

# AP Physics - Electricity - Circuits and AC vs DC

Note Title

3/18/2008

## Circuits

In order for charges to flow continuously, two things must be true:

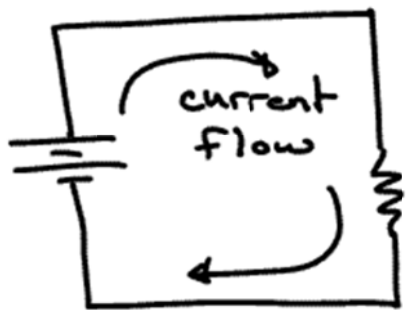
1. There must be an energy source capable of generating an Electromotive Force (EMF).

...and...

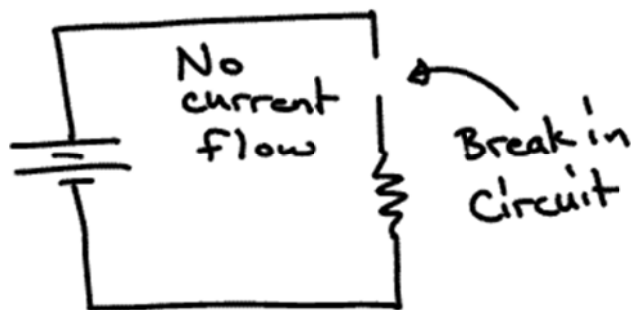
2. There must be a continuous conducting loop current to flow which contains the voltage source (EMF).

If these two conditions are met, then we have a "closed circuit." If the continuous loop is broken, we get an "open circuit", and the current flow stops through the loop.

### Closed Circuit



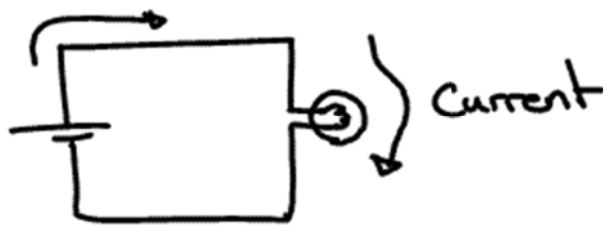
### Open Circuit

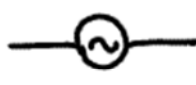


## DC vs AC

A battery, by its design, is only capable of inducing current flow in one direction. This is called "Direct Current" or "DC".

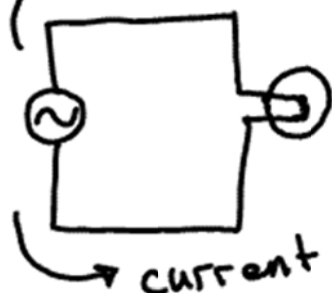
### A simple DC circuit



The electric company doesn't use batteries to supply electricity. Rather, it uses large generators which provide current which oscillates back and forth at 60 cycles/second. This is called "Alternating Current" or "AC". An AC source is shown in a diagram by this symbol: 

### A simple AC circuit

current ( $\frac{1}{2}$  the time)



Light bulb is lit no matter which way the current flows

current (the other  $\frac{1}{2}$  the time)