

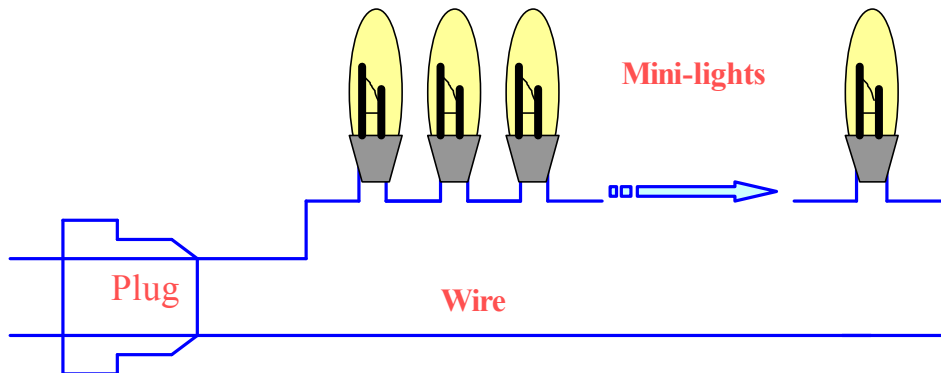
Holiday Lights

How do you think holiday lights work? What kind of electrical circuit do you think they make? Let's think about what we know about them.

Holiday lights often come in sets of 50 bulbs. Sometimes if one bulb goes out the whole strand of lights will no longer work. Which kind of circuit would this be, series or parallel?

How you can tell what kind of circuit you have?

For starters, imagine a strand of holiday lights. There is a plug at one end that goes into a wall socket. Along the strand, you have the 50 mini-lights that are connected to each other.

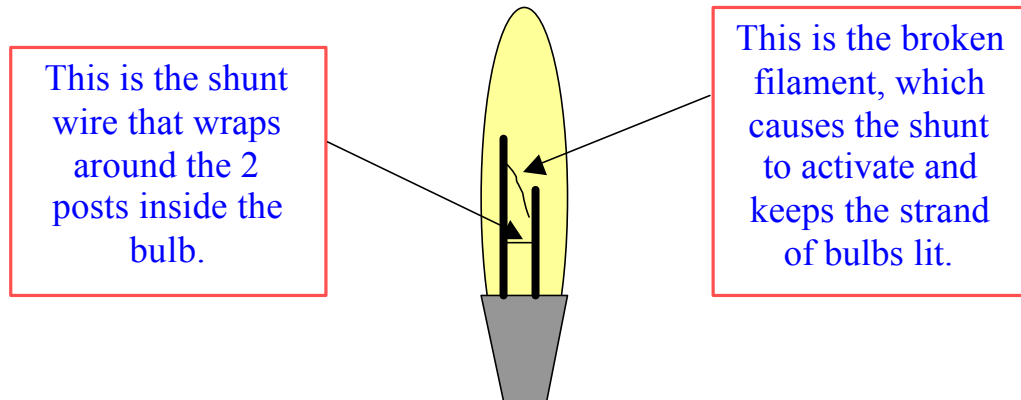


Look at the diagram. If one bulb was removed from this circuit, what do you think would happen? What about when a bulb goes dead? The entire circuit would be broken, and none of the lights would light. This is a series circuit.

How come my holiday lights can have a burnt-out bulb and still work?

Scientists developed bulbs that have something inside them called an internal shunt. A shunt is a strand of wire that gets wrapped around the two posts inside the bulb. When the filament breaks (see Shunt Image for detail) the shunt gets really hot and a coating burns off, activating the shunt. The shunt allows the current to continue to flow even if the bulb is no longer working, and therefore the strand stays lit!

Shunt Image



How come some holiday lights have three wires?

There are three wires in most holiday lights sold today. This is because the third wire attaches to a socket so another strand can be attached.

The dashed diagonal line in the diagram below indicates the third wire. This wire attaches to the outlet at the end of the strand. It will light up the next string of holiday lights plugged into it. When another set of lights is plugged in, it becomes a parallel circuit.

So how do the lights receive the charge? It may not be the way you imagine! The circuit includes the socket, the solid diagonal wire and the top strand, which connects the lights and the socket.

