Materials:
S'mores kit
Cardboard box (use part of your camp box)
Pencil, scissors, tape, oven mitt, aluminum foil dish, thermometer that goes to 250 F (not included)
Aluminum Foil & Plastic Wrap
Newspaper or recycled paper (not included)
Black paper
Ruler (use from Math Tessellations)
Wooden skewer (2)

Date: Thursday, July 9, 2020
Time: 1:00 p.m. (30-60 mins)

Activity Agenda

BPI: Engineering

S'mores Cooking in a Solar Oven

I. **Welcome**

Be sure to have your materials ready before the video session starts and always ask an adult for help and permission.

II. **Activity Overview**

- **Heat, such as that from the sun, is a form of energy. When more energy or heat goes into a box than can come out, the box gets hotter. This is how a solar oven works to cook food. It captures the suns energy/heat and traps it resulting in the box to heat up and cook the food. In this experiment you will create your own solar oven and cook s'mores.**
- **The s'mores portion will be done during our virtual campfire! So, don't eat those yummy s'mores yet!**

III. **Patch/Badge name and requirements**

- **BPI: Valero Energy Foundation – STEM**
  - **To earn this patch, you must complete all 4 activities presented in the virtual session this week**

IV. **Grade Levels – K-12 (D, B, J, C, S, A)**

V. **Activity link**

- https://www.girlscouts-swtx.org/content/dam/girlscouts-girlscouts-swtx/2020-documents/council-patch-programs/valero/2019-20%20VALERO%20Booklet%20Cadette.pdf – page 22

VI. **Activity**

- **Draw a square box on the top of your box at least 1” from the edges and big enough to fit your aluminum foil dish or pie plate.**
- **Use your box cutter to cut along three sides of the box you drew. Be careful to always cut away from you and to watch where your fingers are positioned.**
- **On the uncut side, make a crease so that the new box can be opened like a door.**
- **Cut a piece of aluminum foil and cover the inner side of the box door that was cut in step 2.**
- **Cover the inside bottom of the box with black paper.**
- **Cut two pieces of plastic wrap a little bit bigger than the box door. These will be used to cover the door to make it airtight.**
- **Roll up some newspaper and place around the sides for insulation. Try to fill as much of the open unused space with newspaper as possible. The more insulation will result in less heat loss. Remember to save room for your aluminum dish and food.**
- **We will make our s’more during Friday’s Virtual Campfire!!**

VII. **Clean Up**

A Girl Scout always leaves a place cleaner than she found it.

VIII. **Closing**

Be sure to tune into our next activity – Dino Paleo Art at 3:00 p.m.

See you soon, Girl Scout!

Additional Information

What is happening? The heat from the sun is trapped inside of your cardboard box solar oven, and it starts getting very hot. Ovens like this one are called collector boxes, because they collect the sunlight inside. As it sits out in the sun, your oven eventually heats up enough to melt cheese, or cook a hot dog! How does it happen? Rays of light are coming to the earth at an angle. The foil reflects the ray and bounces it directly into the opening of the box. Once it has gone through the plastic wrap, it heats up the air that is trapped inside. The black paper absorbs the heat at the bottom of the oven, and the newspaper make sure that the heat stays where it is, instead of escaping out the sides of the oven.

By lining your oven with black construction paper, you can preheat the oven for other recipes such as garlic toast or hotdogs. You can even try recipes like baked potatoes, rice and vegetables and more.