Science Curriculum

Grades K-5

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District Mission Statement

The mission of the Hillside Public Schools is to ensure that all students at all grade levels achieve the Next Generation Science Standards and make connections to real-world success. We are committed to strong parent-community school partnerships, providing a safe, engaging, and effective learning environment, and supporting a comprehensive system of academic and developmental support that meets the unique needs of each individual.

Academic Area Overview

The Hillside Township School District is committed to excellence. We believe that all children are entitled to an education that will equip them to become productive citizens of the twenty-first century. We believe that an education grounded in the fundamental principles of science will provide students with the skills and content necessary to become our future leaders.

A sound science education is grounded in the principles of inquiry and rigor. Children are actively engaged in learning as they model real-world scientific behaviors to construct knowledge. They have ample opportunities to manipulate materials in ways that are developmentally appropriate to their age. They work in an environment that encourages them to take risks, think critically, and make models, note patterns and anomalies in those patterns. Children are encouraged to ask questions, not just the "how" and the "what" of observed phenomena, but also the "why".

Our program provides teachers with cost-effective science materials that are aligned to state and national standards, incorporate instructional strategies that are research-based, and provides teachers with a deep understanding of science and the pedagogical underpinnings of science. Our teachers receive quality professional development through a partnership with nearby districts. Our K-8 kit based program encourages "hands-on science" and is endorsed by the National Science Foundation.

Equality and Equity in Curriculum

The Hillside Township School District ensures that the district's curriculum and instruction are aligned to the Next Generation Science Standards and addresses the elimination of discrimination and the achievement gap, as identified by underperforming school-level AYP reports for State assessment, by providing equity in educational programs and by providing opportunities for students to interact positively with others regardless of race, creed, color, national origin, ancestry, age, marital status, affectional or sexual orientation, gender, religion, disability or socioeconomic status.

N.J.A.C. 6A:7-1.7(b): Section 504, Rehabilitation Act of 1973; N.J.S.A. 10:5; Title IX, Education Amendments of 1972

New Jersey Student Learning Standards for Science

In 2014, NJ adopted the Next Generation Science Standards now known as the New Jersey Student Learning Standards for Science with the goal of ensuring our students graduate ready for college and career. The standards for science practice describe varieties of expertise that science educators at all levels should seek to develop in their students. These practices rest on important "processes and proficiencies" with longstanding importance in science education. The Science Framework emphasizes process standards of which include planning investigations, using models, asking questions and communicating information. Crosscutting concepts have value because they provide students with connections and intellectual tools that are related across the differing areas of disciplinary content and can enrich their application of practices and their understanding of core ideas. Throughout the year, students should continue to develop proficiency with the eight science practices. Crosscutting concepts can help students better understand core ideas in science and engineering. When students encounter new phenomena, whether in a science lab, field trip, or on their own, they need mental tools to help engage in and come to understand the phenomena from a scientific point of view. Familiarity with crosscutting concepts can provide that perspective. A next step might be to simplify the phenomenon by thinking of it as a system and modeling its components and how they interact. These preliminary studies may suggest explanations for the phenomena, which could be checked by predicting patterns that might emerge if the explanation is correct, and matching those predictions with those observed in the real world. More information regarding the Next Generation Science Standards can be found at: http://www.nextgenscience.org/

K-5 Science Program Overview: Units by Grade Level

	Life Science	Physical Science	Earth Science
K	Animals Two by Two	Materials and Motion	Trees and Weather
1	Plants and Animals	Sound and Light	Air and Weather
2	Insects and Plants	Solids and Liquids	Pebbles, Sand, and Silt
3	Structures of Life	Motion and Matter	Water and Climate
4	Environments	Energy	Soils, Rocks, and Landforms
5	Living Systems	Mixtures and Solutions	Earth and Sun

