



Project #12: Shoebox Solar Home Model

Make a solar home model using an ordinary shoebox. Include solar features like south-facing windows with overhangs, thermal mass and photovoltaic cells.

Materials

- Shoebox & lid
- Masking tape, Clear tape, Glue sticks
- Scissors (or Craft Knife if an adult helps)
- Hot glue gun & glue sticks (optional)
- Pencil
- Ruler
- File folders for roof (legal size)
- Cardboard & construction paper
- Mini solar electric modules (optional)
- Fan motor & popsicle stick for blade (optional)
- Clear plastic for windows (packaging scraps work well)

What to Do

1. Cut a piece of cardboard to fit inside one end of the box.
2. Draw a line where the top of the box meets the cardboard.
3. Mark a point at the top of the cardboard, and make cuts from this mark to the ends of the line. This will be one side of the house.
4. Repeat these steps to make another side.
5. Tape or glue the sides inside the ends of the box.
6. Cut out the door. Be sure to cut only three sides so the door stays attached to the house. Fold it open.
7. Measure how wide and long the shoebox is. Multiply the length times the width to get the area of the floor.

Example: 8" wide X 12" long = 96 square inches of floor area

8. To heat the house with sunlight, we'll have about 12 square inches of south-facing windows for every 100 square inches of floor area. This means we multiply the floor area by *0.12*

Example: $96 \times .12 = 11.5$ or about 12 square inches of windows

9. A window 2' high and 3' long would be 6 square inches in area. Our example needs 2 windows this size. Calculate the windows you'll need, and cut them out. Be sure to cut only 3 sides so you can fold up the overhang. Put the windows on the long side of the shoebox.
10. Put the lid on the box, and use a file folder for the roof. You might have to trim the folder to fit.
11. Add other windows, plastic for glass, and other solar features. Draw tiles on construction paper for a thermal mass floor, or make a thermal mass wall. You can even put solar cells on the roof, and power a small fan or lights.

