

Sun Banking

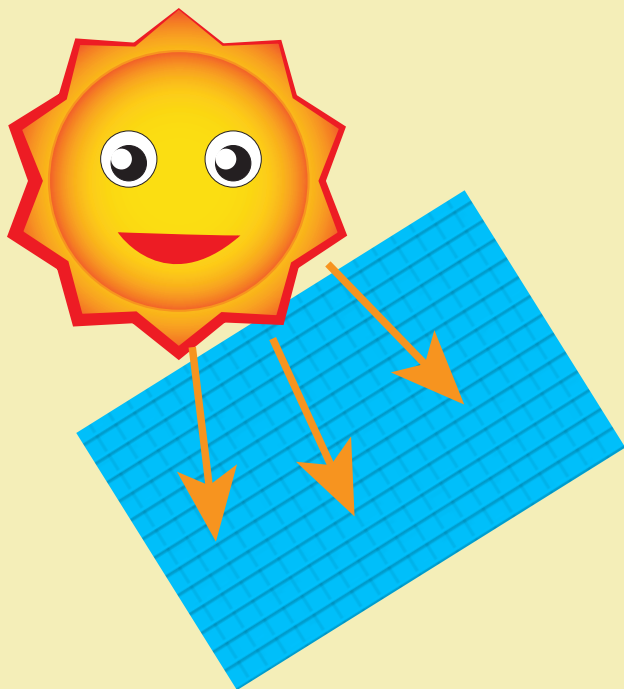


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**Do you need an idea for a scientific study?
Try out one of our ideas or make one of your own.**

Start learning right now about converting sunlight into usable energy. Take the following brief quiz to see how much you already know about solar energy. See the bottom of page 4 to check your answers.

1. Currently, which country has the most installed solar energy?
 - a. China
 - b. Germany
 - c. Spain
 - d. United States
2. What is the ideal direction for solar panels to face in the Southern Hemisphere?
 - a. East
 - b. North
 - c. South
 - d. West
3. The amount of solar energy that falls on the United States during one hour of noontime summer is equal to the amount of U.S. electricity needed for one year.
 - a. true
 - b. false



4. Photovoltaic cells convert _____ from the sun into electricity.
 - a. energy
 - b. heat
 - c. light
 - d. temperature

Sol Cooking

Do you want to harness the power of 10,000 degrees Fahrenheit? You can make your own fun solar plate warmer with just a few household items and a sunny day! Use it to warm up s'mores, crispy rice snacks, or another favorite treat! No baking, no burning. Adult supervision required.

Credit: These directions were provided by the U.S. Department of Energy

Supplies Needed:

- one pizza box
- newspapers
- tape
- scissors
- black construction paper
- clear plastic wrap
- aluminum foil
- a piece of notebook paper
- a pencil or pen
- a ruler or a wooden dowel or a stick

1. Make sure the cardboard is folded into its box shape and closed.
2. Place the piece of notebook paper in the center of the lid of the box and trace its outline on the lid. Put the piece of paper aside.
3. Carefully cut the two long edges and one of the short edges of the rectangle that you just traced on the lid of the box, forming a flap of cardboard.
4. Gently fold the flap back along the uncut edge to form a crease.
5. Wrap the underside (inside) face of this flap with aluminum foil. Tape it on the other side so that the foil is held firmly. Try to keep the tape from showing on the foil side of the flap. The foil will help to reflect the sunlight into the box.



6. Open the box and place a piece of black construction paper in so it fits the bottom of the box. This will help to absorb the sun's heat.
7. Close the box, roll up some newspaper, and fit it around the inside edges of the box. This is the insulation that helps hold in the sun's heat. It should be about 1 to 1 1/2 inches thick. Use tape to hold the newspaper in place, but only tape it to the bottom of the box, not the lid.
8. Cut two pieces of plastic wrap an inch larger than the flap opening on the box top. Open the box again and tape one piece of plastic wrap to the underside of the flap opening. After taping one side, **BE SURE TO PULL THE PLASTIC WRAP TIGHT**, and tape down all four sides so the plastic is sealed against the cardboard. Then close the box and tape the other piece of plastic wrap to the top of the flap opening. Again, be sure the plastic wrap is tight and tape down all four edges to form a seal. This creates a layer of air as insulation that helps keep the sun's heat in the box.
9. On a sunny day, pick a treat to warm up and carry it and the box outside to a sunny spot. Open the box, put the treat in the center, and close the box. Now open the flap and turn the box so the foil is facing the sun. The shadow of the flap should go straight back from the back of the box. Move the flap up and down and note how it reflects the sunlight. Use a dowel, ruler, or stick to prop up the flap so that it bounces the sunlight into the box.
10. Wait about one half hour for the box to warm up in the sun. Then enjoy your warmed-up treat!

