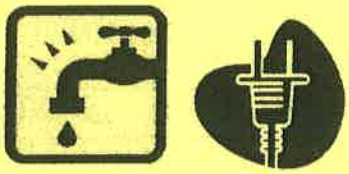
Name: KEY

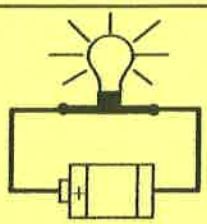
Period: _____

Circuits and Symbols

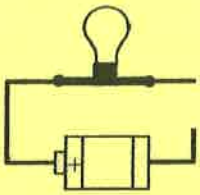
Electricity works a lot like water. Often imagining how water would work in an circuit will tell you how electricity will work as well.



Electricity flows through circuits: *paths of conductors (usually wires). Any break in the circuit will cause the circuit to fail, just like a break in a pipe lets water leak out of a water system.*



A *closed circuit* has no breaks: the light lights up.

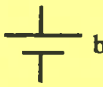


An *open circuit* has a break in it: the light will not light up.

A break in a circuit is any spot where an insulator is in the way of the electricity's flow. Paper, plastic, or even an air gap can keep electricity from flowing.

Circuit diagrams

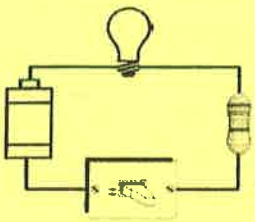
Circuit diagrams are a short-cut method of drawing circuits. They don't need to be perfectly draw, but they can be drawn wrong.

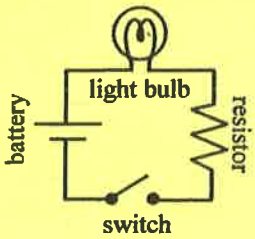


battery

capacitor

These components *look* similar, but are very different and have different functions.





The diagram on the right is a faster way of drawing the circuit on the left. (Notice the direction of the battery, which is important)

Electrical Symbols

Electrical Device	Symbol	Function	Water Equivalents
wire		paths for electricity to flow.	pipes
battery		pushes electricity through circuit.	pump
light bulb		lights up; resists electricity.	no equivalent
switch		turns electricity on and off	valve
resistor		resists flow of electricity.	restriction in a pipe

3 Quantities of a Circuit

Voltage *Pushes Electrons*

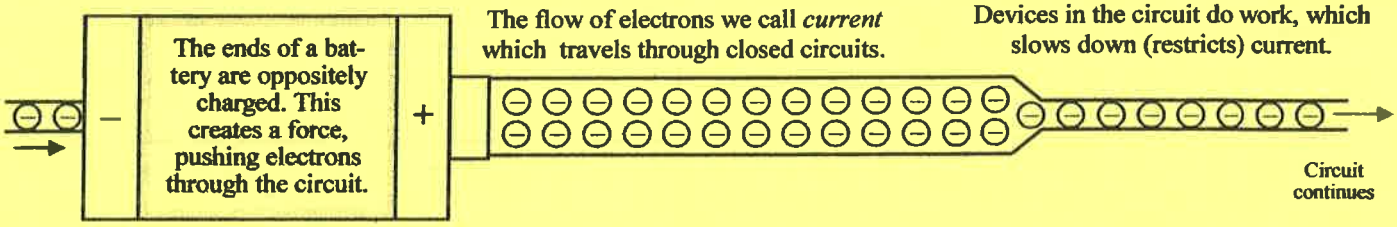
The ends of a battery are oppositely charged. This creates a force, pushing electrons through the circuit.

Current *Flows Through Circuits*

The flow of electrons we call *current* which travels through closed circuits.

Resistance *Resists Current Flow*

Devices in the circuit do work, which slows down (restricts) current.



Voltage is measured in ***Volts***. **Current** is measured in ***Amps***. **Resistance** is measured in ***Ohms***.

These three quantities are linked in any circuit.
Change one of them and one or both of the others will change.

