Unit 3: The Properties of Matter

Content Area: **Science**
Course(s): **Generic District Course, Science**
Time Period: **Generic Time Period**
Length: **Weeks**
Status: **Published**

Unit Overview

In the *Properties of Matter* unit, the students will identify and describe the properties of the three states of matter: solids, liquids and gasses. They will conduct experiments and work collaboratively to safely measure, gather, evaluate and share evidence using tools and technologies. They will compare and contrast the three states of matter and describe objects based on their properties. Through various lab activities they will come to understand that all matter has mass and volume. They will discover how the states of matter can change and form new substances and how mixtures, solutions and suspensions are formed.

Standards

SCI.3-4.5.1.4.A.1	Demonstrate understanding of the interrelationships among fundamental concepts in the physical, life, and Earth systems sciences.
SCI.3-4.5.1.4.A.2	Use outcomes of investigations to build and refine questions, models, and explanations.
SCI.3-4.5.1.4.A.3	Use scientific facts, measurements, observations, and patterns in nature to build and critique scientific arguments.
SCI.3-4.5.1.4.B.1	Design and follow simple plans using systematic observations to explore questions and predictions.
SCI.3-4.5.1.4.B.2	Measure, gather, evaluate, and share evidence using tools and technologies.
SCI.3-4.5.1.4.B.3	Formulate explanations from evidence.
SCI.3-4.5.1.4.B.4	Communicate and justify explanations with reasonable and logical arguments.
SCI.3-4.5.1.4.C.1	Monitor and reflect on one's own knowledge regarding how ideas change over time.
SCI.3-4.5.1.4.C.2	Revise predictions or explanations on the basis of learning new information.
SCI.3-4.5.1.4.C.3	Present evidence to interpret and/or predict cause-and-effect outcomes of investigations.
SCI.3-4.5.1.4.D.1	Actively participate in discussions about student data, questions, and understandings.
SCI.3-4.5.1.4.D.2	Work collaboratively to pose, refine, and evaluate questions, investigations, models, and theories.
SCI.3-4.5.1.4.D.3	Demonstrate how to safely use tools, instruments, and supplies.
SCI.3-4.5.2.4.A.1	Identify objects that are composed of a single substance and those that are composed of more than one substance using simple tools found in the classroom.
SCI.3-4.5.2.4.A.2	Plan and carry out an investigation to distinguish among solids, liquids, and gasses.
SCI.3-4.5.2.4.A.3	Determine the weight and volume of common objects using appropriate tools.
SCI.3-4.5.2.4.B.1	Predict and explain what happens when a common substance, such as shortening or candle wax, is heated to melting and then cooled to a solid.
SCI.3-4.5.4.4.G.1	Explain how clouds form.
SCI.3-4.5.4.4.G.2	Observe daily cloud patterns, types of precipitation, and temperature, and categorize the

	clouds by the conditions that form precipitation.
SCI.3-4.5.4.4.G.3	Trace a path a drop of water might follow through the water cycle.
SCI.3-4.5.4.4.G.4	Model how the properties of water can change as water moves through the water cycle.

Essential Questions

How does the classification of objects and substances help us to understand the natural world?

How do the three states of matter exist and change in our world?

How can measurement and observation help us answer questions about the world around us?

Application of Knowledge and Skills...

Students will know that...

- 1. The students will know that all objects and substances in the natural world are composed of matter.
- 10. The students will know the difference between a solution, a suspension and a mixture.
- 11. The students will know that evaporation and filtration can be used to separate chemicals.
- 12. The students will know that heat can cause both physical and chemical changes to matter.
- 2. The students will know that the three states of matter are solid, liquid and gas.
- 3. The students will know that the water cycle is an example of change in matter.
- 4. The students will know the steps of the Scientific Method.
- 5. The students will know the safety procedures for conducting experiments.
- 6. The students will know what tools to use while carrying out investigations.
- 7. The students will know what tools to use to find the volume and mass of substances and objects.
- 8. The students will know that substances can undergo physical and chemical changes to form new substances.
- 9. The students will know that objects and substances have different properties.

Students will be able to...

