Circuits Game Directions

1. Start with a large battery drawn on the floor with masking tape.
2. Kids pick cards from a box. They can be electrons, batteries, or light bulbs. Ratio of cards is specific to each board (see below). You can add a string to make them signs they can hang around their necks. Rolls can also be assigned by the teacher.
3. The teacher starts by laying out the wire for the first circuit. The wire can be tape on the floor, rope, anything to make a loop. I like to use an extension cord.
4. Electrons fill up the battery. Battery kids pass out the energy (Volts). Each battery gets a set amount of cards (Volts). If they get used up the battery is dead. Once the electrons get energy from the battery, they move through the wires.
5. Each battery provides one Volt to each electron. If two batteries are in series, they each give the electrons a Volt. (If two batteries are in parallel, electrons choose a battery to get a Volt from. This way you can compare parallel and series batteries.) Electrons only get more energy from the battery if they run out.
6. Light bulbs stand with arms together over the wire, London Bridge style. The electrons must give up their energy as they pass through the light bulb.

Board 1: Open Circuit

Roles: 1 or 2 batteries, electrons

1. Electrons get in battery and get their energy. They get stuck when the circuit is open.
2. Close the circuit. Electrons can move, but they don't loose their energy. The battery doesn't die because it doesn't have to give out energy any more when the electrons pass through.

Board 2: One Light Bulb

Roles: 1 then 2 batteries, 2 light bulbs, electrons

1. The 2 light bulb kids make a 'bridge' across the wire to slow down the electrons.
2. Electrons start in the battery and move when the switch is closed.
3. When they get to the light bulb they loose all of their energy.
4. Let them run for a while. How much energy does the light bulb use?
5. What is the effect of adding more batteries in series? In parallel? (Series – more voltage, so the light bulb is brighter. Parallel – the battery doesn't die as quickly, but the light bulb uses the same energy and stays the same brightness.)

Board 3: Two Light Bulbs in Series

Roles: 2 batteries, 4 light bulbs, electrons

1. The light bulb kids make a 'bridge' across the wire to slow down the electrons.

2. Put two batteries in series. (They'll need twice the Volts to get through both light bulbs.) Electrons start in the batteries and move when the switch is closed.
3. When they get to the light bulb they loose their energy. Now there are two light bulbs, so they must save some energy for the second one.
4. Let them run for a while. How much energy does each light bulb use? What if one light bulb was more powerful (used more energy) than the other?

Board 4: Two Light Bulbs in Parallel

Cards: 2 batteries, 4 light bulbs, electrons

1. Lay out the circuit. The light bulb kids make a 'bridge' across the wire to slow down the electrons.
2. Electrons start in the batteries (in series) and move when the switch is closed.
3. When the electrons get to the branch they have to choose which way to go. It is probably easiest to have one electron go left and the next go right.
4. When the electrons get to the light bulb they loose their energy. To keep it simple, make both light bulbs charge 6 V, so electrons loose all of their energy.
5. Let them run for a while. How much energy does each light bulb use? Which would be brighter?

(Also included are two more advanced boards: one with a capacitor and one with bulbs in both parallel and series.)

Please adapt this activity to meet your needs! Be creative - you can make short circuits, add bulbs in series and parallel, add other appliances (i.e. Play Station or TV) and see what happens.

I find it helpful to have bulbs, batteries, and wires handy to show the real circuits after they have acted out each scenario.