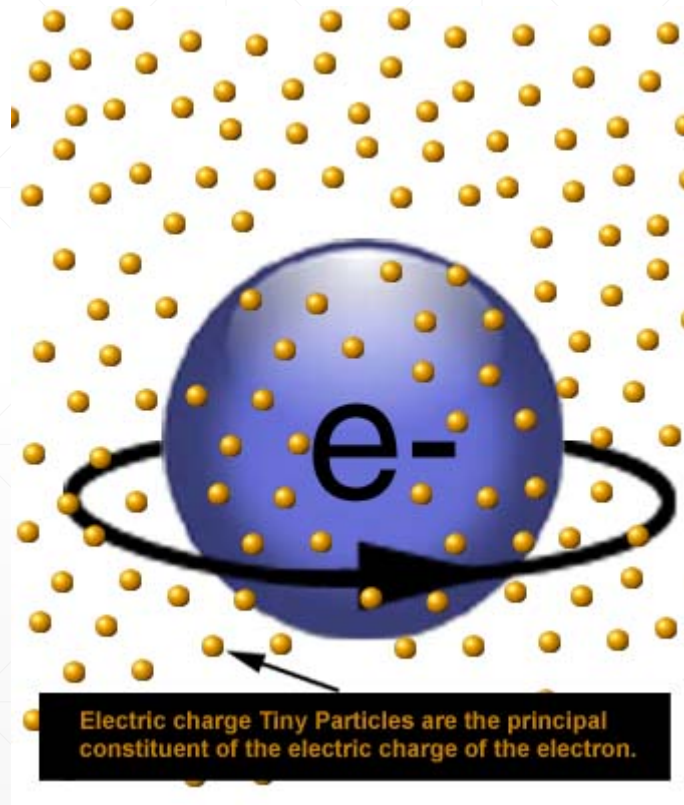
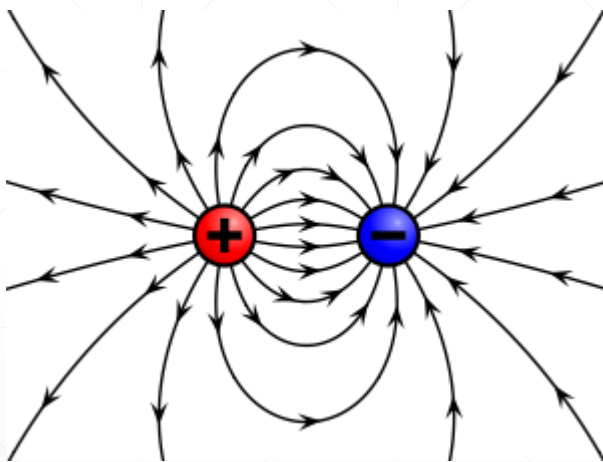


The Electron

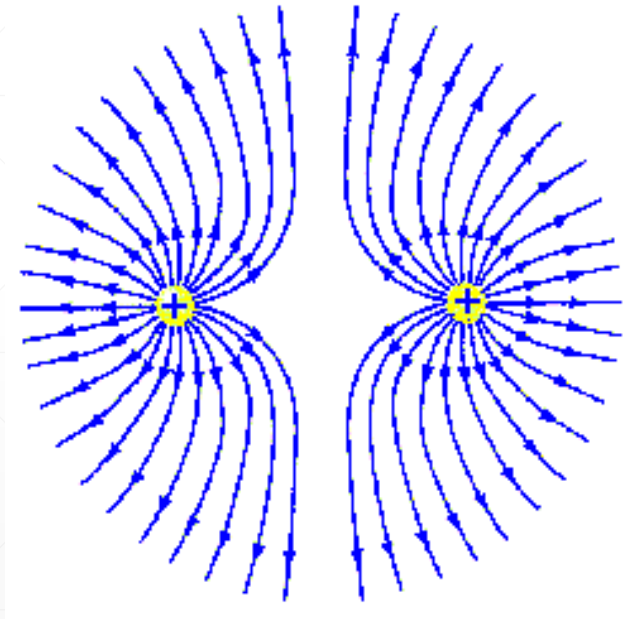
The electron is bound to the nucleus as a result of the electric charge forces in play.



