Unit 11- READING 1
What is moving and which way is it going?

No one can see what moves through the wires, but something about the moving substance causes a compass needle to deflect. The property that enables the substance to do this is called **CHARGE**, from a Latin word that means "vehicle". The experiments you've done provide evidence that CHARGE is carried through wires, but they provide no evidence yet about the nature of the charges themselves.

Representing conventional charge flow

The deflection of a compass needle under a wire will reverse if the direction of charge flow in the wire reverses. But it cannot tell you which of the two possible directions of charge flow is the actual one. The direction of movement in a simple circuit with lit bulbs is either clockwise or counter-clockwise – but a compass cannot tell you which is actually occurring.

To avoid confusion, we need to assume charge travels in one of the two possible directions in a wire. Scientists searched for hundreds of years trying to determine which way the charge really moved, but were unable to do so until the late 1800's. In the absence of any evidence, they decided to **assume** a direction for the motion. Such an assumption is "conventional" — that is, simply an "agreement" which isn't necessarily right or wrong but is **useful** because it is necessary for communication. The international convention is that the charges circulating around a circuit **leave the battery at the "positive" end** (red spot), travel around the circuit and **re-enter at the "negative" end** (blue spot), and pass through the battery.

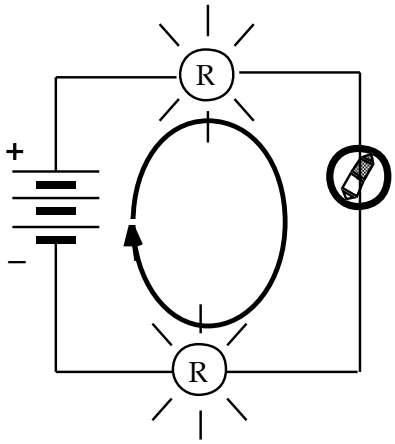

Figure a
Standard Battery Orientation

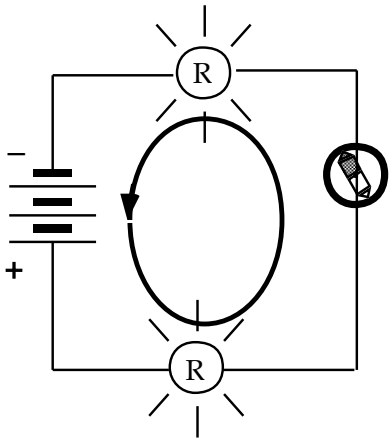

Figure b
Reversed Battery Orientation

The word "conventional" means by agreement – and the agreement is that mobile charge in a circuit with a single battery is assumed to flow out of the "+" terminal of the battery and into the "–" terminal. Arrows in Figures a and b illustrate this conventional flow direction. The arrows in these schematic diagrams are drawn as one continuous (unbroken) arrow – to represent continuous flow through the bulbs and wires.