?*

ADDITIONAL RESOURCES: For more background information on this topic, please visit www.purpleplow.org.

Have a cookout! Keep your solar ovens and have students bring food from home to cook in class. Caution: Please supervise as solar ovens can get very hot. Do not cook raw meat with solar ovens.

[i] Science Buddies. (2014, July 31). Sunny science: Build a pizza box solar oven. *Scientific American.* Retrieved from: https://www.scientificamerican.com/article/sunny-science-build-a-pizza-box-solar-oven/

[ii] U.S. Department of Energy. (2016, June 6). *Top 6 things you didn't know about solar energy.* Retrieved from: https://www.energy.gov/articles/