



# EVERYONE CAN SOLAR COOK!

By: John Kell



WHO AM I

- Daisy Gibson School
  - Teacher, Coordinator, & Mentor
- MEEC
  - Believer and Supporter
- Solar Cook Off
  - 6th Year Participant

# WHY SOLAR COOKING?

- Two Reasons
  - Increased STEAM Integration
  - Increased Student Engagement



# BACKGROUND CHECK

- What is STEAM Education?

The basis of true STEAM education ties it to real world issues and authentic problems as well as incorporates 21st Century learning skills through hands-on activities.

- What does STEAM learning look like?

Student-Centered, problem-based projects that have deliverables in which students must justify their relevance to authentic audiences.

# STEAM INTEGRATION IN THE CLASSROOM

- Integrates all 5 areas of STEAM

Meets NGSS, Common Core, and ISTE Standards

- Incorporates 21st Century learning skills

Communication, Collaboration, Creative & Critical Thinking

- The 3 "C" of Success are built

Curiosity, Courage, and Confidence

# STUDENT ENGAGEMENT IN THE CLASSROOM

- Students learn of the issues that affect many poor, wood-fueled reliant, countries
- They are given a problem that is authentic and through collaboration design and construct innovated solutions they get to test for effectiveness and efficiency

# BACKGROUND

- Wood-Fuel demands and water purification are the two biggest issues in many, if not most, over-populated or poor countries.
- Cooking with solar power, especially along the equatorial countries reduces fuel demands so that people can cook in the relative safety of their homes/villages as well as enables them to provide a more pure water source for themselves
- This in turn helps prevent disease, malnutrition, and even human trafficking in these areas.

# PASTEURIZING WATER EXPERIMENT

- A great experiment to show the power of solar energy.
  - Place foil around a large bowl and a small dark cup in center. Fill bowl with dyed water. Cover with plastic wrap and place weights right above the cup.





# THE GREAT MEEEC SOLAR COOK-OFF :)

- Up to two teams grades 4 - 12
- Design and construct solar oven
- Design and cook up 3 recipes for 3 judges
- +20 teams Compete!



# THE LOGISTICS OF IT ALL

## Week 1

- Select Teams; go over what solar cooking is and why it's important; Review CARES and collect sketches of possible solar cookers; build a materials list and hand out permission slips



# THE LOGISTICS OF IT ALL

## Week 2

- Collect permission and media release forms;  
Review CARES (Make sure they understand how a solar cooker works); build your solar cooker



# THE LOGISTICS OF IT ALL

## Week 3

- Complete solar cooker and test inside temperature; Fill out Design forms; develop a menu



# THE LOGISTICS OF IT ALL

## Week 4

- Make adjustments, if any, to solar cooker, test cook first meal (sometimes it's good to stove cook the menu for taste before this); fill out recipe form; have students explain how the solar oven works



# THE LOGISTICS OF IT ALL

## Week 5

- Make final adjustments, if any, to the solar cooker; make sure you have all forms collected and ready to go; have your teams decorate their cookers to reflect who they are



# THE LOGISTICS OF IT ALL

## Week 6

- If possible, test cook one more time



# THE LOGISTICS OF IT ALL

Week 8

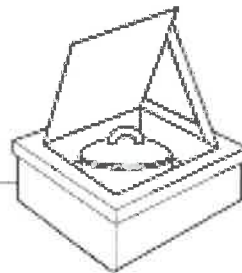
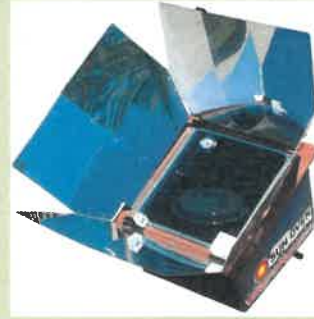
- Off to the Cook-Off



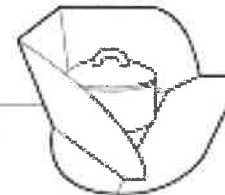


# BUILDING A SOLAR OVEN

There are several types of Ovens, such as the box, panel, and parabolic. All of these work well but the one I find works the best for this competition is a combination Panel Box Cooker.