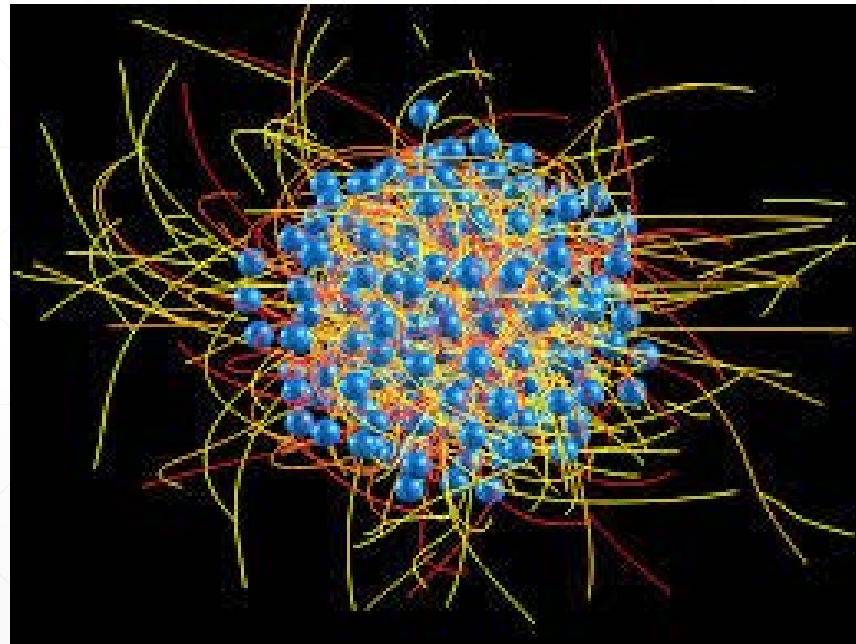
Positive charges attract negative charges.



In contrast, two particles of like charge repel each other.



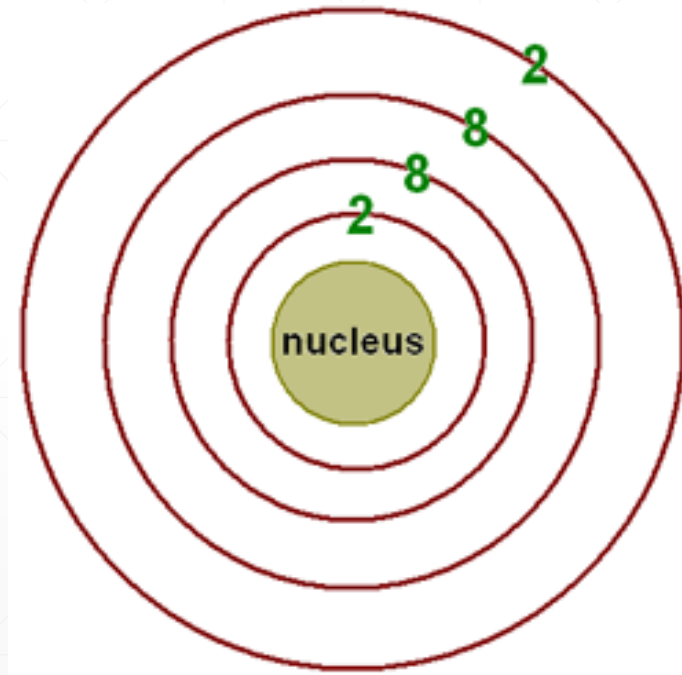
Electrons are rapidly revolving around the nucleus, and they tend to want to launch themselves far from the atom.



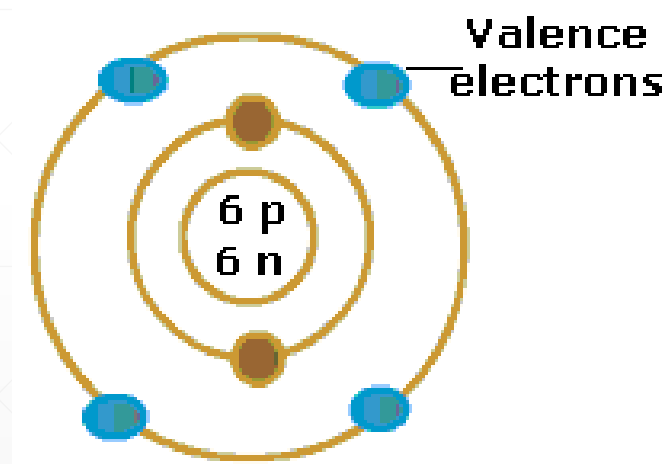
However, they are bound by these electrostatic forces between the positively charged protons and the negatively charged electrons.



