Investigation 2: Conductors and insulators

Part 3 – Continuous conducting path (bulb)

**Background:** Parts that behave like a single conductor are said to form a “continuous conducting path.”

**Materials:** 3 D-cells, battery holder, 3 round bulbs, 2 sockets, 4 wires

The parts of a light bulb are shown in the diagram at the right.

- Looking at each part of the bulb individually, predict whether the part is a conductor (C) or an insulator (I).
- Place each part of the test bulb into the test circuit to see if the other bulbs in the circuit light. Record your observation (Bulbs Light or Bulbs Don't Light).
- Classify each part as a conductor (C) or an insulator (I).

<table>
<thead>
<tr>
<th>Test Object</th>
<th>Prediction</th>
<th>Observation</th>
<th>Classification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Glass</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Threaded Section</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Black Ring</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tip</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

1. Consider just the test objects that were conductors. (Refer to the chart above.) When you connected the test objects to your test circuit, did the test bulb light? (In other words, were all 3 bulbs lit?)

2. What does it take to light the test bulb? (In other words, what does it take to make all three bulbs light?)

   a. Draw a diagram of the situation where the test bulb is lit.
   
   b. Why does the bulb light in this situation?
3. Ask the teacher for a 100 W household light bulb whose glass globe has been removed. Test a) the filament and b) a support to determine if they are conductors or insulators and record your observations.

4. Parts that behave like a single conductor are said to form a **continuous conducting path**. Which parts of the bulb form a continuous conducting path?

5. Look at the inside of a 100 W household bulb. Using the picture shown at the right, draw a path showing the conducting path through the bulb. (Use a colored pencil so that the path shows up.)

**Conclusions:** Any combination of items in the testing loop that made the light bulbs light is called a **circuit**. Based on your investigations, what is required to make a circuit?