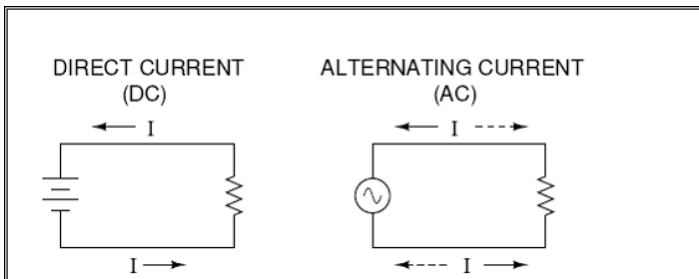


Biology

AC and DC current

Created: Monday, 29 August 2011 08:52 | Published: Monday, 29 August 2011 08:52 | Written by [Super User](#) | [Print](#)

Introduction to AC and DC Current

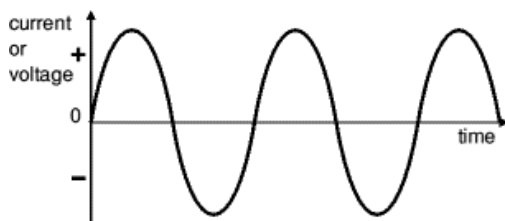


AC means "Alternating Current" and DC means "Direct

Current." AC and DC are also used when referring to [voltages](#) and electrical signals, which are not currents. DC is electricity flowing in a constant direction, and/or possessing a voltage with constant polarity.

DC is the kind of electricity that a battery with definite positive and negative terminals makes, or the kind of charge that is generated by rubbing certain types of materials against each other. Certain sources of electricity (most notably, rotary electro-mechanical generators) naturally produce voltages that alternate in polarity, reversing positive and negative over time. Either as a voltage switching polarity or as a current switching direction back and forth, this "kind" of electricity is known as Alternating Current (AC).

What is Alternating Current (AC)



Alternating Current (AC) flows one way, then the other way, continually

reversing direction. An AC voltage is continually changing between positive (+) and negative (-). The rate of changing direction is called the [frequency](#) of the AC and it is measured in [hertz \(Hz\)](#), which is the number of forwards-backwards **cycles per second**. An AC supply is suitable for powering some devices such as lamps and heaters but almost all electronic circuits require a steady DC supply.

This shape portraying AC from a power supply is called a **sine wave**. Alternating current is the most common form used in the transmission of electricity from power plants to homes and businesses. It is convenient because the voltage can be changed easily with transformers. High voltage is good for long-distance transmission of electricity because it means less current has to flow to achieve the same amount of power, and power is lost in the resistance of wires in proportion to the square of the current. Alternating current is generated at the power station by rotating a coil of wire inside a big magnet. The energy needed to make the coil turn is provided by burning fuels such as coal, oil, natural gas, or by harnessing air, water, or nuclear power to do it. Faraday's law of induction relates the change in the voltage around the coil of wire to the rate of change of the amount of magnetic flux through the wire. If the wire turns around in circles, the voltage will be positive, then negative, then positive again. Because the voltage swings back and forth between positive and negative values, at some times it crosses zero.

What is Direct Current (DC)

Direct Current (DC) always flows in the same direction, but it may increase and decrease. DC voltage is always positive (or always negative), but may increase and decrease. Electronic circuits normally require a **steady DC** supply which is constant at one value or a **smooth DC** supply which has a small variation called **ripple**.

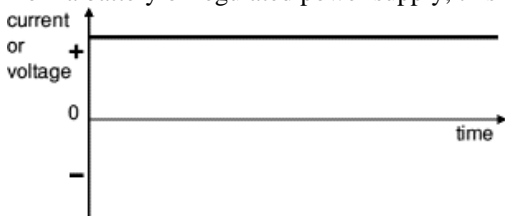
Cells, batteries, and regulated power supplies provide **steady DC** which is ideal for electronic circuits.

Power supplies contain a [transformer](#) which converts the mains AC supply to a safe low voltage AC. The AC is then converted to DC by a [bridge rectifier](#). However, the output is **varying DC** which is unsuitable for electronic circuits.

Direct current is very useful in powering small things such as flashlights and radios and toys. Batteries are the most common source of direct current -- the voltage of a battery is constant. Things that need lots of power in the form of direct current, like computers, have power supplies inside which transform alternating current from the wall plug to direct current. This way, they don't run out of batteries.

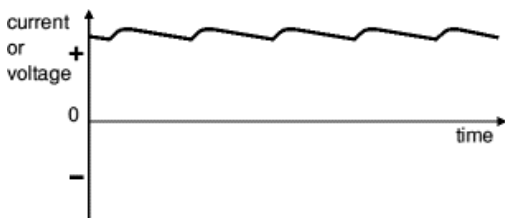
Steady DC

from a battery or regulated power supply, this is ideal for electronic circuits.



Smooth DC

from a smoothed power supply, this is suitable for some electronics



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Reference links:

- <http://www.science.howstuffworks.com> > ... > Physical Science > Electricity
- <http://www.allaboutcircuits.com> > ... > BASIC AC THEORY
- <http://www.hyperphysics.phy-astr.gsu.edu/hbase/electric/elevol.html>

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