Science Kit Pacing Grades K-5

Grade Level	First Kit	Second Kit	Third Kit
K	**Trees and Weather** Begins: September Ends: December	**Materials and Motion** Begins: January Ends: March	**Animals Two by Two** Begins: March Ends: June
1	**Air and Weather** Begins: September Ends: December	**Sound and Light** Begins: January Ends: March	**Plants and Animals** Begins: March Ends: June
2	**Pebbles, Sand and Silt** Begins: September Ends: December	**Solids and Liquids** Begins: January Ends: March	**Insects and Plants** Begins: March Ends: June
3	**Water and Climate** Begins: September Ends: December	**Motion and Matter** Begins: December Ends: February	**Structures of Life** Begins: February Ends: June
4	**Soils, Rocks, and Landforms** Begins: September Ends: December	**Energy** Begins: December Ends: March	**Environments** Begins: March Ends: June
5	**Earth and Sun** Begins: September Ends: December	**Mixtures and Solutions** Begins: January Ends: March	**Living Systems** Begins: March Ends: June

Science Department Lesson Plan Template

Lesson Information

Lesson Name: _____
Unit: _____
Date: _____

Lesson Data

1. Essential Question:

2. NJSLS-S Performance Expectation

Students will be able to…

3. Disciplinary Core Idea :

Students will know……

4. Practices:

Students will be able to…..

5. Crosscutting Concepts:

Students will apply…

6. Assessment:

Evidence of student learning:

7. Lesson Agenda:

Include in Lesson Outline:

- *Anticipated timing*
- *DO NOW*
- *Activities and Investigations*
- *Discussion prompts*
- *Journal writing prompts*
- *Student uses of technology*
- *Safety precautions*
- *Materials*

8. Homework:

Science

Kindergarten

UNIT: Trees and Weather
Kindergarten

ENDURING UNDERSTANDINGS	ESSENTIAL QUESTIONS
✔ All living organisms have specific characteristics in common. ✔ Plants have different structures that serve different functions ✔ Weather is the condition in the air outdoors and can be described; weather changes ✔ Seasons change in a predictable annual pattern	✔ *What are the parts of trees?* ✔ *What do trees need to grow?* ✔ *How are leaves different?* ✔ *What is the weather today?* ✔ *What do trees look like during the different seasons?*

NJSLS-S	KNOWLEDGE Students will know:	SKILLS/ PRACTICES Students will be able to:	CROSSCUTTING CONCEPTS Students will apply:
K-LS1-1 K-ESS2-2 K-ESS3-1	**Trees** ✔ Trees are living plants. ✔ Trees have structures: branches, leaves, trunk, and roots. ✔ Trees differ in size and shape. ✔ Plants have basic needs: water, light, air, nutrients, and space. Key Terms: adopt, bark, branch, circumference, compare, cone, conifer desert, flower, leaves, living, mountain, observe, ocean, patterns, plant, river, root, rubbing, seed, shape, similar, stem, swamp, texture, tree, trunk, twig, valley	• Look at the variety and structure of trees in the schoolyard. • Work with representational materials to look more closely at the shapes of trees and their parts. • Adopt schoolyard trees to observe changes through the year. • A living tree becomes part of the classroom for several weeks, and students complete the investigation by planting their class tree on the school grounds. • Apply understanding of tree structures to authentic scenarios	• Patterns • Systems and system models • Structure and function
K-LS1-1 K-ESS2-2	**Leaves**	• Conduct a schoolyard walk, focusing on the leaves of trees. • Match leaves with geometric shapes	• Patterns • Scale, proportion, and quantity