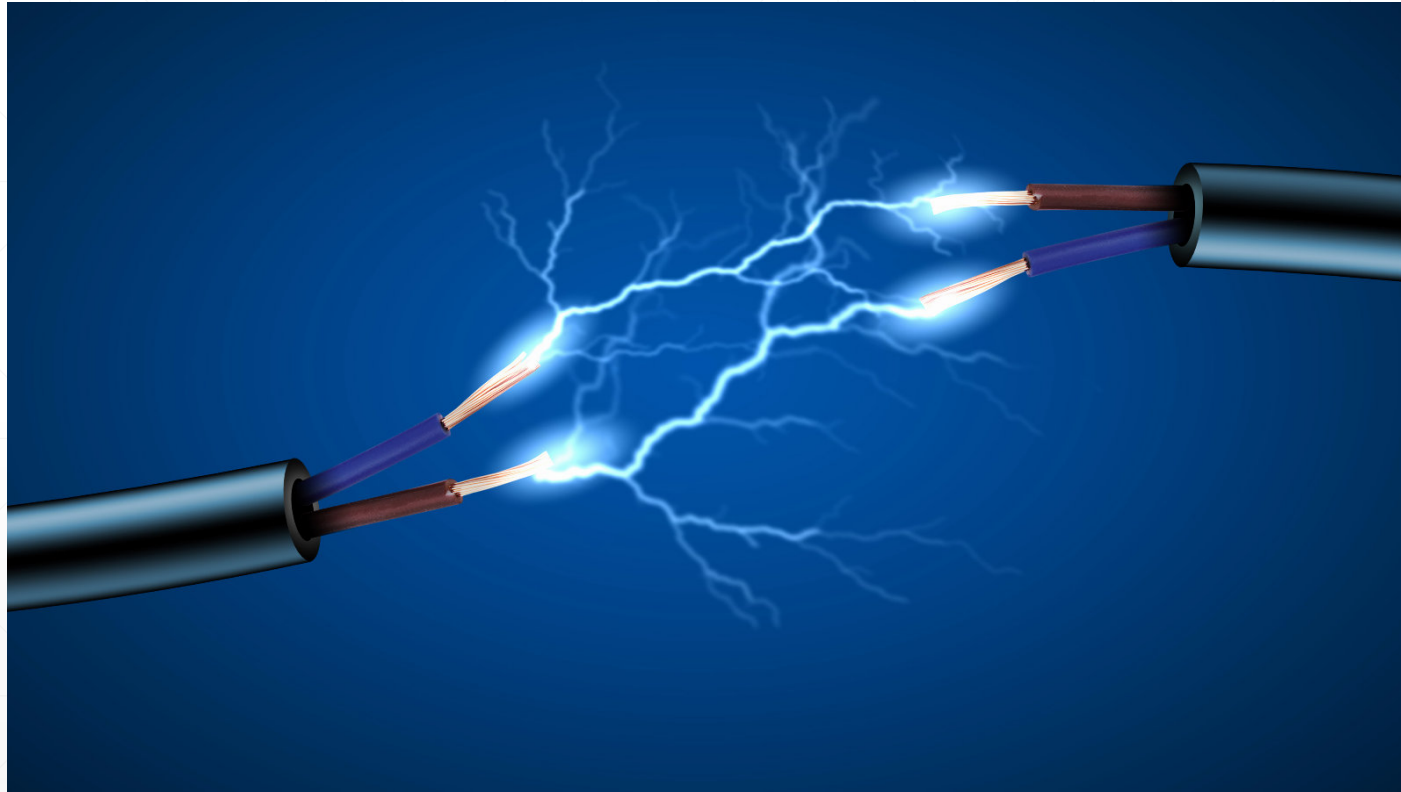
Electrons can differ in the energy they have and can occupy different SHELLS around the nucleus.



