

Name: \_\_\_\_\_

## What is Electricity?

**Directions:** Read the passage about electricity. Label the diagrams on page two to show your understanding of how electricity works.

The Electron Theory says that all matter is made of atoms. Atoms are made of smaller particles, called electrons and protons, each of which has an electrical charge. Protons, and neutrons, are found within the nucleus of the atom. Neutrons are neutral. Electrons orbit the nucleus. There are as many protons in the nucleus as there are electrons that orbit it. The nucleus of an atom always has a positive charge because protons have a positive charge. Electrons have a negative charge.

Positive and negative charges are unlike each other. They are opposite. Two positive charges, as well as two negative charges, will repel each other. But, a positive and negative charge attract each other. All normal atoms have an equal number of negative and positive charges, making them electrically balanced atoms. Atoms have inner and outer orbits. Electrons nearest to the nucleus (inner) are strongly attracted to it, and are called bound electrons. Electrons in the outer orbit are not so strongly attracted to the nucleus. They can be easily forced off their orbits, and are called free electrons.

When an atom loses one of its free electrons, it becomes electrically unbalanced and positive in charge because it has more protons than electrons. To regain its normal balanced condition, an electrically unbalanced atom tries to attract any stray electrons within its reach. A positive is attempting to attract a negative. This is the basic principle of an electric current, or current flow. Electrical imbalance causes electrons to flow from atom to atom. To produce an orderly electrical flow that can be controlled, we use wires which are properly called conductors. These conductors are made of a material in which the atoms hold their free electrons with a weak force so the electrons can be easily pushed from their orbits. The atoms are spaced close together so their free electrons overlap, allowing them to move from atom to atom with the least amount of effort.

If the ends of the conductor are connected to a negatively charged object and a positively charged object, the positively charged object will attract electrons from the conductor so its unbalanced atoms can regain their balance. The negatively charged object, which has a surplus of electrons, supplies electrons to the conductor, replacing those attracted to the positively charged object. An electron flow, commonly called an electrical current, has been established in the conductor.