	• Different kinds of trees have different leaves. • Leaves have properties: size, shape, tip, edge, texture, and color. • Leaves properties vary. • Leaves can be described and compared by their properties. Key Terms: color, edge, heart, line, lobed, longer, narrower, outline, oval, paddle, pointed, property, rough, rounded, shorter, silhouette, size, smooth, spear, tip, toothed, triangle, wider	• Go on a leaf hunt to compare properties of leaves • Work at centers with representational materials • Make a leaf book. • Communicate observations to peers • Compare and sort leaves based on their properties • Apply understanding of leaves to authentic scenarios	• Structure and function
K- PS3-1 K-ESS2-1 K-ESS3-2 K-2 ETS1-2	**Observing Weather** • Weather is the condition in the air outdoors and can be described; weather changes. • Temperature is how hot or cold it is; thermometers measure temperature. • Sunlight warms Earth's surface. • Wind is moving air; a wind sock indicates wind direction and speed. Weather forecasts help people prepare for the severe weather that is likely in that area. Key Terms: Air, blowing, calendar, cloud, cold, cool, direction, freezing, hot, monitor, moving air, overcast, partly cloudy, rainy, snowy, streamer, sunny, temperature, thermometer, warm, weather, instrument, wind, wind sock	• Share what they know about weather and how it relates to air. • Record daily weather observations on a class calendar. • Use weather pictures to indicate five basic types of weather. • Use a thermometer to measure relative temperature (how hot or cold it is) • Make a wind sock to observe the wind direction and speed. • Observe and compare objects in the sky during the day and at night	• Patterns • Cause and effect • Systems and system models
K-LS1-1 K-ESS2-1 K-ESS3-1	**Trees Through the Seasons:** • Seasons change in a predictable annual pattern: fall, winter, spring, and summer. • Bark, twigs, leaves, buds, flowers, fruits, and seeds are parts of trees. • The buds on twigs grow into leaves or flowers.	• Extend understanding of trees asa growing, changing, living part of their world. • During each season, students visit the schoolyard trees; observe their twigs, leaves, flowers, and seeds; and compare them to those from a previous season.	• Patterns • Cause and effect • Stability and change

	● Trees change through the seasons. ● Some trees produce seeds that can grow into new trees of the same kind. ● Some trees lose their leaves in winter; others do not. Key Terms: blossom, bud, leaves, seed, flower, food, forcing, growth ring, leaf scar, season, spring, summer, swollen fruit, nut, shell, fall, evergreen, needle, scale, winter	● Apply understanding of a tree's seasonal changes to authentic scenarios	

Science Unit Trees and Weather
Kindergarten

TIME FRAME	TOPIC	PERFORMANCE TASKS ACTIVITIES/PROJECTS ASSESSMENTS	RESOURCES/INTERDISCIPLINARY CONNECTIONS
September October *7 periods*	Trees	FOSS Investigation 1: Observing Trees Part 1: Observing School Yard Trees Part 2: Tree Parts Part 3: Tree Puzzles Part 4: Tree-Silhouette Cards Part 5 : Adopt School Yard Trees Part 6: A Tree Comes to Class **Assessment:** Teacher Observations	**Science Resource Book** "*Where Do Trees Grow?"* *"What do Plants Need?"* **FOSS Poster and Story** *" A Tree Comes to Class*" **Supplemental Resources** BrainPOP Jr.: Johnny Appleseed Discovery Education: Plant Parts and Their Uses Discovery Education: Reading Rainbow - Once There Was a Tree SMART Notebook Lesson: Trees
October November *6 periods*	Leaves	FOSS Investigation 2: Observing School Yard Tress Part 1: Leaf Walk Part 2: Leaf Shapes Part 3: Comparing Leaves Part 4: Matching Leaf Silhouettes and Outlines Part 5: Leaf Books **Assessment**: Teacher Observations	**Books:** *"How Do We Learn?"* *"Our Very Own Tree"* **Video** *Once There Was a Tree* **FOSS Online Activity** Leaf Sorting **Supplemental Resources** BookFlix: Forests Discovery Education: Plants and Leaves Discovery Education: Autumn Leaves
November December	Weather	FOSS Investigation 3: Observing Weather Part 1: Weather Calendar	**Science Resource Book** *"Up in the Sky"*

