**States of Matter and Phase Changes - Notes**

**Matter:** anything that has volume and mass

**3 states of matter:** defined by motion of particles (kinetic energy)

1. **Solids:** fixed shape (slow motion), definite volume, not easily compressed (can’t be squeezed), little expansion when heated, low Kinetic energy and motion of particles, strong intermolecular forces
2. **Liquids:** fluid shape (medium motion), definite volume, not easily compressed, little expansion when heated, intermediate intermolecular forces, can flow, takes on shape of container
3. **Gases:** shape varies (fast motion), indefinite volume, easily compressed, expands at any temperature. Lots of kinetic energy and particle motion. Increases temperature leads to increased pressure on the container

\*NOTE: These are not all the characteristics we talked about in class.

**Phase changes (Physical changes)**

Evaporation (vaporization) – liquid 🡪 gas

Melting – solid -> liquid

Freezing – liquid -> solid

Condensation – gas ->liquid

Sublimation – solid -> gas

Deposition – gas -> solid

**Which of these are endothermic reactions? Which are exothermic? How do you know?**

**Kinetic Molecular Theory**

1. Matter is made up of particles
2. The particles are always moving (Kinetic energy is the energy of movement)

\*An increase of temperature leads to an increase in kinetic energy

**Phase change graphs** – can show exothermic or endothermic reaction and phase changes (can go backwards and forwards)

What does this graph mean? What is happening at each stage?



L

Phase changes are physical changes. What is evidence of a chemical change? Can you differentiate between physical changes in matter and chemical changes in matter?

Law of Conservation of Matter – says that matter can neither be created nor destroyed. For example, the liquid above turns into a gas, it doesn’t totally disappear (not a magic trick!)