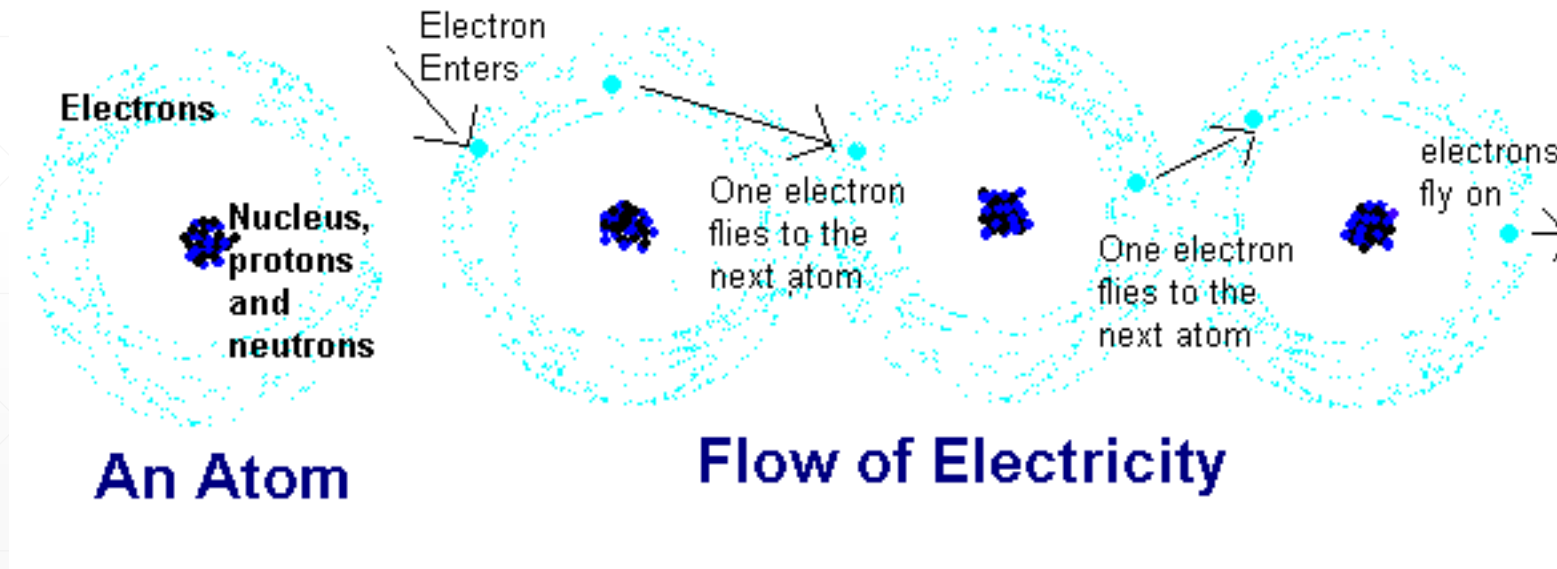
The outermost shell is the valence shell.



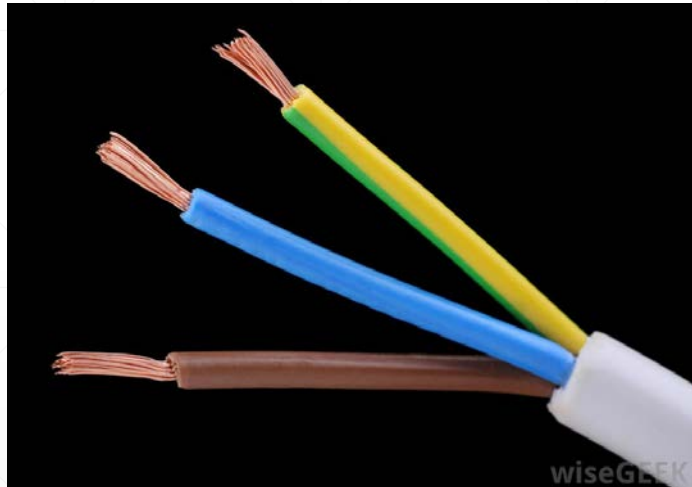
Recall that “electricity” is the movement, flow and control of electrons.