- A. classify objects and substances as to whether they are solids, liquids or gasses;
- B. describe the three states of matter;
- C. describe the water cycle as an example of change in matter;
- D. conduct experiments using the Scientific Method;
- E. employ good safety procedures while conducting investigations and experiments;

- F. use the appropriate tools as they conduct investigations;
- G. use a balance scale and a graduated cylinder to find the volume and mass of substances and objects;
- H. identify the properties of unknown chemicals and objects;
- I. identify the difference between physical and chemical changes;
- J. describe the physical and chemical changes that occur to objects and substances;
- K. identify whether a substance is a solution, suspension or mixture;
- L. separate chemicals using evaporation and filtration;
- M. use heat to enact a physical and/or chemical change in matter;
- N. explain how heat can cause a change in matter.

Assessments

Diagnostic: Other written assessments
Properties of Matter Splash Activity 5.1.4.A.1; 5.1.4.B.3; 5.1.4.B.4; 5.1.4.C.1

Formative: Other written assessments
"What Is Matter" assessment 5.1.4.A.1; 5.1.4.A.2; 5.1.4.A.3;5.1.4.B.3; 5.1.4.B.4; 5.1.4.C.1; 5.1.4.C.2; 5.1.4.C.3; 5.1.4.D.1; 5.1.4.D.2; 5.2.4.A.3

Formative: Other written assessments
"States of Matter" assessment 5.1.4.A.1; 5.1.4.A.2; 5.1.4.A.3; 5.1.4.B.1; 5.1.4.B.2; 5.1.4.B.3; 5.1.4.B.4; 5.1.4.C.1; 5.1.4.C.2; 5.1.4.C.3; 5.1.4.D.1; 5.1.4.D.2; 5.1.4.D.3; 5.2.4.A.2

Formative: Other written assessments
"How Does Matter Change?" assessment 5.1.4.A.1; 5.1.4.A.2; 5.1.4.A.3; 5.1.4.B.1; 5.1.4.B.2; 5.1.4.B.3; 5.1.4.B.4; 5.1.4.C.1; 5.1.4.C.2; 5.1.4.C.3; 5.1.4.D.1; 5.1.4.D.2; 5.1.4.D.3; 5.2.4.A.2; 5.2.4.B.1

Formative: Other visual assessments
Water Cycle Activity assessment 5.1.4.A.1; 5.1.4.A.2; 5.1.4.A.3;5.1.4.B.3; 5.1.4.B.4; 5.1.4.C.1; 5.1.4.C.2; 5.1.4.C.3; 5.1.4.D.1; 5.1.4.D.2; 5.4.4.G.1; 5.4.4.G.3; 5.4.4.G.4

Formative: Lab Assignment
Chemical Tests Data Sheets 5.1.4.A.1; 5.1.4.A.2; 5.1.4.A.3; 5.1.4.B.1; 5.1.4.B.2; 5.1.4.B.3; 5.1.4.B.4; 5.1.4.C.1; 5.1.4.C.2; 5.1.4.C.3; 5.1.4.D.1; 5.1.4.D.2; 5.1.4.D.3; 5.2.4.A.1; 5.2.4.A.2; 5.2.4.B.1

Formative: Other written assessments
Crystals assessment paragraph 5.1.4.A.1; 5.1.4.A.2; 5.1.4.A.3; 5.1.4.B.1; 5.1.4.B.2; 5.1.4.B.3; 5.1.4.B.4; 5.1.4.C.1; 5.1.4.C.2; 5.1.4.C.3; 5.1.4.D.1; 5.1.4.D.2; 5.2.4.A.1

Formative: Other written assessments
Crossword Puzzle 5.1.4.A.1; 5.1.4.A.2; 5.1.4.A.3; 5.1.4.B.1; 5.1.4.B.2; 5.1.4.B.3; 5.1.4.B.4; 5.1.4.C.1; 5.1.4.C.2; 5.1.4.C.3; 5.1.4.D.1; 5.1.4.D.2; 5.2.4.A.1; 5.2.4.B.1

