# Introduction to Matter Study Guide

**Matter** = anything with mass and volume

**Classification of Matter:**

Law of Conservation of Matter (Mass): matter cannot be created or destroyed

Law of Conservation of Energy: energy cannot be created or destroyed; it may, however, be transformed

Virtually everything that is, is made up of atoms.

Currently, we have about _____ kinds of atoms. In the natural world there exists _____ different kinds of atoms. The others have been artificially produced in laboratories.

We call each kind of atom an _____, and we give it a specific name and symbol.

Atoms are made up of _____, _____ & _____.
Protons and neutrons are in the nucleus of atoms. Electrons travel around the nucleus.
Different kinds of atoms are different because they have different numbers of _____.
We list elements by their _____, the # of protons.

**Physical properties:** characteristics that can be observed without changing the identity of the substance.
Examples:

**Physical change**: a change in the physical form or properties of a substance that occurs without a change in composition.
Examples:

**Chemical property:** describes a substance's ability to change into a different substance.
Examples:

**Chemical change:** occurs when a substance changes composition by forming one or more new substances. (bonds are broken and bonds are formed)
Example:

Indications of a chemical change…

# Phases of Matter

Kinetic Theory:

- All matter is made of atoms and molecules that act like tiny particles.
- These tiny particles are always in motion. The higher the temp., the faster the particles move.
- At the same temp., more massive (heavier) particles move slower than less massive (lighter) particles

Solids:

- Definite Shape? _____
- Definite Volume? _____
- Molecules in a solid are _____ and constantly vibrating.

Liquids:

- Definite Shape? _____
- Definite Volume? _____
- Some liquids flow more easily than others. The resistance of a liquid to flow is called _____.
    - Honey has a high viscosity compared to water

Gases:

- Definite Shape? _____
- Definite Volume? _____
- The particles in a gas are spread _____, but can be compressed by pumping them into a restricted volume.

Energy Transfers:

- ENERGY is the ability to _____ or move matter.
- Energy is _____ when substances melt or evaporate.
    - NOTE: our bodies cool down when our sweat evaporates.
- Energy is _____ when substances freeze or condense.

Melting: Change of state from _____ to _____

- Energy (heat) is _____ by the substance that is melting.

Freezing: Change of state from _____ to _____

- Energy (heat) is _____ by the substance that is undergoing freezing.

Evaporation: Change of state at the surface of a _____ as it passes to a _____

- Results from random motion of molecules that occasionally escape from the liquid surface.
- Energy (heat) is _____ by the liquid. (Cooling of the liquid results)
- Can happen at any time.

Condensation: Change of state from _____ to _____

- Energy (heat) is _____ by the substance that is condensing. (Warming of the liquid results)

Boiling: Change of state from _____ to _____

- Occurs _____ the liquid.
- Boiling point/temperature is determined by _____
- Energy is _____ by the liquid