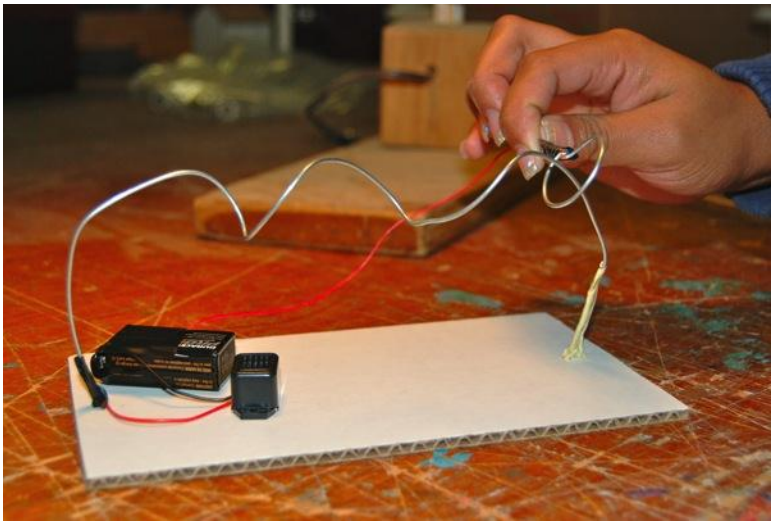
Circuit Game

Category: Physics: Electricity & Magnetism

Type: Make & Take



Rough Parts List:

1	Piezo buzzer or Christmas light
6”	Wire, stiff
1’	Wire, stiff
1’	Electrical wire
2	3” Pieces of electrical wire
	Batteries, 2AA or 1-9V
	Cardboard

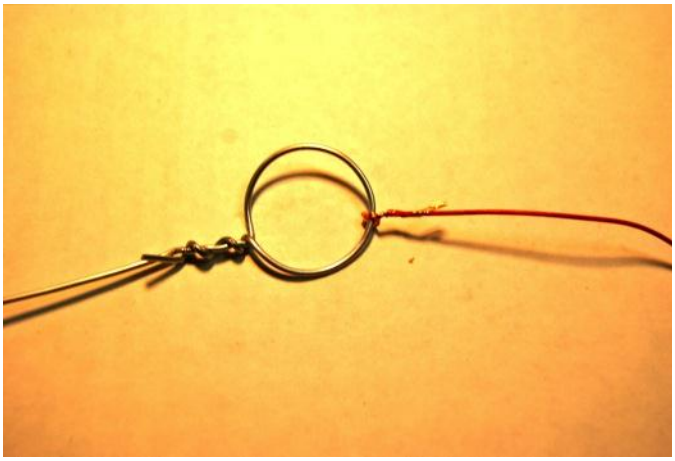
Tools List:

Electrical Tape
Scissors
Hot glue gun
Pliers

Video: http://youtu.be/G-nb1qiY5H8

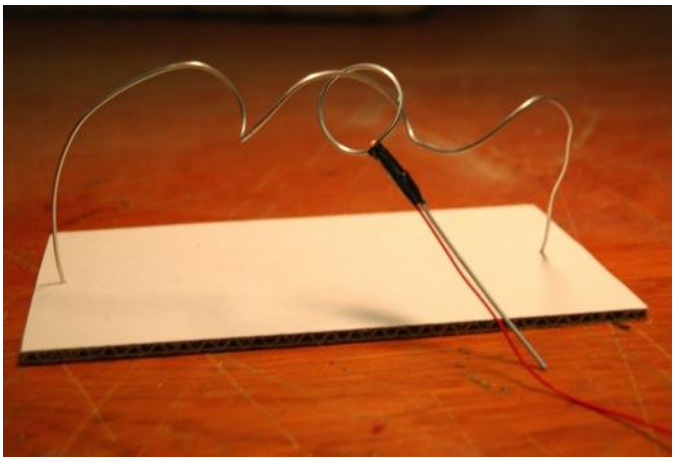
How To:

Make a wand with the 6” galvanized wire.

