

ILLUSTRATED STEPS / SAVE IT. FIND IT. BUILD IT.

SOLAR HEAT BOX

Build a small solar heat experiment and measure what it actually does.



START HERE

01

GET READY

Tools + clickable build map

02

FOLLOW THE STEPS

One clearly numbered stage at a time

03

FIND IT AGAIN

Quick reference + PDF bookmarks

Five construction-and-test steps, a temperature log, and a separate food-safety reference. Begin with no food. The video's hot-dinner promise is not a validated cooking schedule.

NUKE ON TIKTOK

MORE FREE BUILD GUIDES

SOURCES / NASA JPL: solar oven

BUILD MAP

NEXT

YOUR BUILD MAP

Tap a step to jump there. The printed page numbers work offline too.

HAVE THESE READY

- Adult helper; clean shallow cardboard box
- Aluminum foil, black paper and tape
- Clear plastic wrap for a short demonstration
- Two suitable thermometers and a clock
- Stable outdoor surface; notebook; heat-resistant gloves

READ IN ORDER

PREP	Reflect, absorb, retain	03
01	Prepare the box	04
02	Add reflector and absorber	05
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QUICK REFERENCE / PAGE 11

BEFORE YOU START

Build a nonfood heat experiment first. This craft box is not validated for cooking meat, preserving food or purifying water. Adults handle cutting and hot parts.

KEEP THIS COPY

Save the PDF with its guide ID. Use the build map, bookmarks, or your PDF reader's search to find a step later. Video and source links need internet; the instructions do not.

SETUP

Reflect, absorb, retain

READ BEFORE STEP 01

PREP

Three jobs help the box warm up in sunlight.



THE MECHANISM

- **Foil redirects light, a dark surface absorbs energy, and a clear cover reduces heat escaping with moving air.**
- Sunlight and weather affect the result.

THE DEMONSTRATION

- **Use black paper rather than painting cookware.**
- Use clear wrap for this short nonfood trial, not scavenged glass.
- Episode art shows a glass-lid variant; it is not a parts specification.

SOURCES / NASA JPL: solar oven · UMaine: solar box design

BUILD MAP

PREVIOUS

NEXT

STEP

Prepare the box

1 OF 5 / READ IN ORDER

01

Choose a clean, shallow box and an adult-supervised work area.

SOLAR HEAT BOX / SCHEMATIC



ADULT CUTS THREE SIDES

Solid lines: cut. Dashed line: leave hinged.
Keep the outer border intact.

DO THIS

- **Use a box with a lid, such as a clean pizza box.**
- An adult cuts three sides of a flap in the lid, leaving the fourth side as a hinge.
- Leave a sturdy border around the opening.

CHECK

- **Remove loose scraps.**
- The lid still closes; the flap hinges without tearing.
- Keep blades with the adult and choose a level outdoor site sheltered from wind.

SOURCES / UMaine: solar box design

BUILD MAP

PREVIOUS

NEXT

STEP

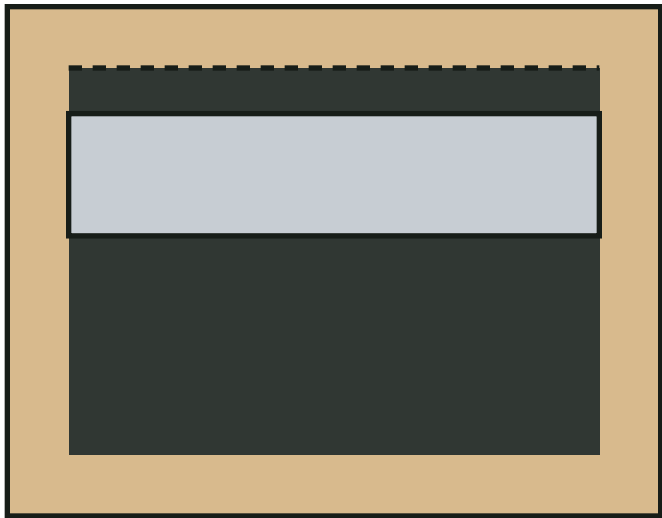
Add reflector and absorber

2 OF 5 / READ IN ORDER

02

Give sunlight a path to a dark surface.

SOLAR HEAT BOX / SCHEMATIC



FOIL FLAP + BLACK FLOOR

Foil on the flap underside. Black paper inside the box. This is a cutaway schematic.

DO THIS

- **Cover the underside of the lid flap with smooth foil and secure it.**
- Place black paper on the floor of the box.
- Keep tape and paper away from anything hot.

CHECK

- **The foil is secure, and the dark floor remains visible through the lid opening.**
- This empty, nonfood model needs no painted pot, cooking oil or improvised insulation near heat.

STEP

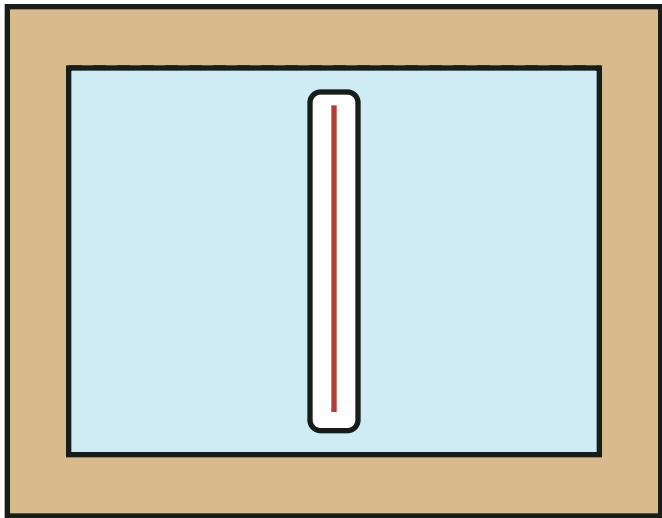
Make a clear window

3 OF 5 / READ IN ORDER

03

Keep outside air from freely sweeping through the box.

