MP1-Structure and Properties of Matter

Content Area: **Science**
Course(s): **Science 5**
Time Period: **Marking Period 1**
Length: **MP 1**
Status: **Published**

Essential Questions

- What are the properties of matter and what happens when matter changes state?
- When two substances are mixed, what is formed and is it always something new?

Big Ideas

- Because matter exists as particles that are too small to see, matter is always conserved even if it seems to disappear.
- Measurements of observable properties can be used to identify particular materials.
- Chemical reactions that occur when substances are mixed can be identified by the emergence of substances with different properties; the total mass remains the same.

Cross-Curricular Integration

Integration Area: Language Arts

RI.5.1 Quote accurately from a text and make relevant connections when explaining what the text says explicitly and when drawing inferences from the text.

RI.5.7 Draw on information from multiple print or digital sources, demonstrating the ability to locate an answer to a question quickly or to solve a problem efficiently.

Activity:

Students will research using library resources to find out about atoms. Students will find out who first used the word atom and what an atom is.

Science and Society

Charles Goodyear

Process Vulcanization

Social Justice

See Social Studies Appendix C

Book: Pigskins to Paintbrushes by Don Tate (National Art Day)

Book:Granddad Budd: A Veteran's Day Story by Sharon Ferry (Veterans Day)

CSDT Technology Integration

8.1.5.DA.1: Collect, organize, and display data in order to highlight relationships or support a claim.

Activity:

Students will observe, measure, and graph quantities of H2O as a liquid, a solid, and in mixtures to provide evidence that regardless of the type of change that occurs when heating, cooling, or mixing substances, the total weight of matter is conserved.

Science and Engineering Practices

Asking Questions and Defining Problems

- Ask questions about what would happen if a variable is changed.

Developing and Using Models

- Use a model to test cause and effect relationships or interactions concerning the functioning of a natural or designed system.

Planning and Carrying Out Investigations

- Make observations and/or measurements to produce data to serve as the basis for evidence for an explanation of a phenomenon or test a design solution.
- Make predictions about what would happen if a variable changes.
- Test two different models of the same proposed object, tool, or process to determine which better meets criteria for success.

Constructing Explanations and Designing Solutions

- Use evidence (e.g., measurements, observations, patterns) to construct or support an explanation or

design a solution to a problem.

Engaging in Argument from Evidence

- Distinguish among facts, reasoned judgment based on research findings, and speculation in an explanation.

Construct and/or support an argument with evidence, data, and/or a model

- Use data to evaluate claims about cause and effect.

Obtaining, Evaluating, and Communicating Information

- Read and comprehend grade-appropriate complex texts and/or other reliable media to summarize and obtain scientific and technical ideas and describe how they are supported by evidence.
- Compare and/or combine across complex texts and/or other reliable media to support the engagement in other scientific and/or engineering practices.
- Communicate scientific and/or technical information orally and/or in written formats, including various forms of media and may include tables, diagrams, and charts.

Enduring Understandings

Matter and its Interactions

5-PS1-1 Develop a model to describe that matter is made of particles too small to be seen.

5-PS1-2 Measure and graph quantities to provide evidence that regardless of the type of change that occurs when heating, cooling, or mixing substances, the total weight of matter is conserved.

5-PS1-3 Make observations and measurements to identify materials based on their properties.

5-PS1-4 Conduct an investigation to determine whether the mixing of two or more substances results in new substances.

Student Learning Standards

ELA/Literacy

RI.5.7 Draw on information from multiple print or digital sources, demonstrating the ability to locate an answer to a question quickly or to solve a problem efficiently. (5-PS1-1)

W.5.7 Conduct short research projects that use several sources to build knowledge through investigation of different aspects of a topic. (5-PS1-2),(5-PS1-3),(5-PS1-4)

W.5.8 Recall relevant information from experiences or gather relevant information from print and digital sources; summarize or paraphrase information in notes and finished work, and provide a list of sources. (5-PS1-2),(5-PS1-3),(5-PS1-4)

W.5.9 Draw evidence from literary or informational texts to support analysis, reflection, and research. (5-PS1-2),(5-PS1-3),(5-PS1-4)

Mathematics

MP.2 Reason abstractly and quantitatively. (5-PS1-1),(5-PS1-2),(5-PS1-3) MP.4 Model with mathematics. (5-PS1-1),(5-PS1-2),(5-PS1-3)

MP.5 Use appropriate tools strategically. (5-PS1-2),(5-PS1-3)

5.NBT.A.1 Explain patterns in the number of zeros of the product when multiplying a number by powers of 10, and explain patterns in the placement of the decimal point when a decimal is multiplied or divided by a power of 10. Use whole-number exponents to denote powers of 10. (5-PS1-1)

5.NF.B.7 Apply and extend previous understandings of division to divide unit fractions by whole numbers and whole numbers by unit fractions. (5-PS1-1)

5.MD.A.1 Convert among different-sized standard measurement units within a given measurement system (e.g., convert 5 cm to 0.05 m), and use these conversions in solving multi-step, real-world problems. (5-PS1-2)

5.MD.C.3 Recognize volume as an attribute of solid figures and understand concepts of volume measurement. (5-PS1-1)

5.MD.C.4 Measure volumes by counting unit cubes, using cubic cm, cubic in, cubic ft., and non-standard units. (5-PS1-1)

Focus Areas

Knowledge

- Matter is a term that applies to all of the stuff around us and it is made of particles that are too small to see.
- When substances are heated, cooled, or mixed the total weight before and after is always the same.
- Substances can be identified based on observable and measureable properties.
- Sometimes when two substances are mixed, each of the substances keeps its original properties and sometimes a new substance is formed.

Skills

- Give an example of what is matter.
- Describe how gases are made from matter particles that are too small to be seen. (Ex: an inflated balloon)
- Measure and graph the weights of matter before and after being heated, cooled, or mixed.
- Identify materials based on various observable properties.
- Determine whether the mixing of two substances always results in the formation of new substances or not and provide examples.
- Identify the differences between soluble and insoluble solutions.

Understandings

- Develop a model to describe that matter is made of particles too small to be seen.
- Measure and graph quantities to provide evidence that regardless of the type of change that occurs when heating, cooling.
- Make observations and measurements to identify materials based on their properties.
- Conduct an investigation to determine whether the mixing of two or more substances results in new substances.

Resources

Primary Resource

Scott Foresman Interactive Science, Pearson, 2016

- Properties of Matter - Chapter 1

Leveled Readers

- *Matter and Its Properties*
- *Properties of Matter*
- *Pioneers of Physics*
- *Changes in Matter*
- *Baking Chemistry*

Scientific Inquiry

Core

- Properties of solids, liquids and gasses inquiry lab
- Conservation of matter and chemical reaction inquiry lab
- Particles in matter lab

Supplemental

- How are weight and volume affected when objects are combined? p.2
- What are some ways to separate a mixture? p. 40