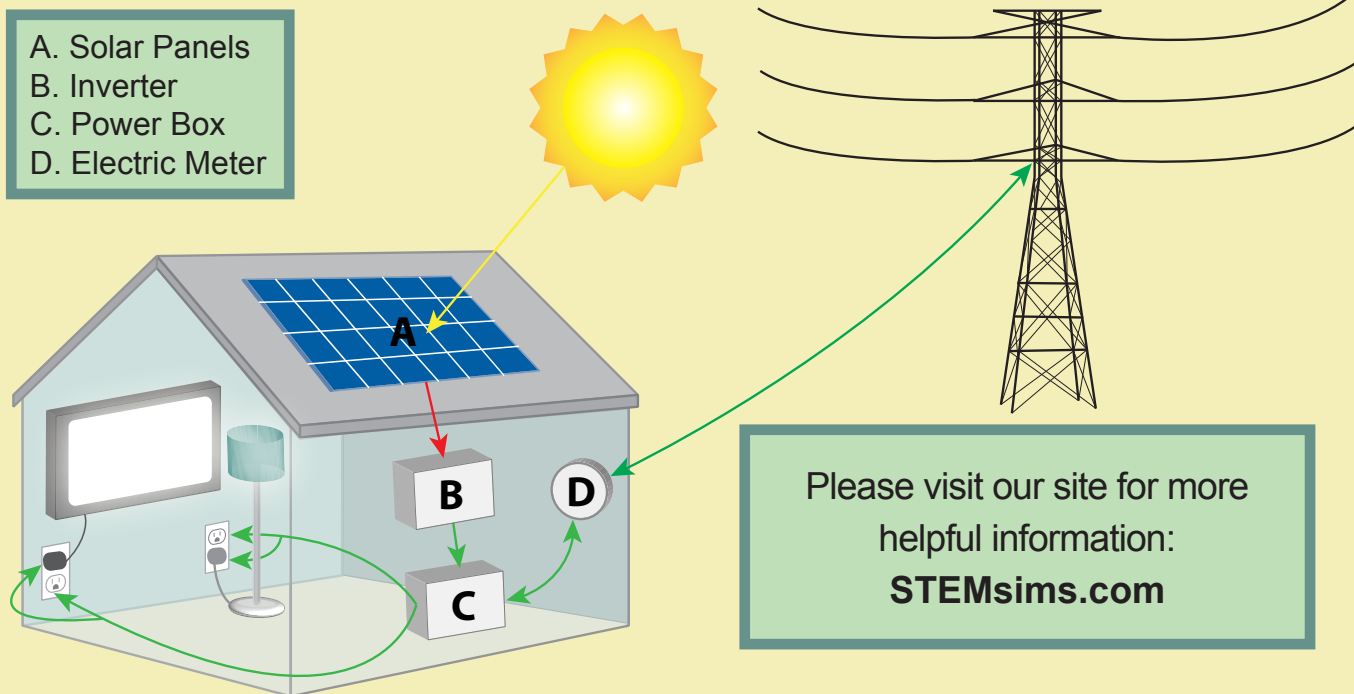
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Living on the Grid

When sunlight hits solar panels, the panels generate direct current (DC) electricity that is sent into an inverter. The inverter turns the DC electricity into alternating current (AC) electricity that can be used inside the home to power appliances. So what happens if a house needs more electricity than the solar panels generate? What happens if it needs less? That depends on the type of solar panel system that is used. There are two types of solar panel systems: on-the-grid and off-the-grid.

An on-the-grid system (also known as a grid-tied system) is connected to the utility grid. If the house uses more electricity than the solar panels generate, it takes what it needs from the grid, just like a house without solar panels. Of course, the power company will charge the homeowner for any electricity that is used from the grid. If the house uses less electricity than the solar panels generate, then the excess can go into the main utility grid for other houses to use. In this instance, the power company will actually pay the homeowner for the extra electricity.

An off-the-grid system is not connected to the main utility grid. Since there is no power company to use as a backup, an off-the-grid system has to store electricity for times when the solar panels are not producing enough electricity to power the house. This is accomplished by using batteries. Instead of excess electricity going to the utility grid, it is stored in batteries for later use. This type of system is less common, but it is sometimes the only option for remote areas without easy access to the utility grid.



Answers: Page 2 Answers: 1) b. 2) b. 3) a. 4) c.

The Green Engineering Magnet (GEM) project was funded in part under the National Science Foundation grant contract #IIP-1127544. Its contents are solely the responsibilities of the authors and do not necessarily represent the official views of the National Science Foundation.

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