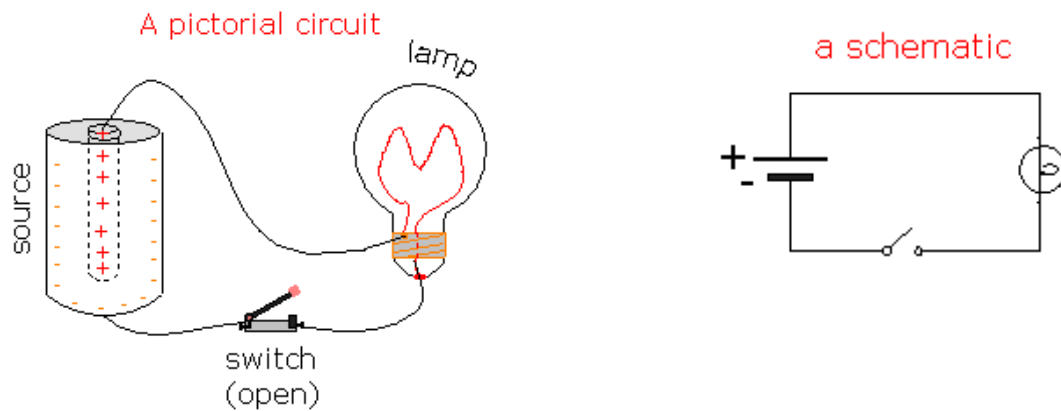


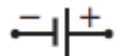
Section 2: Electrical Circuits and Symbols (Text: page 593)



An **electric circuit** is a vehicle for the transfer and conversion of electrical energy into other useful forms of energy such as heat, light, and motion. Electrical energy is transferred from a **source (ex. a battery)** to a **load (ex. a light bulb)** by means of electrons moving through a complete circuit.

Any break in the circuit will cause the electric current to cease. The circuit is then said to be an **open circuit**.

Source of electrical potential



Cell

Battery



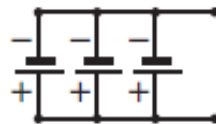
DC generator



Cells in series



AC generator



Cells in parallel

Electrical loads



Resistor (fixed)



Resistor (variable) or rheostat



Lamp



Coil

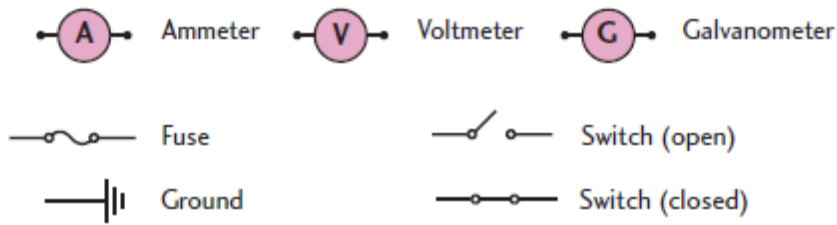


Motor

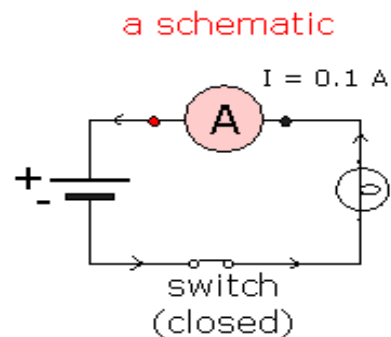
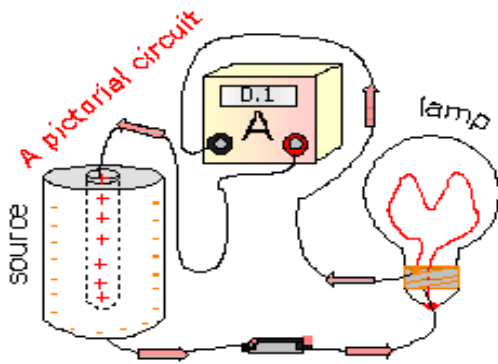


Transformer

Electric meters



Measuring current



Current is measured with an instrument called an **ammeter** which has a **very small resistance**. It is connected **in series** with the other components of the circuit. In other words, it is connected directly in the conducting path.

Why is this so?

To answer this question, consider the following. If we wanted to take the temperature of a small volume of water, we would not use a large icy-cold thermometer because this would cause the small volume of water to cool off. Therefore, the temperature reading would be lower than the temperature of the water in the first place. You would not get an accurate reading because the cold thermometer contaminates the system.

Likewise, we don't want the ammeter to affect the circuit. We want the current reading on the ammeter to be as close as possible to the current in the circuit before the ammeter was inserted. The only way this can happen is if the ammeter must provide only a tiny, tiny, tiny obstacle to the current so that the current hardly realizes the ammeter has been put in the circuit. In other words, the ammeter must present just a tiny, tiny, tiny **resistance** compared to other resistances in the circuit. The **ammeter must be connected in series**.

NOTE: An ammeter typically has a red terminal and a black terminal. Connect the red terminal to the positive terminal of the battery. Then connect the other wire from the black terminal to the lamp.