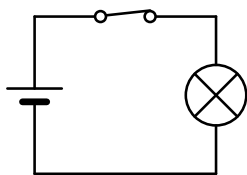
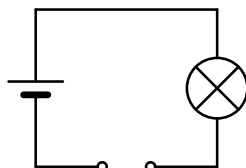


Part A: Complete Circuits

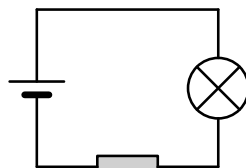
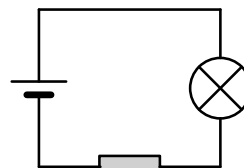
1. Which of these circuits will light the bulb? For each one, explain why or why not.



Circuit A



Circuit B

plastic comb
Circuit Cbrass key
Circuit D

2. Maya says, "The bulb uses up the charges, so fewer charges come back to the battery than leave it." Is she right? Explain what actually gets used up, and describe the energy changes in the battery and the bulb.

Part B: Symbols and Diagrams

3. Name each circuit symbol.



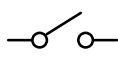
a.



b.



c.



d.



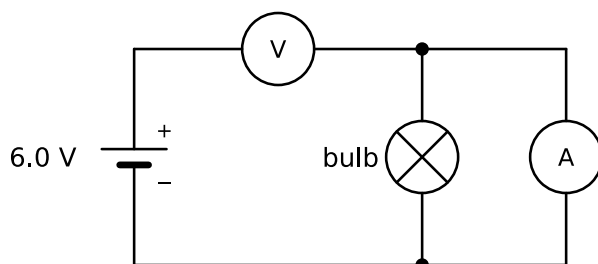
e.



f.

4. Draw a circuit diagram with one loop that contains a battery, a closed switch, a bulb, and a resistor. Then add an ammeter that measures the current through the bulb and a voltmeter that measures the voltage across the resistor. Use straight wires with square corners and label each part.

5. Diego built this circuit to measure the current through the bulb and the voltage across it, but the bulb will not light. What did he do wrong? Explain why the bulb stays dark, and describe how to fix it.



Part C: Conductors and Insulators

6. Sort each item as a conductor or an insulator: silver spoon, rubber band, iron nail, wooden spoon, aluminum can, plastic straw, ceramic mug, gold ring. Then explain why a phone charger cord has a metal core inside a plastic coating.