4-12
How does Temperature Affect Viscosity and Density?

Name: Date:

Vocabulary: N/A	Student Notes
Big Ideas: ▪ The viscosity of a fluid decreases as the temperature increases & the fluid flows faster. ▪ In most cases the density of a fluid decreases with an increase in temperature.	
Key Question: How does temperature affect viscosity and density? - Viscosity, Density and Buoyancy all change with changes in _____. - Most fluids become _____ _____ _____ _____. - As heat is removed from a fluid, the fluid particles _____ and it becomes _____--- and its viscosity increases. - An _____ in temperature represents an _____ in the average kinetic energy of the molecules in the fluid, which usually causes the fluid to _____. - Thus, the density and buoyancy of fluids are affected by heat. - The hot air inside a hot-air balloon is less dense than the cooler air outside it. - The buoyant force exerted by the cooler, denser air keeps the balloon afloat. - The temperature of tropical water is higher than the temperature of water in temperate zones, resulting in tropical water having a lower density. - The buoyant force exerted by tropical water is therefore lower, causing ships to float lower than in colder water.	

Summary:

Water: A Special Case:

- Water reaches its maximum density at _____ °C.
- This allows ice to float on top of water and keeps plants and other aquatic life alive.
- If the lake froze solid, trapping the plants and animals, they would freeze and die.
- Water is _____ dense at 4 °C.
- Above and below 4 °C, water is _____- dense.
- Water is the only fluid to behave this way.

Thermometers:

- Heat is neither a substance nor exactly a form of energy
- *Heat* is actually a term used to describe the energy transferred from a higher-temperature object to a lower-temperature object because of the difference in temperature.
- Temperature is a measure of the average kinetic energy of individual molecules.

A Summary of the _____, the three states of matter and mass, volume and density:

A.) _____:

- Solids have mass and a definite volume (they take up their own space).
- The density of the particles making up the mass of a solid is the greatest of the three states of matter.
- The particles of the solid have strong forces of attraction and are locked into a rigid structure.

B.) _____:

- Liquids also have mass and a definite volume, but they take the shape of whatever container they are in.
- Liquids are less dense because the energy the particles have gained causes them to move faster, farther apart, and free of the force of attraction holding them in one place.
- The density of the particles making up the mass of a liquid is less than that of a solid, but greater than that of a gas.

C.) _____-:

- Gases also have mass, but they have an indefinite volume. Gases disperse to fill whatever container they are in and also take the shape of the container.
- The density of the particles making up the mass of a gas is the lowest of the three states of matter.
- Gas particles have gained so much energy that they have moved very far apart, with the freedom to fill any space they occupy.