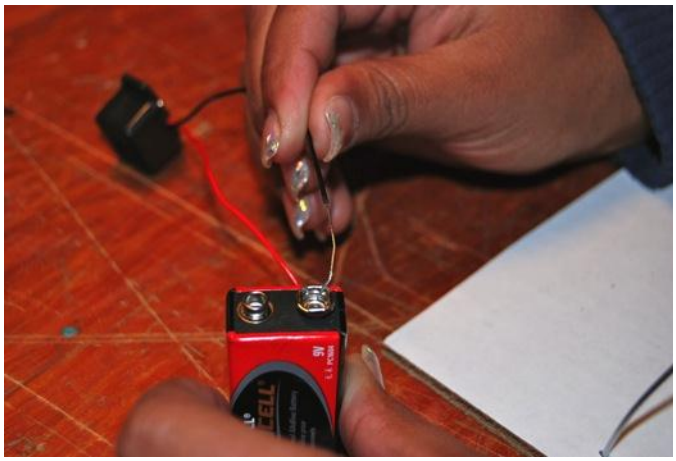


Tie one end of the 1’ electrical wire to the wand.

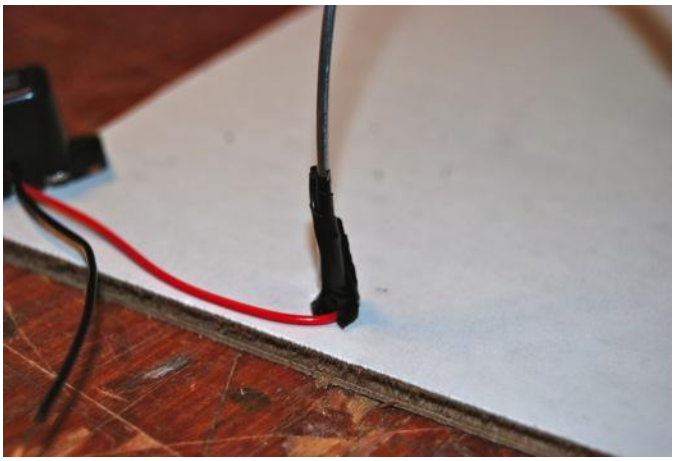
Secure the electrical wire to the wand using electrical tape.



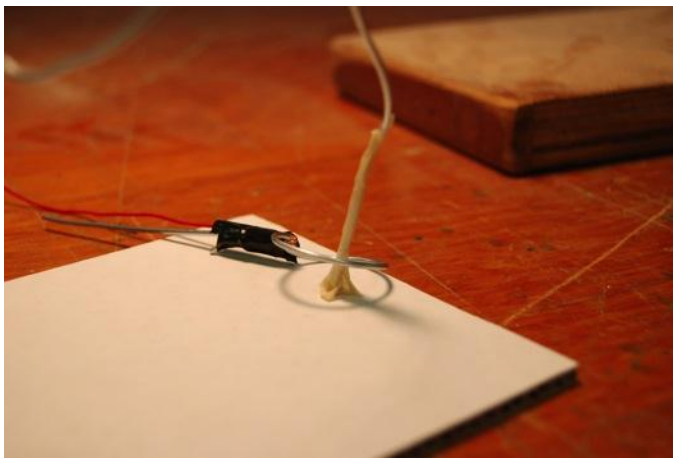
Make a funny shape with the 1' stiff wire. Loop the wand through the wire. Stick the ends of the stiff wire into cardboard.



