

Phoenixville Area School District Understanding by Design (UbD) Science Template

Grade Level: 6

Unit Name: Structure and Properties of Matter

Author: L. Freeman

Stage 1 Desired Results

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<p>Overarching NGSS & PA Standards:</p> <p>3.2.6-8.A Develop models to describe the atomic composition of simple molecules and extended structures.</p> <p>3.2.6-8.B 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.</p> <p>Which branch(es) of science apply: PS</p>	Transfer	
	<p><i>Students will be able to independently use their learning to...</i></p> <ol style="list-style-type: none"> 1. Ask questions and/or define problems 2. Develop and/or use models 3. Plan and/or carry out investigations 4. Analyze and interpret data using computational thinking 5. Obtain, evaluate, and communicate information (supported by evidence) 6. Construct explanations and design solutions 	
	Meaning-Making	
	<p><i>Students will understand that...</i></p> <ul style="list-style-type: none"> • Matter is anything that has a mass and takes up space. • Everything is made of matter, which can be broken down into basic elements (individual atoms) • Physical properties are characteristics that scientists can measure without changing the composition of the sample under study, such as mass, color, and volume, and density. • The metric system of measurement is the standard unit of measurement used by scientists. 	<p>ESSENTIAL QUESTIONS <i>Students will keep considering...</i></p> <ol style="list-style-type: none"> 1. What is matter? 2. How is it possible for matter to have different properties 3. What is mass? Volume? Density? 4. Why do some things float while others sink?
	Knowledge and Skills Acquisition	
	UNDERSTANDINGS	
	<p><i>Students will know...</i></p> <ul style="list-style-type: none"> • Physical properties can be measured or observed without changing the matter into something else. • Compare independent and dependent physical properties of pure substances. • Each pure substance has characteristic physical and chemical properties (for any bulk quantity under given conditions) that can be used to identify it. • Each pure substance has measurable properties, some of which are independent of the amount of matter present (density) and others that are dependent on the amount of matter present (volume, mass, and weight). • All matter is made up of atoms. 	<p><i>Students will be skilled at...</i></p> <ul style="list-style-type: none"> • Developing models of basic atom composition • Determining and calculating a solid object's mass • Determining and calculating a regular and irregular solid object's volume.

- Atoms of the same elements share the same basic properties.
- Gases and liquids are made of molecules or inert atoms that are moving about relative to each other.
- In a liquid, the molecules are constantly in contact with others; in a gas, they are widely spaced except when they happen to collide.
- In a solid, atoms are closely spaced and may vibrate in position but do not change relative locations.
- The changes of state that occur with variations in temperature or pressure can be described and predicted using these models of matter.
- Changes between solid, liquid, and gaseous states of matter occur when heat is added or removed from the atoms/molecules of a substance.

- Developing models of molecules within different states of matter.
- Determine the density of substances.
- Experimenting with density of solids and liquids
- Comparing density of objects and substances.

KEY VOCABULARY

- Matter
- Physical Properties
- Mass
- Volume
- Density
- Atom
- Proton (+)
- Neutron
- Electron (-)
- Element
- Compound
- Molecule
- Solid
- Liquid
- Gas

Stage 2 – Evidence

**Evaluative
Criteria**

Assessment Evidence

PERFORMANCE TASK(S):

Differentiation Considerations:

<p>Rubric (linked below)</p>	<p>1. Structure and Properties of Matter Performance Task</p> <ul style="list-style-type: none"> Follow the Scientific Method to form a hypothesis, gather evidence, and form a conclusion Students will use triple beam balances, graduated cylinders, and everyday objects to determine the density of objects Accurate metric measurements to the nearest tenth are expected and all units of measurement should be present <p style="text-align: center;">Mass, Volume, and Density Performance Task</p>	<p>Alter number of objects for assessment</p> <p>Directions printed in various languages</p>
<p>Graded Lab</p> <p>Content Criteria</p> <p>Graded Lab</p> <p>Content Criteria</p>	<p style="text-align: center;">OTHER EVIDENCE:</p> <p>1. Mass Lab</p> <ul style="list-style-type: none"> Students use a triple beam balance to find accurate measurements in grams to the nearest tenth A variety of objects are needed Students record observations here: Mass Lab <p>2. Measuring Volume: Rainbow Lab</p> <ul style="list-style-type: none"> Students accurately measure volume in milliliters and follow directions Rainbow Lab Directions and Student Answers <p>3. Calculating Volume of an Irregular Solid Lab</p> <ul style="list-style-type: none"> Students use graduated cylinders to calculate the volume of irregular solids through water displacement Chart should be complete with metric units of measurement Irregular Solid Water Displacement Lab Student Copy <p>4. Liters, Meters, Grams Foldable The Metric System</p> <p>5. Mystery Canisters Lab</p> <ul style="list-style-type: none"> Challenges students to modify three film canisters so that they have one that floats, one that sinks, and one that will remain suspended in the tub of tap water 	<p>Differentiation Considerations:</p> <p style="text-align: center;">Modified Quizzes</p> <p style="text-align: center;">Flexible grouping</p> <p style="text-align: center;">Guided/Cloze Notes</p> <p style="text-align: center;">Pictures and videos to support vocabulary</p> <p style="text-align: center;">Sentence Starters</p> <p style="text-align: center;">Product modification in place of writing: -Drawing -Verbal explanation</p> <p style="text-align: center;">Homogeneously grouped labs to allow for teacher support</p>

Content Criteria/ Graded Lab	<ul style="list-style-type: none"> Once the students have their canisters approved, they find the mass and volume of the canisters and calculate each density Complete the activity sheet: Mystery Canisters 	
Graded Lab	<p>6. BrainPop Video and Questions: Atoms</p> <ul style="list-style-type: none"> Watch the video and answer the questions attached below: <p>BrainPop Atoms Student Questions</p>	
Graded Quiz	<p>7. Basic Atom Structure and Composition</p> <ul style="list-style-type: none"> Through use of the Atom's Family, students learn and create models of a basic atom Atom's Family PowerPoint Atoms Family Student Sheet 	
Content Criteria	<p>8. Metric Measurement Study Guide Metric Measurement, Density, States of Matter CS</p>	
Content Criteria	<p>9. Exploring Density – Density Towers Lab</p> <ul style="list-style-type: none"> Students compute measurements to determine density Liquids are ordered from most dense to least dense Students create tower to check answers Exploring Density – Density Towers Lab 	
Content Criteria	<p>10. Density Quiz</p>	
Observation	<p>11. Calculating Density Lab (CS)</p> <ul style="list-style-type: none"> Students calculate density of everyday objects Students must find the mass using a triple beam balance and the volume using water displacement in a graduated cylinder Students compute measurements to determine density Calculating Density Lab 	
	<p>12. Science Notebook Entries</p> <ul style="list-style-type: none"> Concept maps Note-taking Vocabulary/Glossary entries Guided Research <p>13. Class Participation</p> <ul style="list-style-type: none"> Volunteering 	

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| | <ul style="list-style-type: none">• Note-taking• Participation in Labs | |
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