

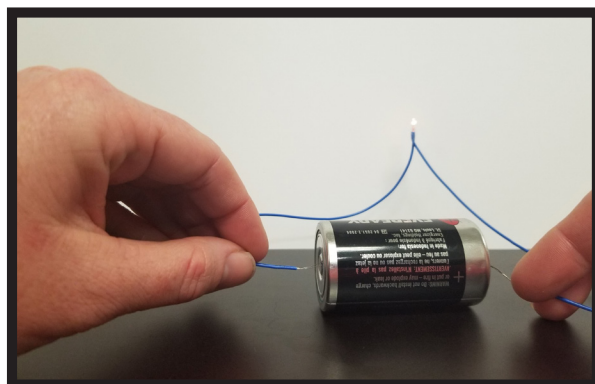
# Circuit Tips

## General Troubleshooting

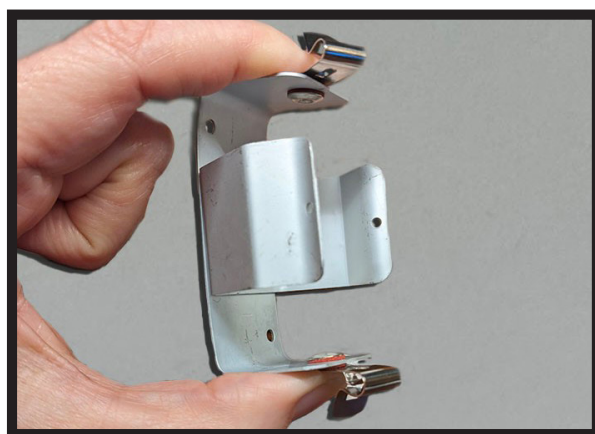
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- The problems in this module involve you and your students building and working with electronic circuits. While working with circuits in the classroom, you may find them to be finicky. For example, if you do not have a clean connection between components, the circuit will not be completed. Below are some tips to help you troubleshoot students' circuits and ensure that the components are working properly.

- Make sure the batteries are not dead. Quickly test the batteries by touching the ends of a grain-of-wheat bulb to opposite ends (terminals) of the battery. If the bulb does not light, the battery is dead. Set up the circuit again using fresh batteries. Dispose of dead batteries according to your local regulations.



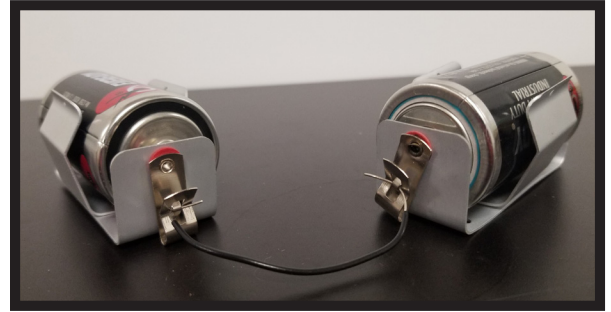
- Check that the batteries are properly inserted into the metal battery holders. If the battery is loose in the holder or if the connection ends are bent outward, the circuit will not be completed. To ensure that the battery ends (terminals) make contact with the holder, take the battery out of the holder, gently bend the ends of the holder in, and reinsert the battery.



- When multiple battery holders are connected, positive terminals connect to negative terminals (as shown in the diagram below).



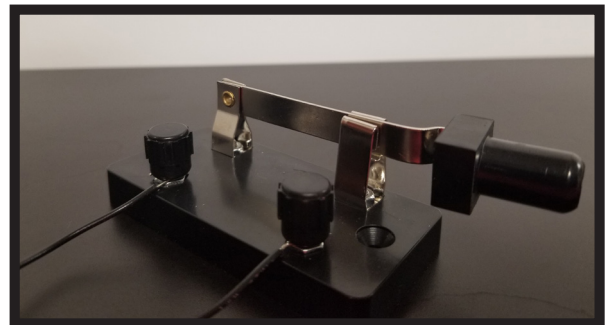
- Ensure that at least 2 cm (0.75 in) of the connection wire is stripped of the insulation casing to make full contact with the clips of the battery holder. Make sure that the clips on the battery holder are holding the bare wire tightly.



- If you are using alligator clips, check that the metal clips are making full contact with the clips of the battery holder.



- If the circuit has a knife switch, make sure that the metal arm of the switch is held tightly between the metal poles on the base when the switch is closed. Also ensure that the switch does not remain in the “on” position for too long, as this will drain the batteries.



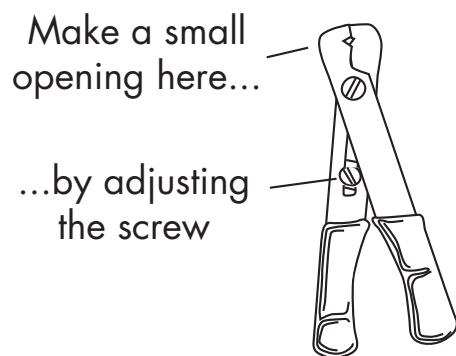
## Using Wire Strippers

1. Place the wire into the opening in the bottom blade of the wire stripper. It should fit snugly when you close the blades. Adjust the screw in the wire stripper as needed to adjust the blades.

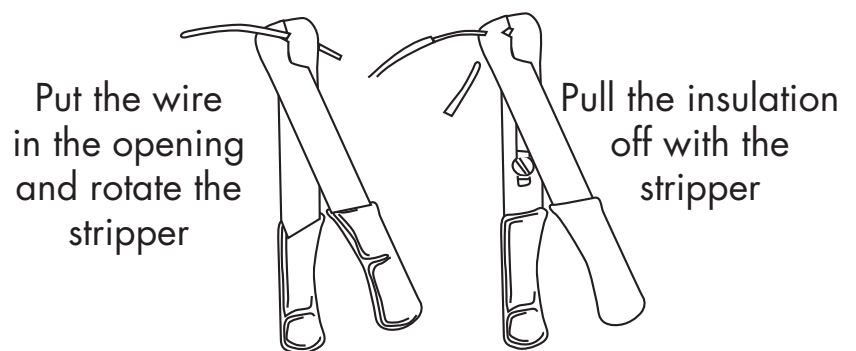


2. Squeeze the handles of the wire stripper to push the blades together; meanwhile, rotate the wire stripper while firmly holding the wire in place. Next, gently pull the wire stripper toward the shorter side of the wire to remove insulation.

### Adjusting Wire Stripper



### Stripping Wires



## Using the Hand-Crank Generator

To use the generator, firmly hold the handle with one hand and use the other hand to turn the crank clockwise. Push firmly to start the handle turning, but resist over-cranking the handle as you continue to turn it. Take care not to drop the generator. Caution students to be firm but not overly aggressive when using the hand-crank generators.

