Unit 2: Matter and Energy

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

Unit Overview

Students will make predictions of different states of matter. Students will observe the force of energy. Science practices are integrated into the Cumulative Progress Indicated within each science domain in recognition that science content and processes are inextricably linked; science is a body of knowledge and an evidence-based, model building enterprise that continually extends, refines, and revises knowledge.

Students will explore changes in solids and liquids when the substances are combined or exposed to different temperatures. Students will investigate how and why things move.

Enduring Understandings

• Ice cream, chocolate, ice cubes

• The solids turn into liquid and the liquids turn into solids, the result of freezing and melting.

• Wheel, pulley, lever, screw, inclined planes

Essential Questions

• What are some solids that can turn into liquids?

• What happens when a solid substance is heated or cooled?

• What makes things move?

Learning Objectives

- Identify matter as things that can be seen and touched.
- Describe basic properties of objects (size, color, shape, texture, weight).
- Sort and classify objects based on observable properties.

- Explore different forms of matter (solid and liquid).
- Observe and describe changes in matter (melting, freezing, mixing).
- Use simple language to explain changes they observe.
- Recognize that energy makes things move, light up, or make sound.
- Explore different types of energy through play (light, sound, motion, heat).
- Describe how objects move (fast/slow, up/down, push/pull).
- Explore cause-and-effect relationships (what happens when we push, pull, heat, or cool something).
- Make simple predictions about what might happen during an activity.
- Use senses and simple tools to investigate materials.
- Ask questions and share ideas during explorations.
- Record observations through drawings, marks, or verbal descriptions.
- Use new vocabulary related to matter and energy (solid, liquid, move, light, sound).
- Listen to and respond to stories and informational texts about matter and energy.
- Participate in science discussions, songs, and experiments using appropriate language.
- Follow simple safety rules during science activities.
- Work cooperatively with peers during hands-on investigations.

Standards: Content

5.1.2	Observe, question, predict, and investigate materials, objects, and phenomena during classroom activities indoors and outdoors and during any longer-term investigations in progress. Seek answers to questions and test predictions using simple experiments or research media (e.g., cracking a nut to look inside; putting a toy car in water to determine whether it sinks).
5.1.3	Use basic science terms (e.g., observe, predict, experiment) and topic-related science vocabulary (e.g., words related to living things [fur, fins, feathers, beak, bark, trunk, stem]; weather terms [breezy, mild, cloudy, hurricane, shower, temperature]; vocabulary related to simple machines [wheel, pulley, lever, screw, inclined plane]; words for states of matter [solid, liquid]; names of basic tools [hammer, screwdriver, awl, binoculars, stethoscope, magnifier]).
5.1.4	Communicate with other children and adults to share observations, pursue questions, make predictions, and/or conclusions.
5.2.1	Observe, manipulate, sort, and describe objects and materials (e.g., water, sand, clay, paint, glue, various types of blocks, collections of objects, simple household items that can

	be taken apart, or objects made of wood, metal, or cloth) in the classroom and outdoor environment based on size, shape, color, texture, and weight.
5.2.2	Explore changes in liquids and solids when substances are combined, heated, or cooled (e.g., mixing sand or clay with various amounts of water; preparing gelatin; mixing different colors of tempera paint; and longer term investigations, such as the freezing and melting of water and other liquids).
5.2.3	Investigate sound, heat, and light energy through one or more of the senses (e.g., comparing the pitch and volume of sounds made by commercially made and homemade instruments, recording how shadows change during the course of a day or over time, using flashlights or lamp light to make shadows indoors).
5.2.4	Investigate how and why things move (e.g., slide block, balance structures, push structures over, use ramps to explore how far and how fast different objects move or roll).
5.5.1	Identify and use basic tools and technology to extend exploration in conjunction with science investigations (e.g., writing, drawing, and painting utensils, scissors, staplers, magnifiers, balance scales, ramps, pulleys, hammers, screwdrivers, sieves, tubing, binoculars, whisks, measuring cups, appropriate computer software and website information, video and audio recordings, digital cameras, tape recorders).

Standards: Interdisciplinary

0.1.1	Express individuality by making independent decisions about which materials to use.
5.1.2	Observe, question, predict, and investigate materials, objects, and phenomena during classroom activities indoors and outdoors and during any longer-term investigations in progress. Seek answers to questions and test predictions using simple experiments or research media (e.g., cracking a nut to look inside; putting a toy car in water to determine whether it sinks).
0.1.2	Express ideas for activities and initiate discussions.
0.1.3	Actively engage in activities and interactions with teachers and peers.
0.1.4	Discuss their own actions and efforts.
5.1.4	Communicate with other children and adults to share observations, pursue questions, make predictions, and/or conclusions.
4.1.4.a	Accurately count quantities of objects up to 10, using one-to one-correspondence, and accurately count as many as 5 objects in a scattered configuration.
5.1.5	Represent observations and work through drawing, recording data, and “writing” (e.g., drawing and “writing” on observation clipboards, making rubbings, charting the growth of plants).
4.1.4.b	Arrange and count different kinds of objects to demonstrate understanding of the consistency of quantities (i.e., “5” is constant, whether it is a group of 5 people, 5 blocks or 5 pencils).
0.2.1	Make independent choices and plans from a broad range of diverse interest centers.
5.2.1	Observe, manipulate, sort, and describe objects and materials (e.g., water, sand, clay, paint, glue, various types of blocks, collections of objects, simple household items that can be taken apart, or objects made of wood, metal, or cloth) in the classroom and outdoor environment based on size, shape, color, texture, and weight.
0.2.2	Demonstrate self-help skills (e.g., clean up, pour juice, use soap when washing hands, put away belongings).
0.2.3	Move through classroom routines and activities with minimal teacher direction and transition easily from one activity to the next.

