

WAUCONDA SCHOOL DISTRICT 118

UNIT PLANNING ORGANIZER

Subject: Science

Grade Level or Course: 6th

Unit 5: Chemistry II: States of Matter and Properties of Matter

Pacing: 4-5 weeks

STAGE 1 – DESIRED RESULTS

Essential Questions: (What will students take away from this unit, not necessarily on an assessment)

- What are the different states of matter?
- What are the properties of matter?
- What is energy?
- What happens when thermal energy is absorbed or released from matter?
- Why do some objects float, but others sink?
- How is pressure transmitted through fluids and gases?
 - Archimede's Principle
 - Bernoulli's Principle
 - Pascal's Principle
- What is the relationship between moving gases and liquids and the pressure that exists within them?
- How do you determine the density of an object?
- What is the pH scale, how is it used, and what does it identify?
- What are acids, bases, and neutral solutions?

Big Ideas:(Discipline specific goals that help to answer the essential question, will be tested)

- Matter exists in different states or phases (solid, liquid, gas, plasma, colloids)
 - the state of matter relates to the energy of its particles
- Matter has chemical and physical properties
- Energy is the ability to do work or cause change
- The absorption or release of thermal energy affects the state of matter
 - Melting, Boiling, Vaporization, Condensation, Sublimation
- Archimedes' Principle-The buoyant force placed on an object is equal to weight of fluid displaced.
- Pascal's Principle-When force is applied to a fluid, pressure is transmitted equally throughout the fluid
- Bernoulli's Principle-when the speed of a fluid increases, the pressure decreases
- The density of an object is proportional to the amount of matter it possesses, not the size of an object
- The density of pure water is 1.0 g/cm³ and objects with a greater density will sink and objects with less density will float
 - the density of matter is its mass divided by its volume
- The pH scale shows the potential of hydrogen
 - acids have higher concentrations of Hydrogen Ions (H⁺)

- bases have higher concentrations of Hydroxide Ions (OH⁻)
- neutral solutions have equal concentrations of Hydrogen and Hydroxide Ions
- The pH scale is from 1-14
 - 1 is the most acidic, 7 is neutral, and 14 is the most basic
 - moving 1 number left or right increases or decreases the potential of hydrogen by the power of 10
 - indicators are used to determine acids, bases, or neutral solutions
 - examples of acid indicators would include: blue litmus paper, btb, phenol red
 - examples of bases indicators would include: red litmus paper, phenolphthalein, methyl red
 - examples of universal indicators would include: pH paper, cabbage juice, universal indicator

CCSS (Priority Standards):

- MS-PS1-2. Analyze and interpret data on the properties of substances before and after the substances interact to determine if a chemical reaction has occurred.** [Clarification Statement: Examples of reactions could include burning sugar or steel wool, fat reacting with sodium hydroxide, and mixing zinc with HCl.] [Assessment Boundary: Assessment is limited to analysis of the following properties: density, melting point, boiling point, solubility, flammability, and odor.]
- MS-PS1-4. Develop a model that predicts and describes changes in particle motion, temperature, and state of a pure substance when thermal energy is added or removed.** [Clarification Statement: Emphasis is on qualitative molecular-level models of solids, liquids, and gases to show that adding or removing thermal energy increases or decreases kinetic energy of the particles until a change of state occurs. Examples of models could include dr
- MS-PS1-5. Develop and use a model to describe how the total number of atoms does not change in a chemical reaction and thus mass is conserved.** [Clarification Statement: Emphasis is on law of conservation of matter and on physical models or drawings, including digital forms, that represent atoms.] [Assessment Boundary: Assessment does not include the use of atomic masses, balancing symbolic equations, or intermolecular forces.]

CCSS (Supporting Standards):



STAGE 2 – EVIDENCE

Concepts (What students need to know)	Performance Tasks (What students will be able to do)	21st Century Skills
<ul style="list-style-type: none"> ● Matter exists in different states. <ul style="list-style-type: none"> -Solid -Liquid -Gas -Plasma -Colloids ● Matter changes phases <ul style="list-style-type: none"> -Melting/Freezing -Vaporization/Condensation -Sublimation/deposition ● Buoyancy ● Archimedes Principle ● Density ● Bernoulli's Principle ● Pascal's Principle ● Ions & Isotopes ● pH Scale ● Acids, Bases, and Neutral ● Hydrogen Ions (H⁺) ● Hydroxide Ions (OH⁻) Indicators 	<ul style="list-style-type: none"> ● The Learner Will (TLW) ● TLW-Define: Solid, Liquid, Gas ● TLW-Define: Thermal Energy ● TLW-Recognize States of Matter at the molecular level ● TLW-Complete Boiling H₂O Lab & Graph Heat Transfer ● TLW-Complete Dry Ice Activities ● TLW-Complete Oobleck Project ● TLW-Use the formula for Density ● $\text{Density} = \text{Mass} / \text{Volume}$ ● TLW-Apply Archimedes Principle in hands on activities ● TLW-Apply Bernoulli's Principle in hands on activities ● TLW-Apply Pascal's Principle in hands on activities ● TLW test the pH of substances ● TLW use indicators to determine acids and bases 	

STAGE 3 – LEARNING PLAN (INSTRUCTIONAL PLANNING)

Suggested Resources/Materials/Informational Texts

- Glencoe Science: *Introduction to Physical Science*

Suggested Research-based Effective Instructional Strategies

Academic Vocabulary/ Word Wall	Enrichment/Extensions/ Modifications	Interdisciplinary Connection
<p>Essential Vocabulary: Essential Vocabulary:</p> <p>Matter solid liquid gas energy temperature heat melting freezing vaporization condensation sublimation pressure buoyant force Density=mass/volume Archimedes' Principle Pascal's Principle Bernoulli's Principle pH scale Acids, bases, neutral solutions Indicators</p>		

Worth-knowing Vocabulary:		
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