## **Can we cook while on the Moon?**

While astronauts might have to bring just about everything with them when we establish a habitat on the Moon, one thing they won't need is solar energy. There may be no atmosphere, no climate nor weather on the Moon, but that all means it DOES make it an ideal place to collect solar energy. Much of the Moon is exposed to sunlight constantly, except briefly during a rare lunar eclipse. If that energy could be harnessed, it could power almost everything in the lunar habitat...including that most important device that helps prepare delicious food – an oven!



## THE CHALLENGE:

Your mission is to design and build a solar oven to cook your own S'mores with the materials provided. Your design constraints are:

- 1. The oven must have a "footprint" of no more than 40 cm x 40 cm.
- 2. In 10 minutes, the temperature inside the oven must increase by 10° C.

SAFETY NOTE: Contents of a solar oven can get very hot. Make sure you use oven mitts, other protective gear or tools (i.e. tongs) when manipulating anything inside of your oven!



To design and build a solar box cooker, and test it to see if it works well enough to make S'mores.

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What questions do you have about today's challenge?

Jocelyn built three different solar ovens with a cardboard box and a clear plastic lid. The clear lid allows sunlight to pass into the box, but will not let the heat out, just like a greenhouse! Jocelyn's three different designs were:

Box 1: a plain empty box

**Box 2:** a box with black construction paper placed on the floor of the box.

**Box 3:** a box with black construction paper on the floor and aluminum foil on the sides of the box.

Which of these three solar ovens do you think collected the most heat?

Do you think black construction paper affects how well a solar oven works?

What purpose do you think the aluminum foil might serve?



Draw and label your solar oven:





## **Experiment & Record**

- Using the materials provided, build your solar oven based on your design. Remember the goal is to capture heat in your oven to cook S'mores.
- 2. Place one S'more in the middle of the oven (1 graham cracker, 1 piece of chocolate, 1 marshmallow). Cover with plastic wrap and begin cooking.
- 3. Record the temperature every 30 seconds for ten and a half minutes. Record the temperature change in the table on the next page.



Time	Oven Temperature	Time	Oven Temperature
Min:sec	°C	Min:sec	°C
0:00		5:30	
0:30		6:00	
1:00		6:30	
1:30		7:00	
2:00		7:30	
2:30		8:00	
3:00		8:30	
3:30		9:00	
4:00		9:30	
4:30		10:00	
5:00		10:30	

## Solar Oven Data Table

Did your S'More melt? If not, discuss with your team how to improve your oven. Make those changes in your drawing and actual oven. Repeat the experiment.



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