



## DESIGN & BUILD

# Solar Ovens



## Solar Energy

Solar energy is a renewable resource we get from the sun. It gives us light and heat. For thousands of years, people have understood the power of the sun. First Nations Australians see the sun as a life-giver and a guide. The ancient Greeks and Romans used mirrors to focus sunlight for heating and cooking. Today, we collect sunlight using solar panels to generate electricity. We can also use the sun's heat for things like heating water or cooking food. This is called solar thermal energy.

## The Challenge

Work in a group or solo to design and build your own solar oven. Research how the sun's heat can be captured and used to melt or warm different items. Next, design your oven, build it, test your design, then showcase it at your School's STEM Expo!

### 1. Research

#### How does a solar oven cook food?

A solar oven uses sunlight to heat things up. It collects sunlight, traps the heat, and keeps it warm inside, like a mini oven!

#### What materials help a solar oven work?

- Shiny things (like foil) reflect sunlight into the oven
- Dark colours soak up the heat
- Clear lids let light inside but keep heat from escaping
- Insulation (like cardboard or fabric) helps hold the heat inside

#### Key Ideas

- Absorption
- Reflection
- Insulation
- Greenhouse Effect

What do you already know about solar ovens? Is there something you're curious about or want to learn more about? It's time to do your own research! Talk with your teacher and use books, videos, or websites to find out how light and heat help a solar oven work. Explore the key ideas above.

### 2. Design

Based on your research, it's time to draw and label a diagram of your solar oven:

- |                                     |  |
|-------------------------------------|--|
| • <b>What shape will it be?</b>     | • <b>How will you trap the heat inside?</b>    |
| • <b>Where will sunlight enter?</b> | • <b>Identify the materials you will need.</b> |

You can use recycled items, cardboard boxes, black paper, black paint, foil, plastic wrap, and more. You don't need to follow one design. Make it your own!

### 3. Build

Build your oven using the materials you've planned. You might try:

- |   |                                     |
|---|-------------------------------------|
| • <b>A box (pizza box, shoebox, cereal box)</b> | • <b>Clear plastic to trap heat</b> |
| • <b>Black paper to soak up heat</b>            | • <b>Tape to seal it all in</b>     |
| • <b>Aluminium foil to reflect sunlight</b>     |                                     |

Be careful with sharp materials and ask for help if needed.



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### 4. Test

Take your oven outside into full sunlight and try melting 2–3 different items.

You might choose:

- **Chocolate pieces**
- **Marshmallows**
- **Cheese**
- **Crayons**
- **Ice cubes**
- **Butter**

Watch what happens and take notes! Try adjusting things like the angle of the lid or adding insulation to make your oven even better.

**Optional: Use a thermometer to track heat inside your oven**

### 5. Evaluate

Think about how your oven worked:

- **What melted first?**
- **Did your design help or slow things down?**
- **What would you change next time?**

### Extension

Want to take your project further? Here are some ideas to inspire you:

- Construct your oven from different materials and test it again.
- Try different foods.
- Build a new oven with a different shape. Does the shape affect how well it works?
- If you have a thermometer, place it inside your oven. What temperature does it reach?
- Design an experiment to test a question like “Does the colour inside the solar oven change how hot it gets?”

### 6. STEM Expo

It's time to communicate your findings at the STEM Expo! Can you come up with a creative way to present your process and discoveries through a report, poster, or even a video? You could:

- **Show your solar oven and explain how it works**
- **Display your design and a list of materials**
- **Share photos or results from your testing**
- **Have a live competition where different groups use their designs to see who can melt an ice cube first!**

### 7. Showcase @ [rezourceforce.com.au](https://rezourceforce.com.au)

Now you can share your project with the REZource Force Online Showcase. This is your chance to show your work to other schools, community members, and professionals working in the renewable energy industry.

**Selected entries will be eligible to win prizes for their school!**

To enter, use the QR code to fill out a short form and upload photos, videos, or documents that show what you created and what you discovered.

