

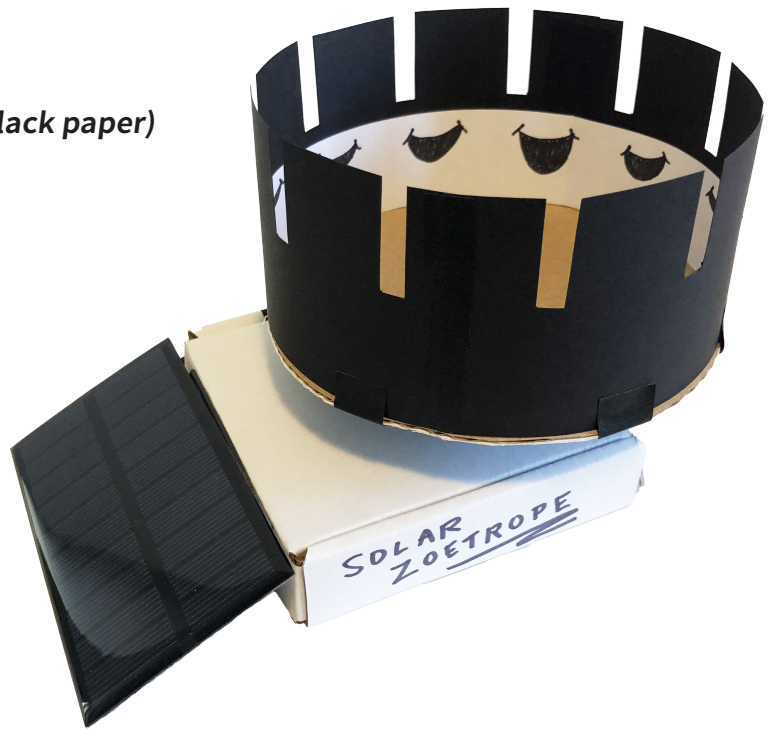
# Make a Solar-Powered Zoetrope!

Your kit includes the following:

- zoetrope template sheet (printed on black paper)
- DC motor
- 5V 200mA solar panel
- plastic gear
- 2 wire caps
- small cardboard box
- 4 strips of white paper (17" x 1.25")
- instruction sheet

You'll also need the following supplies:

- scissors
- a compass (for drawing a circle)
- a piece of corrugated cardboard, at least 5" x 5"
- tape
- hot glue or epoxy

