

A STEM in the Park

Take Home Activity

STEM

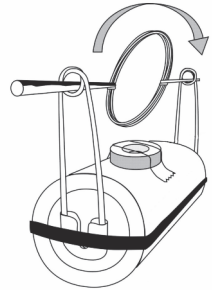
in the **PARK**™

Science, Technology, Engineering, and Mathematics

Building a Simple Motor

Supplies

- 1 strand insulated copper wire (ends exposed about one inch)
- 1 black permanent marker
- 1 small disc magnet
- 1 D-Cell battery
- 1 large rubber band
- 2 large paper clips
- 1 Tootsie Pop



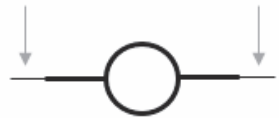
Instructions

1. **Make 4 – ½ in loops with the copper wire.** Starting in the center of the insulated copper wire, wrap both ends around the permanent marker to make 4 – ½ inch loops. Carefully slide the permanent marker out of the wire loops
2. **Make a bundle with the wire.** Wrap each end of the insulated copper wire around the loops to hold them in place. Position the ends so that they are directly across from each other and extending out in a straight line on either side of the bundle – this forms the axle. This is called the *armature*.

Continued on back

Instructions cont.

3. **Insulate one side of the wire.** Hold the wire bundle you have made so that it would be flat against a wall rather than a table (see picture). Color the top of each wire end with the permanent marker. Leave the bottom side of the wire bare.



4. **Form the loops.** Carefully bend one end of the paperclip around the Tootsie Pop stick to form a small loop. Repeat with the other paperclip.
5. **Assemble the motor (part one).** Wrap the rubber band around the length of the D-cell battery. Insert the paperclips on either end of the battery so that one paperclip is touching each terminal. They should be held in place securely by the rubber band with the small loops at the top.
6. **Assemble the motor (part two).** Set the magnet on top of the battery, in the center. Position the copper wire *armature* in the paperclip loops with the shiny side of the wire touching the loops. Make sure the *armature* does not touch the magnet.
7. **Watch your motor in action!**

Tips

- * The motor will run faster the more secure your **paperclips** are to the **battery** terminals and the straighter and more level the **wire bundle** ends are.
- * If your motor does not start immediately, try helping it by spinning the *armature*. Since the motor will only spin in one direction, try spinning it both ways.

When in rotation, the motor parts can become warm. Please operate carefully!

This activity is brought to you by the SSOE Group