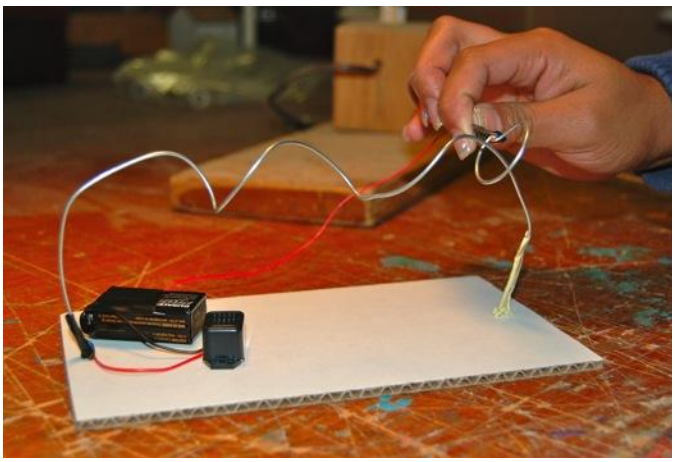
Connect one wire between the buzzer and the negative terminal of the battery.



Connect another electrical wire between the buzzer and the stiff wire.
Secure all connections with electrical tape.



Connect the electrical wire wrapped around the wand to the battery's positive terminal. Stick tape around the base of the stiff wire.



To play, move the wand from one end of the stiff wire to the other end without touching the wire. If you set off the buzzer or light, start the game over and try again.

Fine Points:

→ Be sure to loop the wand through the galvanized wire before connecting the wire to the baseboard.
→ To keep the battery from dying when you are not playing, wrap masking tape around both endpoints of the galvanized wire and store the game with the wand contacting the tape. Or you can disconnect the battery.

Concepts Involved:

- Electric current is the movement of electrically charged particles. Here these particles are electrons.
- A circuit is the path of electric current. A complete circuit is a closed circle.
- Conductors are materials that can carry an electric current.
- Insulators are materials that cannot easily carry an electric current.

Focus Questions:

1. What other material can be used as a conductor?
2. Would the buzzer still make noise if you switched the wires on the battery?

Elaboration:

A diagram of the circuit can be drawn out at the beginning of the activity to give students a better understanding and visual of what the circuit consists of and how it will work.

The wand acts as a switch. When the switch is "off", or the wand is not touching the game wire, the circuit is incomplete or "open." Electricity cannot flow through an open circuit, and therefore, the buzzer or light will not turn on. When the switch is "on", the wand is touching the galvanized wire and the circuit is complete, or "closed." Electricity then flow from the power source to the buzzer or light, which turns them on. An electric current can only flow through a complete circuit. Current cannot flow in a broken or incomplete circuit because electrons have to move in a continuous stream.

The stiff wires, the metal battery terminals, and the electrical wire are all conductors of electricity. The electrical tape, the plastic or rubber covering of the wires, as well as the glue are all examples of insulators.

Links to k-12 CA Content Standards:

<u>Grades k-8 Standard Set Investigation and Experimentation:</u>
Scientific progress is made by asking meaningful questions and conducting careful investigations. As a basis for understanding this concept and addressing the content in the other strands, students should develop their own questions and perform investigations.

<u>Grades k-12 Mathematical Reasoning:</u>
1.0 Students make decisions about how to approach problems:
1.1 Analyze problems by identifying relationships, distinguishing relevant from irrelevant information, sequencing and prioritizing information, and observing patterns.
1.2 Determine when and how to break a problem into simpler parts.

2.0 Students use strategies, skills, and concepts in finding solutions:
1.1 Use estimation to verify the reasonableness of calculated results.
1.2 2.2 Apply strategies and results from simpler problems to more complex problems.

1.3 Use a variety of methods, such as words, numbers, symbols, charts, graphs, tables, diagrams, and models, to explain mathematical reasoning.
2.5 Indicate the relative advantages of exact and approximate solutions to problems and give answers to a specified degree of accuracy.

3.0 Students move beyond a particular problem by generalizing to other situations:
3.1 Evaluate the reasonableness of the solution in the context of the original situation.
3.2 Note the method of deriving the solution and demonstrate a conceptual understanding of the derivation by solving similar problems.
3.3 Develop generalizations of the results obtained and apply them in other circumstances