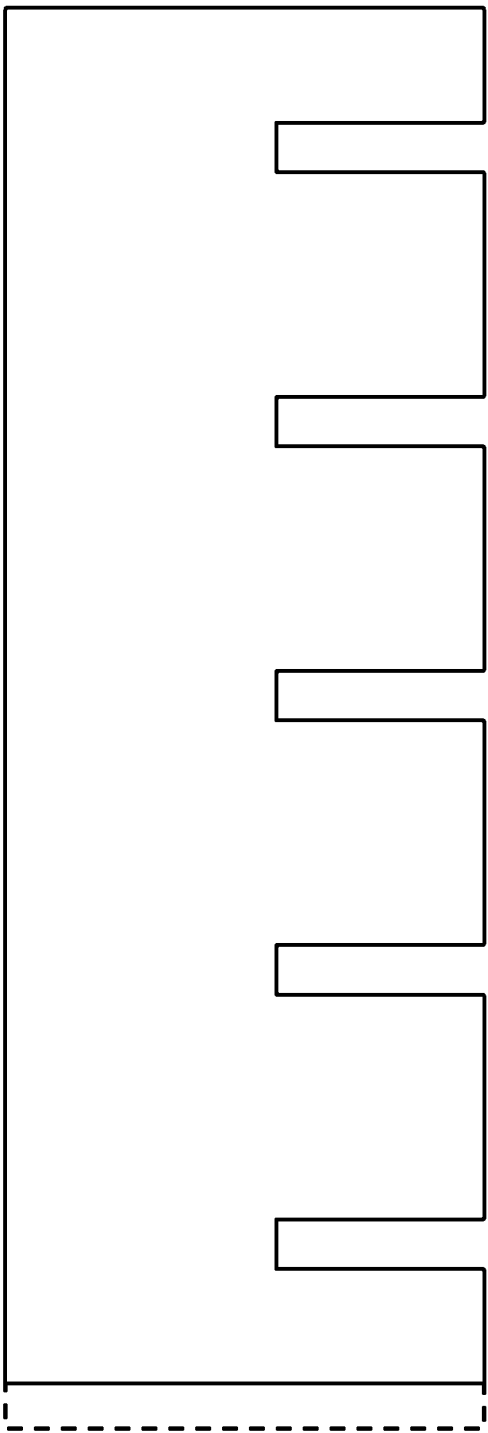


1. Assemble the cardboard box. You'll use it as the base for your zoetrope.
2. Use scissors to cut out your zoetrope template, which is provided on black paper.
3. Carefully connect your template sections with tape, creating a long strip with notches on one side like a comb. Don't make a loop yet!
4. Take a strip of white paper and line it up with your zoetrope strip. Draw 11 evenly spaced animation frames, one beneath each vertical notch. Dark colors and thick lines work best.
5. Tape the loose ends of your zoetrope strip together to make a loop.
6. Use a compass to draw a circle on corrugated cardboard with radius 2.5" (6.35 cm). Cut out the circle with scissors.
7. Line up your zoetrope loop on top of the cardboard circle, with the notches facing up. Use tape to attach the loop around the circle's circumference, creating a cylinder with the top open.

8. Press the plastic gear onto the shaft of the motor, with the flat side facing away from the motor. (Note: If the gear is pressed all the way down against the motor, it may not be able to rotate freely.)
9. Apply hot glue or epoxy to the flat underside of the motor and attach it to the top of the cardboard box, with the gear facing up. Try to get the motor as flat as possible.
10. Flip over your zoetrope cylinder and apply glue to the center of the cardboard circle. Flip it back over and attach it to the plastic gear. Try to keep your zoetrope cylinder centered, so it will stay balanced when it spins.
11. When the glue is dry, line up your animation strip inside the zoetrope and tape it in place. There should be a drawing under each notch in the zoetrope.
12. Give your zoetrope a spin and look through the notches at a downward angle. You should see your animation!
13. Next you'll attach the solar panel to the motor. Take the black wire from the solar panel and the black wire from the motor and twist the stripped ends together. Place a wire cap over the twisted wires and press down while rotating clockwise. The wire cap should stay in place.
14. Repeat the previous step, but connect the red wire from the solar panel and the red wire from the motor.
15. Take your zoetrope to a sunny spot and test it out. It should start spinning on its own in direct sunlight!



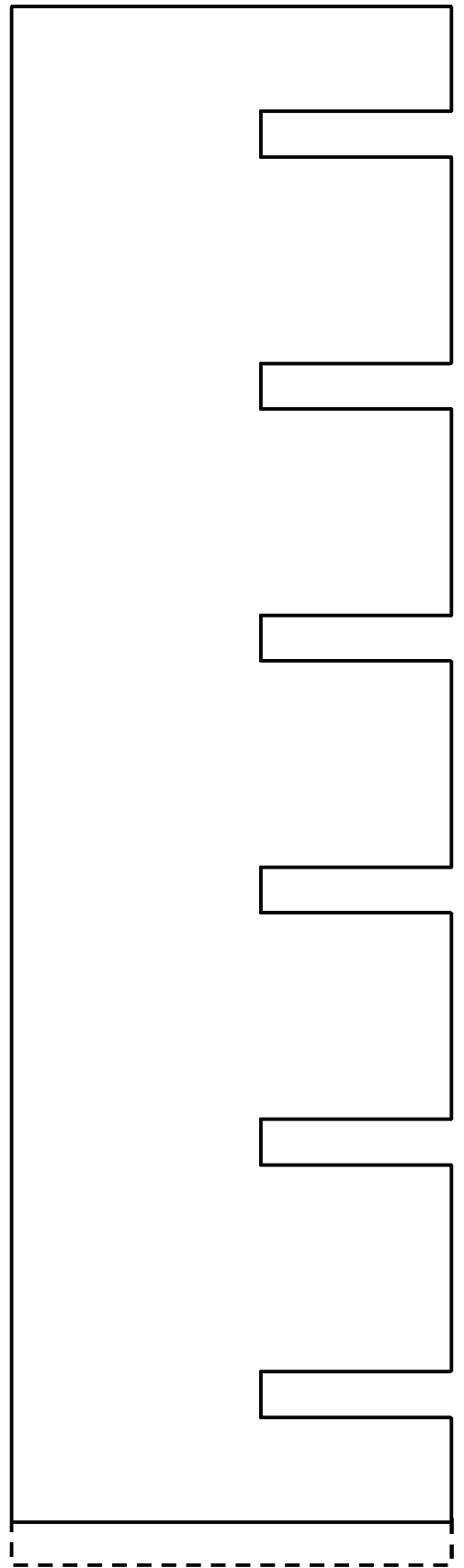
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