5TH-8TH ENRICHMENT LESSON





# **Tiny Dancers**

Resource

**Objective**: Bend a copper wire into a shape that will balance and spin continuously on top of a AA battery.

## Materials:

- 16 Gauge Copper Wire
- 1/2" x 1/8" Neodymium Disc Magnets (<u>link</u>)

Neodymium magnets are extremely strong and MUST BE KEPT OUT OF REACH OF SMALL CHILDREN! Do not give them to any child who might put them in their mouth, they are dangerous if swallowed and must be surgically removed.

- AA Battery
- 3 in 1 Combination Tool or pliers/wire cutters/needle nose pliers
- Crepe paper/material scraps for dancer outfit (optional)
- Hot glue (optional)

# Time: 60 minutes

#### <u>Tips:</u>

- If the motor does not work try turning your magnets upside down and reversing the polarity.
- Make sure that the bottom section of wire encircles the magnets. If it doesn't your motor will not work.
- Be sure your wire is free to move around the battery and magnets. If it's too close to the battery or magnet it will get stuck and be motionless.
- **MONITOR THESE FOR HEAT!** If you notice a battery getting usually warm stop the project, let it cool down and remove the magnets. I recommend *against* reusing a battery that gets overheated. Instead replace it with a fresh battery. Please monitor the motors closely as they spin.

- Keep the forms as symmetrical as possible. Since they spin on an axis if the are not symmetrical and/or balanced they will spin off the battery. If they do spin off try and bend the form slightly to get them balanced on the battery.
- To make the head of the dancer, bend your wire around a pencil.
- Remove the magnets immediately after running your motor. They will drain your motor if kept attached.
- When the electrical circuit is completed you will hear a very low buzz.

#### Step one: See example

Click the resource link (under the title "Tiny Dancers") to get an example of what a Tiny Dancer looks like, and how it works. You may work from the website or from this lesson plan to complete your Tiny Dancer. This lesson has been simplified to help you be successful.

## Step two: Draw plan

Decide on a shape for your Tiny Dancer. Trace a AA battery and then draw a diagram, to scale, around the traced AA battery. Be sure the copper wire touches the small neodymium disc magnets at the bottom, and touches the positive metal cap/terminal at the top. Whatever you create needs to be well-balanced to stay on top of the AA battery. Be precise when drawing your diagram.

#### Step three: Shape wire

Using your diagram, shape your wire with your pliers. Try to copy your diagram exactly. Use a pencil to shape your Tiny Dancer head. Ask a parent if you need help shaping your copper wire, pliers can be tricky.

#### Step four: Test, reshape, test, repeat

Slide your tiny dancer onto your battery and magnets. Be prepared to adjust your copper wire many, many times. Your "Tiny Dancer" should be perfectly balanced on top of the AA battery while maintaining contact with the batteries below.

#### Step five: Enjoy!

Watch your Tiny Dancer, or your other well-balanced form, spin continuously. Be sure to watch your battery as it can heat up quickly. To make your Tiny Dancer your own, use spare material or other choice materials from around the house to dress it up.

PLEASE share your designs, creations, and results with me. I love to see all of your creative ventures. -Miss Emily edesler@forestcharter.com