



Objectives

- ✿ **Define** the term matter.
- ✿ **Explain** the relationship between “elements and atoms”, and “compounds and molecules.”
- ✿ **Contrast** covalent and ionic bonds.
- ✿ **Classify** the parts to a chemical reaction.
- ✿ **Describe** the kinetic energy of particles in different states of matter.



Matter

- ✿ Everything in the universe is made up of **matter**.
- ✿ All matter is made up of tiny particles called **atoms**.
- ✿ Atoms are the smallest unit of an **element** that still retain that element's properties.

Atoms

- ✿ Atoms are made up of three **sub-atomic particles**.
 - ✿ **Protons** are positively charged particles and are located in the nucleus.
 - ✿ **Neutrons** have no charge (neutral) and are also located in the nucleus.
 - ✿ **Electrons** have a negative charge, are located on the outside of the atom in the **Electron Cloud**, and are responsible for **bonding**.



Chemical Bonds

- ✿ Atoms can combine with other atoms to form a **molecule**.
- ✿ Like molecules form a **compound**.
- ✿ There are 2 main types of bonds:
 - ✿ Covalent Bonds occur when atoms share their outermost electrons.
 - ✿ Ionic Bonds occur when atoms gain or lose their outermost electrons.

Chemical Reactions

- ✿ When atoms form or break bonds to become new molecules it is called a **chemical reaction**.
- ✿ The substances that go into a chemical reaction are called **reactants**.
- ✿ The substances that are generated as a result of a chemical reaction are called **products**.



Reactants

Products



Redox Reactions

- ✿ Chemical reactions are responsible for the exchange of energy between an organism and the environment.
- ✿ **Oxidation Reactions** are reactions in which reactants lose electrons (energy.)
- ✿ **Reduction Reactions** are reactions in which reactants gain electrons (energy.)
- ✿ A **redox reaction** is when both oxidation and reduction happen in the same reaction.



Making Reactions Happen

- ✿ Many reactions require the addition of energy to happen.
- ✿ The amount of energy required to make a reaction start is called the **activation energy**.
- ✿ Substances known as **catalysts** can reduce the activation energy for a reaction.
- ✿ Catalysts are not used up in the chemical reaction.
- ✿ **Enzymes** are biological catalysts.



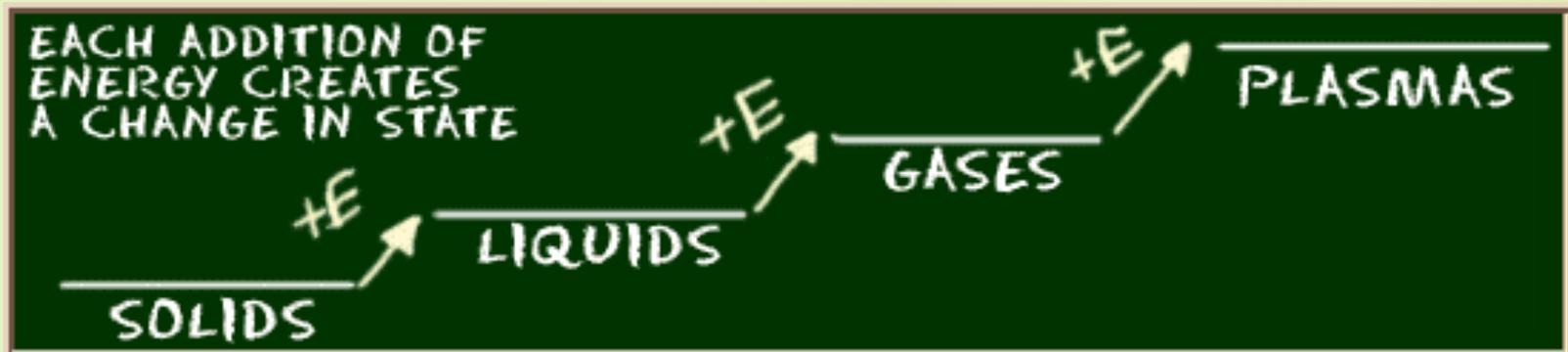
States of Matter

- ✿ **The Kinetic Theory of Matter** states that the particles (atoms and molecules) that make up all matter are constantly in motion.
- ✿ The amount of Kinetic energy (movement) and how close the particles are determines which state of matter the substance is in.

Energy and State

- ✿ Look at the different states of matter and compare the movement.

Purdue Animation





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