01.06 Matter and Energy Guided Notes

1. Define physical property. List 5 physical properties.

**Physical properties** can be observed or measured without changing the composition of matter. 5 physical properties are density, color, texture, mass, and volume.

1. Explain the Law of Conservation of Matter.

**The Law of Conservation of Matter** states that matter can be neither created nor destroyed.

1. Explain physical change.

A **physical change** is a change of a substance from one form to another without changing its composition.

1. List 3 examples of physical change.

Cutting Paper, cracking open an egg, and cutting fruit.

1. Explain chemical change.

A **chemical change** is the transformation of a substance so that the type of matter that makes up the substance changes.

1. List three examples of chemical change.

Burning paper, cooking/heating up an egg, and digesting food.

1. What are the four phases of matter?

Solids, liquids, gases, and plasma.

1. List the 2 factors that explains the differences between states of matter.

Two factors distinguish between the states of matter: particle arrangement and particle motion

1. Particle Arrangement of Solids:

Particle Arrangement: The particles in solids are packed tightly together. In most solids, the particles are arranged in a specific, fixed pattern.

Particle Motion of Solids:

Particle Motion: The particles are packed so closely together, they do not move freely, but instead vibrate in place. Due to the fixed nature of the particles, solids have a fixed volume and shape. They do not take the shapes or sizes of their containers.

1. Particle Arrangement of Liquids:

**Particle Arrangement:** The particles in liquids are fairly close together but not as close together as those in solids. The particles are not arranged in a fixed pattern.

Particle Motion of Liquids:

**Particle Motion:** The particles in liquids have enough energy to slide past each other. The particles move more than in a solid but still remain close together. Liquids have fixed volumes but not fixed shapes. They take the shapes of their containers.

1. Particle Arrangement of Gases:

**Particle Arrangement:** The particles in gases are far apart. They do not have any fixed arrangement.

Particle Motion of Gases:

**Particle Motion:** The particles in gases have so much energy that they stay as far apart as possible, moving at high speeds. Gases have no fixed volume and no fixed shape. They expand to fill their containers. Gases are also highly compressible—it's possible to reduce their volumes considerably by applying pressure to them.

1. Particle Motion of Plasmas:

**Particle Arrangement:** The particles in plasmas, like those in gases, are very far apart. They do not have any fixed arrangement.

Particle Motion of Plasmas:

**Particle Motion:** The particles in plasmas have even more energy than those in gases. They move even more quickly. Like gases, plasmas are compressible and have neither a fixed volume nor a fixed shape. Plasmas have another important characteristic: They are made up of highly energetic ions. An ion is a charged particle that has either gained or lost electrons. Plasmas are made up of positively charged particles and negatively charged electrons that move around independently.

1. Phase changes are caused by

Phase changes are caused by the transfer of thermal energy

1. List the transition points involved in phase changes.

Conduction, Convection, Radiation.

1. Explain the Law of Conservation of Energy: The **Law of Conservation of Energy** states that any form of energy can be transformed to any other form of energy without a loss of net energy.
2. Define temperature: as a measure of the relative motion
3. How is particle motion related to temperature?

If particles or moving quickly, the temperature is high, and If the particles are moving slowly, the substance has a lower temperature.

1. Heat energy is transferred between objects via conduction, convection and radiation.

Explain each process.

Conduction: Conduction occurs when a material is in direct contact with another material with a different heat energy. When objects with different temperatures come in contact with each other, energy is transferred from the higher-temperature object to the lower-temperature object.

Convection: Liquids and gases are considered fluids because atoms and molecules in the substance are free to flow past each other. Convection occurs when warm fluids rise and cool fluids sink. The buoyancy of a fluid is the difference in density when that fluid is in contact with another fluid. Warm fluids are more buoyant and, therefore, they rise. Cool fluids are less buoyant and sink.

Radiation: Conduction and convection need a medium: matter to transfer energy between substances. Radiation is the transfer of energy through waves. The process of radiation does not require a medium.