5.2.2	Explore changes in liquids and solids when substances are combined, heated, or cooled (e.g., mixing sand or clay with various amounts of water; preparing gelatin; mixing different colors of tempera paint; and longer term investigations, such as the freezing and melting of water and other liquids).
0.2.4	Attend to tasks for a period of time.
0.3.1	Recognize and describe a wide range of feelings, including sadness, anger, fear, and happiness.
5.3.1	Investigate and compare the basic physical characteristics of plants, humans, and other animals (e.g., observing and discussing leaves, stems, roots, body parts; observing and drawing different insects; sorting leaves by shape; comparing animals with fur to those with feathers).
0.3.2	Empathize with feelings of others (e.g., get a blanket for a friend and comfort him/her when he/she feels sad).
5.3.2	Observe similarities and differences in the needs of living things, and differences between living and nonliving things (e.g., observing and discussing similarities between animal babies and their parents; discussing the differences between a living thing, such as a hermit crab, and a nonliving thing, such as a shell).
0.3.3	Channel impulses and negative feelings, such as anger (e.g., taking three deep breaths, using calming words, pulling self out of play to go to “safe spot” to relax, expressive activities).
5.3.3	Observe and describe how natural habitats provide for the basic needs of plants and animals with respect to shelter, food, water, air, and light (e.g., digging outside in the soil to investigate the kinds of animal life that live in and around the ground or replicating a natural habitat in a classroom terrarium).
4.2.2	Begin to represent simple word problem data in pictures and drawings.
5.3.4	Observe and record change over time and cycles of change that affect living things (e.g., monitoring the life cycle of a plant, using children’s baby photographs to discuss human change and growth, using unit blocks to record the height of classroom plants).
0.4.1	Engage appropriately with peers and teachers in classroom activities.
0.4.2	Demonstrate socially acceptable behavior for teachers and peers (e.g., give hugs, get a tissue, sit next to a friend/teacher, hold hands).
5.4.2	Explore the effects of sunlight on living and nonliving things (e.g., growing plants with and without sunlight, investigating shadows that occur when the sun’s light is blocked by objects).
0.4.4	Respect the rights of others (e.g., “This painting belongs to Carlos.”).
0.4.5	Express needs verbally or nonverbally to teacher and peers without being aggressive (e.g., “I don’t like it when you call me dummy. Stop!”).
0.4.6	Demonstrate verbal or nonverbal problem-solving skills without being aggressive (e.g., talk about a problem and related feelings and negotiate solutions).
RI.PK.4	With prompting and support, ask and answer questions about unfamiliar words in informational text.
0.5.1	Play independently and cooperatively in pairs and small groups.
RI.PK.5	Identify the front and back cover of a book.
RI.PK.6	With prompting and support, identify the role of author and illustrator in presenting ideas in informational text.
4.4.3.a	two-dimensional shapes (e.g., use two dimensional shapes to make designs, patterns and pictures by manipulating materials such as paper shapes, puzzle pieces, tangrams; construct shapes from materials such as straws; match identical shapes; sort shapes based on rules [something that makes them alike/different]; describe shapes by sides/angles;

	use pattern blocks to compose/decompose shapes when making and taking apart compositions of several shapes).
0.5.2	Engage in pretend play.
0.5.3	Demonstrate how to enter into play when a group of children are already involved in play.
4.4.3.b	three-dimensional shapes by building with blocks and with other materials having height, width and depth (e.g., unit blocks, hollow blocks, attribute blocks, boxes, empty food containers, plastic pipe).
0.5.4	Take turns.
RI.PK.7	With prompting and support, tell how the illustrations support the text (information or topic) in informational text.
0.5.5	Demonstrate understanding the concept of sharing by attempting to share.
RF.PK.1.a	Follow words from left to right, top to bottom, page by page.
RF.PK.2.c	Identify many initial sounds of familiar words.
W.PK.1	Use a combination of drawings, dictation, scribble writing, letter-strings, or invented spelling to share a preference or opinion during play or other activities.
W.PK.2	Use a combination of drawings, dictation, scribble writing, letter-strings, or invented spelling to share information during play or other activities.
L.PK.1.d	Understand and use question words (e.g., who, what, where, when, why, how).
L.PK.1.e	Use frequently occurring prepositions (e.g., to, from, in, out, on, off, for, by, with).
L.PK.1.f	Begin to speak in complete sentences.
L.PK.2.c	Attempt to write a letter or letters by using scribble-writing, letter-like forms, letter-strings, and invented spelling during writing activities throughout the day.
L.PK.4	Begin to determine the meaning of new words and phrases introduced through preschool reading and content.
L.PK.5.c	Identify real-life connections between words and their use (e.g., “Tell me the name of a place in the classroom that is noisy or quiet.”).

Assessment Evidence

Formative	• Student participation • Whole group instruction/discussion • Small group instruction/discussion • Completed projects • Classroom Observations • Question and answer • Completed classwork
Summative	● Work samples and portfolios ● Unit Projects ● Student photographs and video clips
Alternative & Benchmark	● Work samples and portfolios ● Unit Projects ● Student photographs and video clips
Assessment Evidence Resource	

Instructional Resources

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)
	Climate Change		Asian American & Pacific Islander

Social Emotional Learning (SEL) Competencies

NJ Social and Emotional Learning Competencies & Sub-Competencies

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

21st Century Skills & Themes

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