SOLAR HEAT BOX / SCHEMATIC



WRAP OVER THE OPENING

Tape the edges of clear wrap. Thermometer inside, visible. A second thermometer stays in nearby shade.

DO THIS

- **Tape clear plastic wrap across the cut opening in the lid.**
- Close the lid.
- Put a suitable thermometer inside, visible through the window; place a second in nearby shade to compare ambient temperature.

CHECK

- **Keep wrap away from the thermometer's hot surfaces.**
- Read its temperature range and instructions.
- Stop if materials soften, melt, smoke or smell unusual.
- The cartoon glass lid is not used in this version.

SOURCES / UMaine: solar box design · NASA JPL: solar oven

BUILD MAP

PREVIOUS

NEXT

STEP

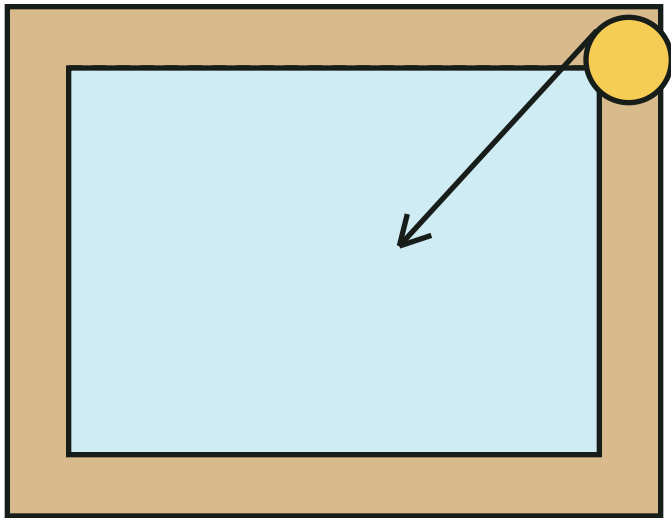
Aim and record

4 OF 5 / READ IN ORDER

04

Reflect sunlight into the window without tipping the box.

SOLAR HEAT BOX / SCHEMATIC



LIGHT ENTERS THE WINDOW

Keep the whole box level. Adjust the hinged reflector. Prop it securely; avoid glare. No food in this trial.

DO THIS

- **Set the box level in sunlight.**
- Adjust and securely prop the foil flap so reflected light enters the window.
- Keep glare out of eyes.
- Record both temperatures at the start and every five minutes for 30 minutes.

CHECK

- **Stay nearby.**
- Note passing clouds and changed shade.
- Handle warm parts with protection.
- Stop if the box becomes unstable, wind rises or any material deteriorates.

SOURCES / NASA JPL: solar oven

BUILD MAP

PREVIOUS

NEXT

STEP

Cool, compare, improve

5 OF 5 / READ IN ORDER

05

Make one change at a time on another trial.



DO THIS

- **Move the box out of sunlight, let it cool and compare your readings.**
- Calculate the inside-minus-shade temperature difference at each time.
- Record the largest difference and the weather.

CHECK

- **On a later supervised trial, change only the flap angle or box orientation, then repeat the log.**
- A higher air temperature does not prove a meal reached a safe internal temperature.

SOURCES /

NOTE

Before actual cooking

KEEP THESE LIMITS WITH THE STEPS

REF

Use a cooker and recipe with reliable cooking instructions, plus a food thermometer.



SEPARATE FOOD-SAFETY REFERENCE

- **This craft box is not approved for raw meat or leftovers.**
- USDA reference minima: poultry and leftovers 165 F; ground meat 160 F; whole beef, pork, lamb or veal cuts 145 F plus a three-minute rest.
- Measure food, not oven air.

CONTROL THE WHOLE PROCESS

- **Perishable food left out needs refrigeration within two hours, or one hour above 90 F.**
- Do not treat those limits as a cooking schedule.
- Use a reliable conventional method if solar cooking performance is uncertain.

SOURCES / USDA: food temperatures · USDA: food holding

BUILD MAP

PREVIOUS

NEXT

NOTE

Your temperature log

KEEP THESE LIMITS WITH THE STEPS

REF

Save the results so the next version has something to beat.



COPY THE HEADINGS

- **Date / weather:** ____ .
- At 0, 5, 10, 15, 20, 25 and 30 minutes, record INSIDE ____ ; SHADE ____ ; DIFFERENCE ____ .
- Flap angle / changes: ____ .

KEEP THE CONCLUSION NARROW

- **Report what this empty box did on this day.**
- No guaranteed cooking temperature, food safety, drinking-water treatment or all-weather performance follows from the trial.

SOURCES /

QUICK REFERENCE

Read the full steps first. Tap any row to return to its instructions.

BEFORE STEP 01

Build a nonfood heat experiment first. This craft box is not validated for cooking meat, preserving food or purifying water. Adults handle cutting and hot parts.

- 01

Prepare a shallow box

Adult makes a three-sided flap in the lid.

P04
- 02

Add foil and a dark floor

Reflector on flap; black paper inside.

P05
- 03

Cover the opening

Clear wrap; thermometer inside and another in shade.

P06
- 04

Aim and record

Level box; secured flap; readings every five minutes.

P07
- 05

Cool and compare

Change one variable next time; no cooking claim.

P08

NUKE SAYS

A notebook makes sunlight reproducible-ish.

SOURCES /