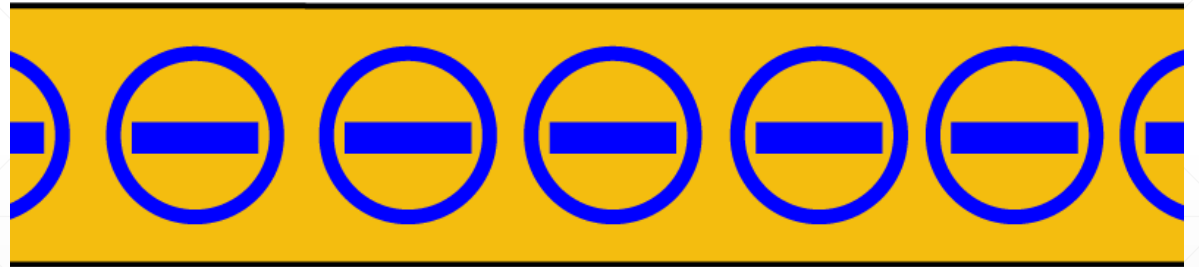
In order to harness electrons to do work for us, we must remove them from their orbits. Electrons in the valence shells are the easiest to remove.



Elements that have either one, two, or three electrons in the valence shell are known as **CONDUCTORS**.