Solar Oven



Panel Cooker



Parabolic  
Solar Cooker

# BUILDING A SOLAR OVEN

I use the **C.A.R.E.S.** Principle

**C** -> **C**ollect the Light

**A** -> **A**bsorb the Light

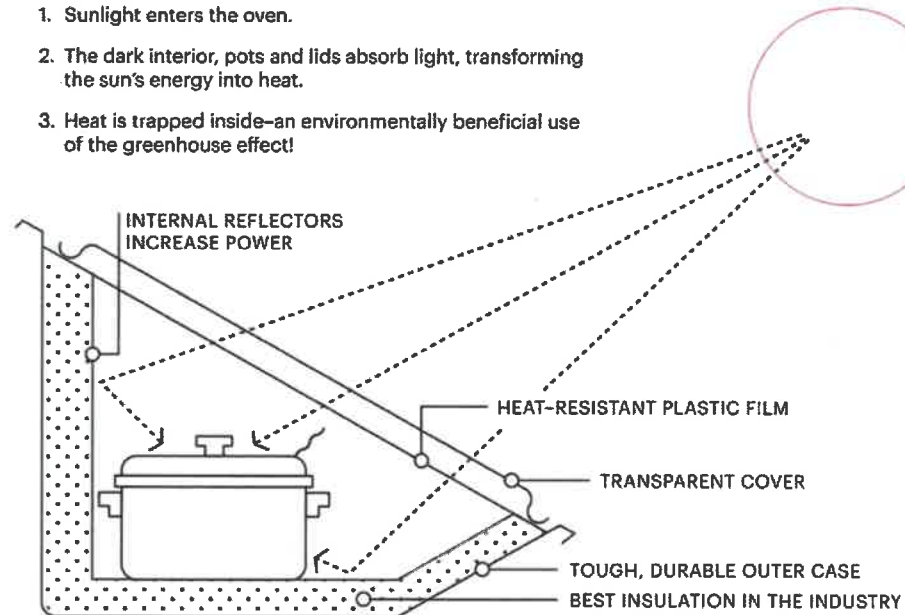
**R** -> **R**etain the Heat

**E** -> **E**ase and Efficiency

**S** -> **S**afety

## HOW THE SPORT WORKS:

1. Sunlight enters the oven.
2. The dark interior, pots and lids absorb light, transforming the sun's energy into heat.
3. Heat is trapped inside—an environmentally beneficial use of the greenhouse effect!



# BUILDING A SOLAR OVEN

You will need the following:

1. 1 medium/large packing box
2. Duct Insulation
3. Plastic/Acrylic Sheet
4. Aluminum Foil
5. Masking tape
6. Duct tape
7. Aluminum/Reflective tape
8. White Glue
9. Rulers
10. Utility Knife



# ON A BUDGET?

- Average cost for a solar cooker if everything is bought is about \$35.00-\$50.00
- Most things can be found or donated
- Should teams pay?



# BUILDING A SOLAR OVEN

Use masking tape to make your box

You can use duct tape right off the bat but masking tape is easier to remove and redo if a mistake has been made

Your kids will decide if they want to build their ovens lengthwise or widthwise



# BUILDING A SOLAR OVEN

Draw an angled line from the very top of your box down to approximately 6" - 8" from the bottom.

You might have to reinforce the edges of your box with more masking tape

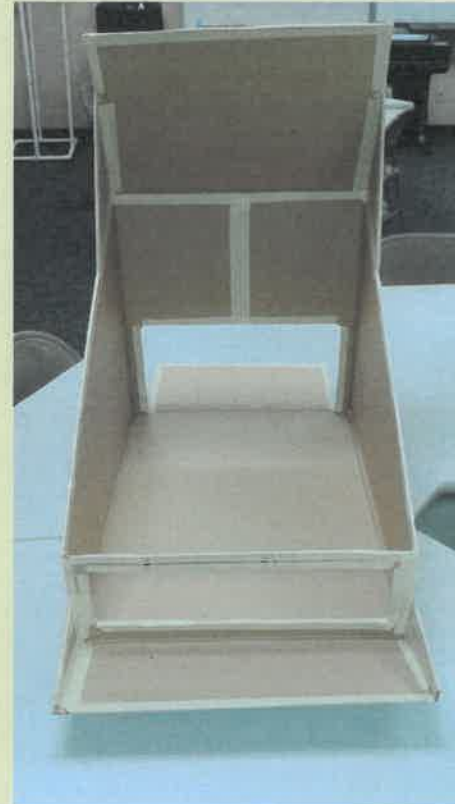


# BUILDING A SOLAR OVEN

Cut out a back door that will meet your team's needs as far as the type of cookware they will use.

Cut out a front opening, leaving approximately 1-2 inches around the sides

Attach two panels, one at the back front, the other at the front bottom...use spare cardboard to attach them at the sides for support



# BUILDING A SOLAR OVEN

Adjust panels until your team is comfortable with their design

Reinforce edges with masking tape





# BUILDING A SOLAR OVEN

Cover inside of cooker with reflective insulation (Aluminum will work too), using glue, aluminum or reflective tape on the edges, to secure it.

Measure and cut plastic/acrylic sheet to fit cooker, secure it with aluminum or reflective tape.

Cover panels outside of the cooker with aluminum foil



# BUILDING A SOLAR OVEN

We used plastic picture hangers and rubber bands to secure the back door

Have student decorate their ovens to match their team's personality



# RESOURCES

MEEC Transportation  
Grant

<https://docs.google.com/forms/d/e/1FAIpQLSeqBU9QIUaYx2YUbv5fEuTXON4IKotL8BmyAW0lgGrM7rgww/viewform>

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# QUESTIONS



# BUILDING A SOLAR OVEN