Unit # - 1 - Matter

Standards Addressed	Student Learning Objectives for this Unit	Content Skills and Knowledge	Learning Activities and Instructional Strategies
NSES Standards: Properties & Changes of Properties in Matter PA STEE Standards: 3.2.7.A (sci. k) 3.2.7.B (app k) 3.4.7.A (str mat) 3.4.7.B (e ht trn) 3.1.7.B (models) 3.7.7.B (instr) 1.2 read crit 1.4 writing 1.8 presentation	Students will be able to… 1. Understand characteristic physical properties of matter. ▪ Mass, volume, and density are properties of liquids and solids. ▪ Density can be used to predict the behavior of matter (floating and sinking.) ▪ Gases have mass, volume, and density. ▪ Density varies with temperature. (Expansion and contraction) ▪ Substances behave in a characteristic way when heated. ▪ Phase changes occur because of the effects of heat and temperature on matter. ▪ Melting and boiling points are characteristic properties. ▪ Mass is conserved during phase change. 2. Understand the nature of mixtures and solutions. ▪ Matter exists as pure substances and mixtures. ▪ Solutions are mixtures of solutes and solvents. ▪ Solubility is a characteristic property. ▪ Mass is conserved during dissolving. ▪ Volume is not conserved during dissolving. ▪ Solubility can be used to separate soluble and insoluble substances. ▪ Different solvents may dissolve different solutes. ▪ Soluble substances can be separated using chromatography. ▪ Solutes can alter the properties of solvents. (Aqueous solutions and alloys)	**Knowledge - Part 1:** ▪ Mass, Volume, and Density ▪ Density = Mass/Volume ▪ Temperature ▪ Mass, Weight, Gravity, Inertia ▪ Melting Point/Boiling Point ▪ Phase Change – S, L, G ▪ Boyle's Law, Charle's Law ▪ Evaporation/boiling **Skills - Part 1:** ▪ Accurately measuring mass and volume to experimentally determine density ▪ Building a density column ▪ 5. Tools: Grad Cylinder, Balance, Meter stick, overflow cup ▪ Use metric measurement where appropriate ▪ **Knowledge - Part 2:** ▪ Solutions, Solvents, & Solutes ▪ Conservation of Mass ▪ Solubility ▪ Chromatography ▪ Aqueous ▪ Alloys **Skills - Part 2:** ▪ Using chromatography paper to separate solutes	**Part 1:Lab or Demonstration:** Density: Calculate density, and identify substances using a density chart. (Holt) Measuring (Holt) Determining Density (Holt) Measuring Mass&Volume of Water (STC) **Reading:** Mass or Weight? (STC) Why did the Titanic Float?(STC) Density Creates Currents (STC) **Worksheet:** A Matter of Density (Holt) As a Matter of Fact! (Holt) **Technology**: Density: Virtual Lab http://explorescience.com/activities/Activity_page.cfm?ActivityID=29 Charles Law http://plabpc.csustan.edu/general/tutorials/temperature/CharlesLaw/CharlesLaw.htm **Part 2: Lab or Demonstration:** Mixing Water and Alcohol (STC) **Reading**: Bicycle Ingredients (STC) **Worksheet**: **Technology**: Solubility of a Salt: NASA http://www.nasaexplores.com/lessons/01-025/9-12_2.html

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Unit # - 1 - Matter

Unit Modifications

Part 1:
Comparing Densities of Different Substances (STC)

Unit Enrichments

Part 1:
Full of Hot Air! (H)
Can Crusher (H)

Part 2:
A Sugar Cube Race (H)

Suggested Assessment Techniques for Unit

Core 1: Matter Unit Common Standards Assessment (district common)
Core 2: Density Performance Assessment.

Materials/Technology for Unit

1. Density is an important concept for students to understand. This "learning tool" is called Density Lab. Here students get to place different hunks of material into a "pail of liquid" to see if they sink or float.
2. This "learning tool" is called The Origin of the Periodic Table. Contained within this lesson is one of the best interactive periodic table called David's Whizzy Periodic Table.
3. Electrolysis: Virtual Experiment. Got Gas?