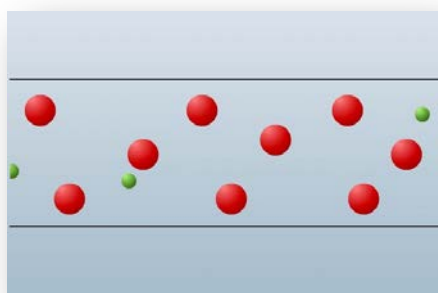


Resistance

Life is not easy for electrons as they flow around a circuit. In order to explain this statement let us start this section by considering the structure of the conductors through which they travel. The conductors are made up of atoms, or molecules, which are close together and arranged in a regular geometrical pattern. The atoms are locked in position within the pattern and vibrate about their mean position.



Structure of a conductor (electrons are shown as the small green spheres, atoms as the larger red spheres).

As the electrons drift towards the positive terminal of the battery, collisions with atoms become inevitable. The atoms carry much more mass than the electrons and provide considerable opposition to the flow. The amount of opposition depends upon the dimensions of the conductor and the material from which it is made. A long, thin conductor will offer much more opposition than a short, fat conductor made from the same material.

Even the best conductors offer some opposition to electron flow. This opposition is called resistance.

Electrons lose some of their kinetic energy during a collision. This kinetic energy is converted into heat energy, resulting in a temperature increase within the conductor.

The unit of resistance is the ohm. The symbol used for an ohm is the Greek letter omega Ω . The unit of resistance has been named after the German scientist, Georg Ohm. His pioneering work in the early 19th century made a major contribution to our understanding of electrical theory.