**Circuits and Quiz Board**

**SUMMARY:**

The circuit lab needs to be done before the quiz board lab.

**OBJECTIVE:**

Create a quiz board using electrical circuits.

**TERMS TO GO OVER:**

Electricity

Circuit

Open and Closed Circuit

Positive and Negative Charges

**CIRCUITS LAB**

**LAB MATERIALS:**

* Worksheet
* 1.5V or 3V Light bulb
* 1 or 2 AA batteries
* Thin insulated wire (at least 30 gauge or smaller)
* Wire cutters/scissors
* Optional: wire strippers
* Optional: conductive and resistive material

**GROUP LEADER/VOLUNTEER/TLC ROLE**

Help students explain why a circuit may be incomplete or not working.

**SETUP PROCEDURE**

1. Cut 6in lengths of wire and strip ends of insulation

**LAB PROCEDURE**

Follow instructions on the worksheet:

1. Predict which patterns will cause the light to light up and which will not and mark accordingly.
2. Test to see if your predictions were accurate
3. Once finished with all the provided circuits, draw in circuits you believe will work and test them. Optional: test the circuits using conductive and resistive materials.

**QUIZ BOARD**

**LAB MATERIALS:**

* Manila folder
* Worksheet
* Insulated 30 gauge wire
* Wire cutters
* Razor
* Brass brads
* 2 AA batteries
* LED light
* Soldering iron
* Solder
* Paper clips
* Tape
* Velcro

**GROUP LEADER/VOLUNTEER/TLC ROLE**

Assist students with troubleshooting and handing out the materials as needed.

**SETUP PROCEDURE**

1. Cut and strip 3, 7, and 9 inch long wires (3 and 9 inch wires for LED light) (7 inch wires for connecting questions and answers)
2. Solder a 3 inch and 9 inch wire to the LED light and attach paperclips to the other ends. So then the pattern is, if stretched out completely, is: paperclip, 3 inch wire, LED light, 9inch wire, paperclip.
3. For the other 9in wires, attach paperclips to both ends
4. Glue the worksheet to the front of the manila folder
5. Cut small slits above each number and letter through only the front flap of the folder – so the students are able to place the brass brads in later.

**LAB PROCEDURE**

1. Place brads into the slits in the manila folder
2. Open the folder and write which brad is which (1 – 10 and A – J)
3. Next, connect a brad to another brad on the other side of the folder with a wire, wrapping the metal part of the wire around the brad and then opening up the brad. (Optional: can have a question have multiple answers by connecting one brad to multiple ones on the other side)
4. Then write the questions down one side. Refer to the back of the folder where the wires are to see where to write the answers on the front side. OR cut out the engineering questions and answers worksheet.
5. Next, tape the batteries together positive to negative.
6. Tape the paperclip attached to the 3in wire to the positive side of the battery pack
7. Tape the paperclip attached to the free 9in wire (not attached to the LED light) to the negative side
8. Check the system by touching the two free paperclips together
9. Next, put two squares of sticky-backed Velcro to the batteries, and the other halves to the folder over the picture of the batteries
10. Tape the wires on either side of the LED light down, over the picture
11. Test to make sure the quiz board works