conductor



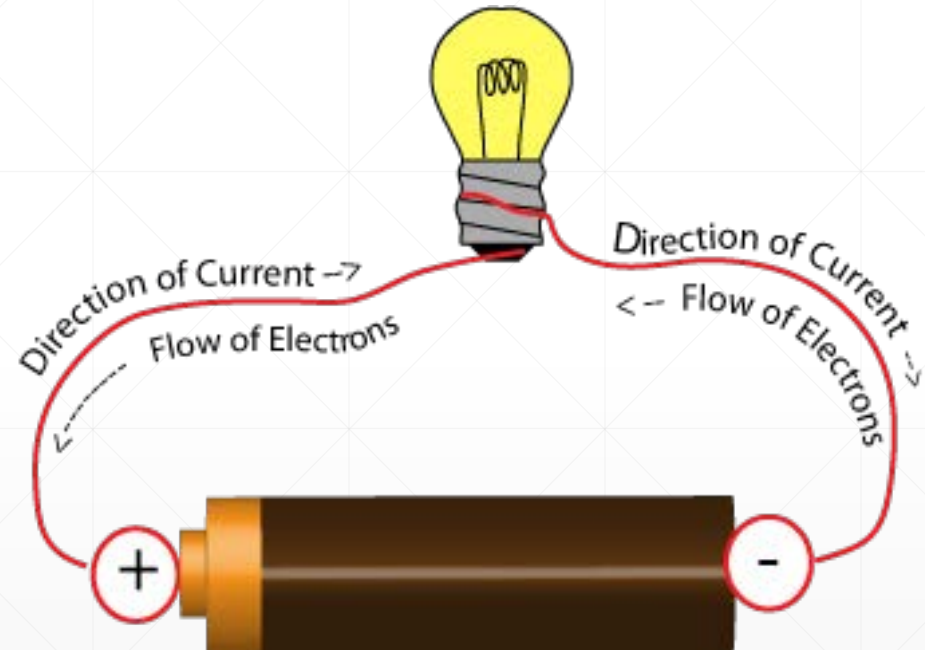
→
electron flow

how equipment works .com

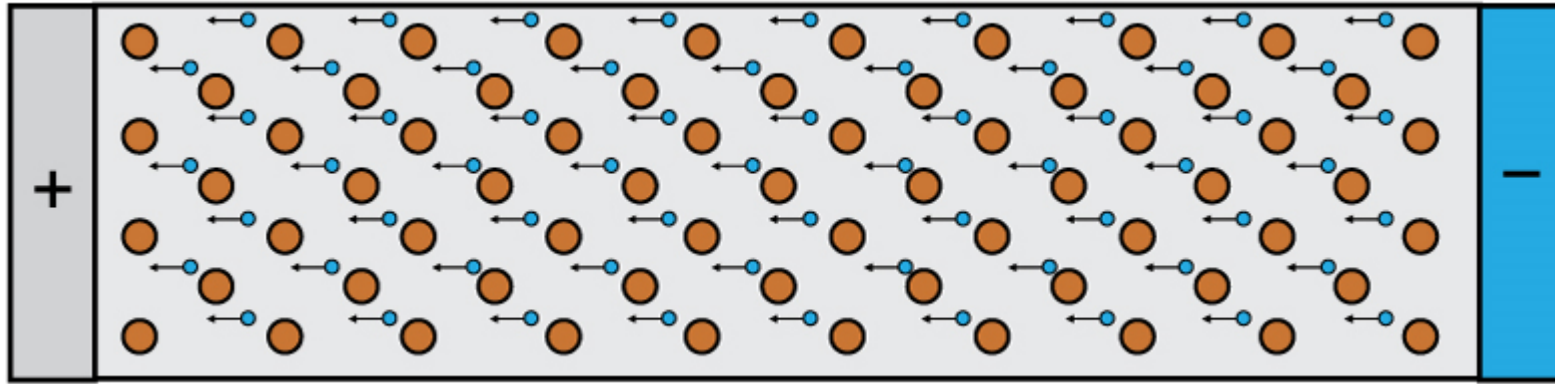
Gold, silver, aluminum, and copper are conductors.



It is the flow of electrons from conducting atoms that form the basis of **ELECTRICAL CURRENT** and the transfer of its energy into an everyday form we call **ELECTRICITY**.



Conductors have billions of atoms which form a sea of electrons ready to be mobilized.

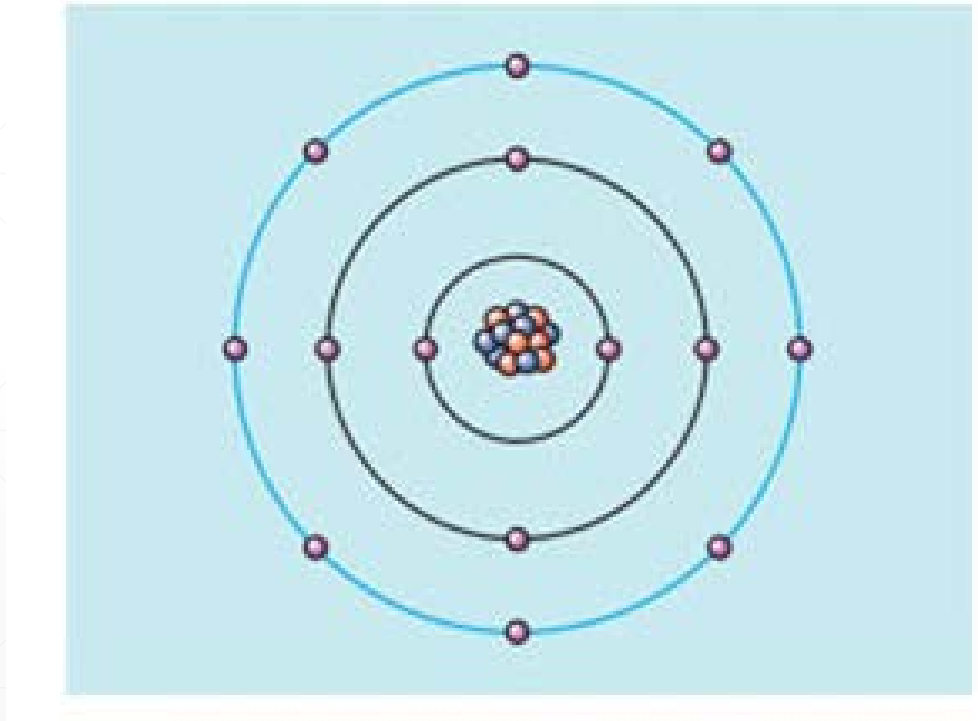


In contrast with conductors, **INSULATORS** are elements composed of atoms that have between six and eight valence electrons.

