Unit 1 - Matter and it's Interactions

Content Area: **Science**
Course(s):
Time Period: **Full Year**
Length: **Full Year**
Status: **Published**

Unit Overview

Students will learn to recognize that all objects are made of matter and identify the three most common states of matter: solid, liquids, and gasses. Students will be able to explain that all matter is made of particles too small to be seen. Through planning and carrying out investigations, students will demonstrate how to measure matter, including length, weight, and volume. Students will also learn about the properties of matter, mixtures, and solutions. They gather evidence about the formation of solutions and analyze information about size, proportion, rate, and ratios. They will also apply math and use models in the properties of matter. Students will study a number of processes to learn which changes in properties represent physical changes and which represent chemical changes. They find that both kinds of changes are consistent with the law of conservation of matter and with the particle model of matter.

Enduring Understandings

Matter comes in three different states: solids, liquids, and gases.
When matter changes form, the amount of matter is conserved.
When two or more chemicals are mixed together, a new substance may be formed with different properties than the original substance.
A physical change only changes the appearance of matter, while a chemical change makes different matter.
Materials can be identified based on a list of their properties: hardness, magnetism, electrical conductivity, thermal conductivity, solubility, heating, cooling, etc.

Essential Questions

What is the difference between types of matter?
What happens when matter changes form?
How can we identify a material based on its properties?
What happens when two or more chemicals are mixed together?
What are the differences between a physical and a chemical change?
What is gravitational force?

Learning Objectives

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, or mixing substances, the total weight of matter is conserved.
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.
Support an argument that the gravitational force exerted by Earth on objects is directed down.
Define matter as having mass and taking up space.
Describe matter as consisting of particles.
Compare and contrast the properties of solids, liquids, and gases.
Infer that a solution contains particles too small to see.
Develop a model to describe that matter is made of particles too small to be seen.
Construct and test a model.
Evaluate the validity of a model.
Use a model to successfully communicate a concept.
Identify seven physical properties of matter.
Describe hardness.
Order the degrees of hardness of various materials.
Determine the hardness order of minerals by performing scratch tests.
Describe magnetism.
Identify substances that are attracted to a magnet.
Explain how the property of magnetism can be tested.
Classify matter based on its ability to conduct or insulate electrical energy.
Identify materials that conduct and do not conduct electricity.
Classify matter based on its ability to conduct or insulate thermal energy.
Determine the solubility in water of various materials.
Define the boiling and melting points of matter.
Identify the boiling and melting points of water.
Describe how boiling affects the state of water.
Define condensation.
Describe how the cooling of water can change its state.
Determine whether matter is conserved during a change in state.
Describe changes in the physical properties of matter that occur during changes in state.
Determine whether matter is conserved when one material is mixed with another material.
Find evidence that supports the Law of Conservation of Matter.
Plan and conduct an investigation.
Organize, analyze, and interpret data.
Express a scientific generalization.
Define and describe a chemical change.
Compare and contrast chemical changes and physical changes.
Distinguish between a chemical change and a chemical reaction.
Identify the signs of a chemical change.
Demonstrate that matter is conserved though changed during a chemical reaction.
Distinguish materials based on an analysis of their physical and chemical properties.
Identify the goal of research scientist Albert Yu-Min Lin and the tools he employs to reach that goal.
Carer Exploration - Examine/research the career of a chemical engineer.

Standards: Content

SCI.5-PS1-1	Develop a model to describe that matter is made of particles too small to be seen.
SCI.3-5-ETS1-1	Define a simple design problem reflecting a need or a want that includes specified criteria for success and constraints on materials, time, or cost.

SCI.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.
SCI.5-PS1-3	Make observations and measurements to identify materials based on their properties.
SCI.5-PS1-4	Conduct an investigation to determine whether the mixing of two or more substances results in new substances.

Standards: Interdisciplinary

Assessment Evidence

Formative	Teacher observations, Class discussions, Lab Activities, Key concepts and vocabulary quizzes, Science Starter's/Do Nows, Open Ended Responses, Modeling, Simulations, Innovators Monthly Research, Lab Activities, Vocabulary Responses, Exit Questions, Interactive Digital Assessments embedded in Exploring Science Digital Book
Summative	Projects, Tests, Quizzes, lab skills demonstrations, projects, and vocabulary quizzes.
Alternative & Benchmark	Alternative - Read to the student and chart oral responses. Word banks, sentence frames, oral responses, graphic organizers, observations, portfolios of student work, orally administered assessments, and anecdotal notes. Benchmark – LinkIt Benchmark Assessment, Teacher Generated Assessments
Assessment Evidence Resource	

Instructional Resources

Smartboard, Computers, Websites and digital interactives/models, Multi-media presentations, Video Streaming, Brain Pop, Middle School Science, Generation Genius Digital Curriculum, Mystery Science Digital Curriculum, Amplify Digital Curriculum, Microsoft 365, Primary and Secondary Source Documents, Assorted lab materials, Plastic bottle, ice, zipper seal plastic bag, Balance or Scale, tape, ruler, scissors, colored pencils, crayons, markers, construction paper, graph paper, 5th Grade Science

Instructional Resource List

Curricular Mandates

Below are the curricular requirements as defined in NJ Administrative Code and Statute

	Amistad		Diversity, Equity, and Inclusion
	Holocaust		LGBT and Disabilities (Grades 6-12)
X	Climate Change		Asian American & Pacific Islander

Social Emotional Learning (SEL) Competencies

NJ Social and Emotional Learning Competencies & Sub-Competencies

	Self-Awareness		Relationship Skills
X	Responsible Decision-Making		Social Awareness
X	Self-Management		

21st Century Skills & Themes

	Global and Cultural Awareness		Technology Literacy		Planning and Budgeting
X	Creativity and Innovation		Financial Institutions		Risk Management and Insurance
X	Information and Media Literacy		Digital Citizenship		Economic and Government Influences
X	Critical Thinking and Problem Solving		Credit Profile	X	Career Awareness and Planning
	Civic Financial Responsibility		Financial Psychology		