Formative: Other written assessments
Chemical Tests Unit Review 5.1.4.A.1; 5.1.4.A.2; 5.1.4.A.3; 5.1.4.B.1; 5.1.4.B.2; 5.1.4.B.3; 5.1.4.B.4; 5.1.4.C.1; 5.1.4.C.2; 5.1.4.C.3; 5.1.4.D.1; 5.1.4.D.2; 5.2.4.A.1; 5.2.4.B.1

Summative: Lab Assignment

Chemical Tests Performance assessment 5.1.4.A.1; 5.1.4.A.2; 5.1.4.A.3; 5.1.4.B.1; 5.1.4.B.2; 5.1.4.B.3; 5.1.4.B.4; 5.1.4.C.1; 5.1.4.C.2; 5.1.4.C.3; 5.1.4.D.1; 5.1.4.D.2; 5.1.4.D.3; 5.2.4.A.1; 5.2.4.A.2; 5.2.4.B.1

Summative: Other written assessments
Chemical Tests Unit Test 5.1.4.A.1; 5.1.4.A.2; 5.1.4.A.3; 5.1.4.B.1; 5.1.4.B.2; 5.1.4.B.3; 5.1.4.B.4; 5.1.4.C.1; 5.1.4.C.2; 5.1.4.C.3; 5.1.4.D.1; 5.1.4.D.2; 5.2.4.A.1; 5.2.4.B.1

Summative: Other written assessments
Grade 3 Benchmark Test- "Properties of Matter" Unit 5.1.4.A.1; 5.1.4.A.2; 5.1.4.A.3; 5.1.4.B.1; 5.1.4.B.2; 5.1.4.B.3; 5.1.4.B.4; 5.1.4.C.1; 5.1.4.C.2; 5.1.4.C.3; 5.1.4.D.1; 5.1.4.D.2; 5.2.4.A.1; 5.2.4.B.1; 5.4.4.G.4

Activities

1. *Chemistry Knowledge Worksheet

2. *Properties of Matter Splash activity

3. "What Is Matter?" reading selection

- Measuring Volume activity
- Physical Properties of Matter reading selection
- Measuring Matter reading selection and activities
- *What Is Matter assessment

4. "What Are States of Matter?" reading selection

- Temperature and Matter experiment
- States of Matter reading selection
- Is It Solid? activity
- *States of Matter assessment

5. "What Is The Water Cycle?" reading selection

- Condensation in a Terrarium experiment
- Rotting Pumpkin (or other fruit) experiment
- Disappearing Act experiment
- *Water Cycle Activity assessment choices:
    - Super Water
    - How Clouds Form
    - The Water Cycle
    - Review Concept Map
    - The Water Cycle project
    - The Water Cycle Wheel
    - Water Cycle Diagram

6. "How Does Matter Change?" reading selection

- Will It Mix? experiment
- Chemical Change experiment

- *How Does Matter Change? assessment

7. Chemical Properties

- Safety Rules and Contract
- Mystery Chemical #1, Describing Properties sheet
- Properties of Unknowns activity
- Water Test
- *Data Sheets for each chemical test
- Water Mixtures/Filtration Test
- "Crystals" reading selection
- *Crystals assessment paragraph
- Vinegar/Iodine Test (add results of Cabbage Test to Data sheets)
- Heat Test
- *Crossword Puzzle
- *Chemical Information Sheet-identify unknowns
- *Unit Review
- *Chemical Tests Performance Assessment
- *Chemical Tests Unit Test

8. *Grade 3 Benchmark Test: "Properties of Matter" Unit

Activities to Differentiate Instruction

Provide vocabulary cards/lists

Study Guides for assessments

Preprinted worksheets

Visual Aids for Instruction

Assigned lab partners/lab groups

Instruction for using measurement tools

Read tests aloud

Resource supplements (ie books from library) available for further research

Computer websites for further research

Blank booklets provided for student research

Additional unknown chemicals available for testing

Integrated/Cross-Disciplinary Instruction

Mixtures and Solutions, Foss Science Stories Series, 2003

Resources

Chemical Tests, Carolina Biological Supply Company, 2002

HSP New Jersey Science, Harcourt School Publishers, 2009