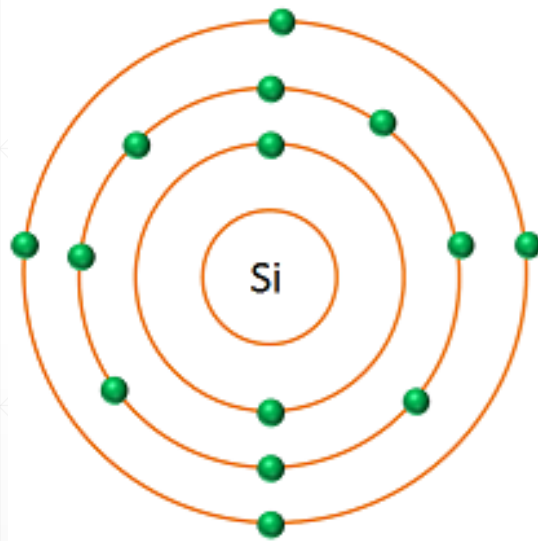


Plastic
insulation does
NOT conduct
electricity

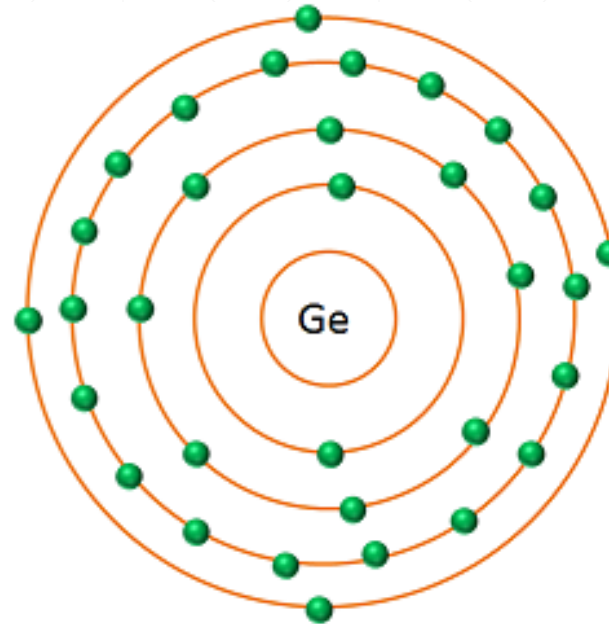
Most solids are considered insulators and resist the flow of electrons since their electrons are in tightly bound orbits.



A special kind of atom is the **SEMICONDUCTOR**, which is both a conductor and an insulator, depending on how it is controlled. Semiconductors have 4 or 5 atoms in the valence shell.



Silicon



Germanium

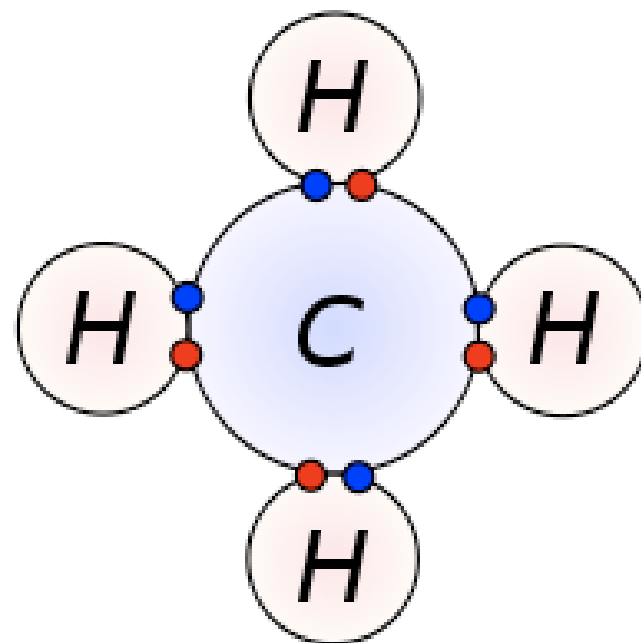
Semiconductors are amazing; their ability to be manipulated into conductors or insulators has led to the invention of components such as transistors, diodes, LEDs and photovoltaic cells.



These components have made the technological explosion of the last generation possible.



MOLECULAR COMPOUNDS: The bonding of two or more atoms can produce a completely new electrical characteristic than the individual atoms possessed themselves.



- Electron from hydrogen
- Electron from carbon

For example, two conductors can combine and become an insulator.