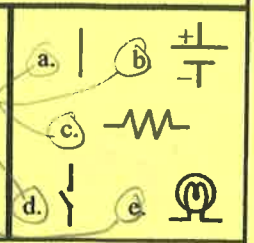
Name: KEY

Period: _____

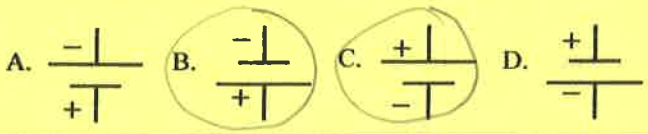
1. Open circuit C	A. Slows down the flow of electricity.
2. Closed circuit E	B. A short-hand way of drawing electrical circuits.
3. Circuit diagram B	C. A circuit with a break in it; no electricity will flow.
4. Voltage D	D. Pushes electricity through a circuit.
5. Current F	E. Electricity can flow through this.
6. Resistance A	F. The flow of electricity through a circuit.

Match the electrical component with the water component and diagram symbol

1. Valve C	A. Resistor
2. Pipes D	B. Battery
3. No equivalent E	C. Switch
4. Resists flow A	D. Wire
5. Pump B	E. Light bulb

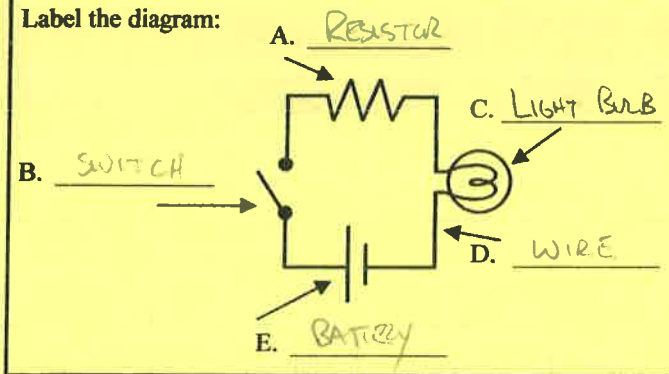


Which of the following are correct?

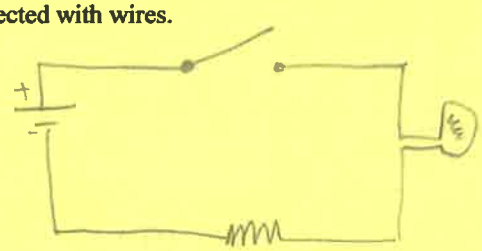


1. Wires D	A. Used to create radiant energy.
2. Battery B	B. Pushes electricity through the circuit.
3. Resistor E	C. Can turn the electricity on and off.
4. Light bulb A	D. Allows electricity to flow.
5. Switch C	E. Slows down the flow of electricity.

Label the diagram:



Draw a circuit diagram (starting on the left) with a battery, a resistor, a lightbulb, and a switch. Make sure it is a closed circuit, connected with wires.



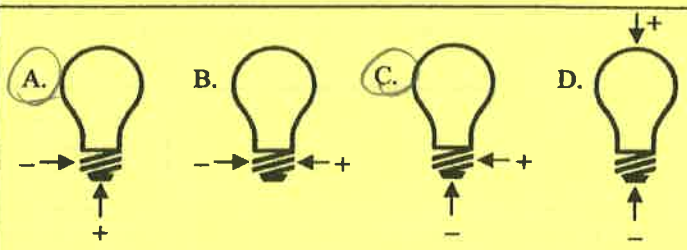
In the Lab

Start by making a circuit with a battery, light bulb, and switch. Turn on the switch to be sure the circuit is correct (light comes on).
Next connect an alligator clip wire to either side of the switch. Touch the free ends of the alligator clip wires together to be sure the light still turns on. If not find the problem.
When correct, use the free ends as probes to complete the following task.

Using the electrical circuit above, test which of these are conductors (C) or insulators (I)

Paper I	Paperclip C	Cloth I
Lock Nut C	Glass I	Wood I
Penny C	Plastic I	Rubber I

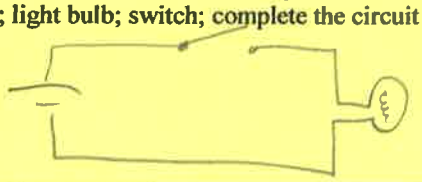
Connect alligator clip wires to either side of the battery. Take a light bulb out of the holder. Circle the letter of the following diagrams that light up the light bulb.



Where are the two parts of a light bulb that must be touched complete the light bulb circuit?

METAL SIDE AND BOTTOM METAL "PLUG"

Create in the lab and draw the diagram for the following circuit: battery; light bulb; switch; complete the circuit (close the circuit).



What happens if you reverse (turn around) the battery? (You must reverse the whole battery holder.)

NOTHING. BATTERY STILL LIGHTS!