

Nerve Tester

Overview: Today's lesson is mostly playtime, since you already know everything you need to in order to create this project. You're going to start with a simple circuit, then modify it a bit and turn it into an electrical roller coaster.

What to Learn: How to modify your simple circuit into something fun and entertaining! And probably hone your troubleshooting skills when things go wrong.

Materials

- AA battery case
- 2 AA batteries
- 2 alligator wires
- LED
- bare wire OR you can use a wire coat hanger, but be aware you may have to use sandpaper if it's is coated with clear enamel
- popsicle stick
- paperclip
- tape
- wood block with wood 2 wood screws and a drill and/or screwdriver OR dense foam block

Lab Time

1. Insert batteries into cases and connect an LED so that it works. Set aside as you make the next part.
2. Using a paper clip, form a loop and secure to a popsicle stick so that it looks like a bubble wand, with the ends poking out of the bottom of the tape. Bend the ends up so you can clip onto them with your alligator clips later. (You should have $\frac{1}{4}$ – $\frac{1}{2}$ " poking upward.)
3. Bend and twist an un-insulated coat hanger wire into spirals and dizzy roller-coaster shapes. When you've got it right, make a small loop at each end. If you're using a wood base, insert one screw into each small loop and screw into the wood base, about 10" apart (be sure to thread the bubble wand loop onto the wire first!). Your roller coaster wire should stand up on its own.
4. Disconnect the clip lead wire from your positive battery terminal and clip it to the exposed paper clip end on your popsicle-stick bubble-wand. Wrap the exposed end of the positive terminal around one end of the coat hanger near the screw and seal with tape.
5. If it doesn't work:
 - a. Make sure the batteries are fresh and inserted the right way.
 - b. Make sure your coat hanger is really just a bare rod of metal. If it's got a coating on it, you'll need to use sandpaper on the entire length before using it in the project.
 - c. Use a block of wood or foam for best results... they are both excellent insulators for the wire track.
 - d. Places where kids most often forget to hook up:
 - i. connect the wire to a bare spot on the track itself, near the base
 - ii. be sure your loop also has a good metal wire connection

Reading

Electrical circuits are used for all kinds of applications, from blenders to hair dryers to cars. And games! Here's a quick and easy game using the principles of conductivity. This experiment is a test of your nerves and skill to see if you can complete the roller coaster circuit and make it from one end to the other. You can opt to make a noisy version (more fun) or a silent version (for stealth).

Exercises

1. Can you travel the entire path without turning on the light?
2. Where in your circuit can you add a switch to turn the game on and off?

Answers to Exercises: Nerve Tester

1. Can you travel the entire path without turning on the light? (Answers vary)
2. Where in your circuit can you add a switch to turn the game on and off? (Answers vary)