7 periods		Part 2: Recording Temperature Part 3: Wind Direction **Assessment:** Teacher Observations	*"Weather"*
November December *7 periods*	Seasons	FOSS Investigation 3: Trees through the Seasons Part 1: What comes from trees? Part 2: Food from Trees Part 3: Visiting Adopted Trees Part 4: Winter: Evergreen Hunt Part 5: Winter: Twigs Part 6: Winter: Visiting Adopted Trees Part 7: Spring: Forcing Twigs Part 8: Spring: Bark Hunt Part 9: Spring: Visiting Adopted Trees **Assessment:** Teacher Observations	**Science Resource Book** *"My Apple Tree"* *"Orange Trees"* *"Maple Trees"* **Video** *Once There was a Tree Summer* **FOSS Online Activity** Who Lives Here? **Book** *"Our Very Own Tree"* **Supplemental Resources** SMART Notebook Lesson: Describing Plants Song: C is for Conifers Apple tasting Math: count seeds Make pine cone ornaments Chalk drawings of winter trees Discovery Education: Planting a Tree *Seeds* by Ken Robbins BookFlix: Forests BrainPOP Jr.: Parts of a Plant Discovery Education: Nuts

UNIT: Materials and Motion
Kindergarten

ENDURING UNDERSTANDINGS	ESSENTIAL QUESTIONS
✔ Materials can be identified by a variety of properties. ✔ Pushing or pulling on an object can change the speed or direction of its motion and can start or stop it.	✔ What makes one material different than another? ✔ *How can we conserve natural resources?* ✔ *What causes objects to move?* ✔ *What happens when objects collide?*

NJSLS-S	KNOWLEDGE Students will know:	SKILLS/ Practices Students will be able to:	Cross Cutting Concepts Students will apply
2- PS1-2 K-ESS3-3 K-2 ETS 1-1 K-2- ETS 1-2 K-2-ETS 1-3	**Getting to Know Wood** ✔ Wood can be described in terms of its properties. ✔ Different kinds of wood come from different kinds of trees. Trees are natural resources. Some kinds of wood are processed and made by people. ✔ Wood floats in water but can be made to sink. ✔ Wood can be changed by sanding and mixing with water. ✔ Sawdust is tiny wood pieces that can be recycled. ✔ Basic materials can be transformed into new materials (particleboard and plywood). Key Terms: basswood, grain, layer, particleboard, pine, plywood, redwood, rough,	● Work with five different wood samples to observe their properties.\ ● Conduct free exploration ● Go on a hunt for matching samples ● Drop water on the samples and float them in basins. ● Test the wood to find out how many paper clips it takes to sink it, then organize their results by making a concrete graph. ● Use sandpaper to change the shape of wood. ● Compare sawdust and shavings and how they interact with water. ● Simulate the manufacture of two kinds of wood- particleboard and plywood. ● Make detailed observations of different types of wood ● Communicate observations to peers	● Patterns ● Cause and effect ● Energy and matter ● Structure and function

	smooth, texture, wood, absorb, float, sink, soak, spread, test, weight, basswood, evaporate, property, raft, sandpaper, sawdust	• Apply understanding of wood's properties to authentic scenarios	
2-PS1-2 K-ESS3-3 K-2-ETS 1-1 K-2-ETS 1-2	**Getting to Know Paper** ✔ Paper has many observable properties. ✔ People make paper from wood. ✔ The properties of papers determine their uses. ✔ Some papers absorb water; others do not. ✔ Some paper changes when soaked in water. Some paper breaks down into small fibers. ✔ Paper can be reused, recycled, and fabricated. Key Terms: chipboard, construction, corrugated, corrugated cardboard, facial tissue, newsprint, paper towel, tag board, waxed, bumpy, slick, tear, bend, corner, crease, flat, fold, half, thick, thin,, drop, dropper, submerge, paper mache, wax paper, wheat pasta, recycling, pulp	• Observe and compare the properties of ten kinds of paper and go on a hunt for matching samples. • Compare how well the papers fold and which has the best surface for writing. • Test papers for absorption, then soak the samples overnight. • Learn how to recycle paper by making new paper from old and crafting papier- mâché bowls • Communicate observations to peers • Apply understanding of paper's properties to authentic scenarios	• Patterns • Cause and effect • Structure and function
2-PS1-2 K-PS3-1 K-PS3-2 K-ESS3-3 K-2-ETS 1-1 K-2-ETS 1-2 K-2-ETS 1-3	**Getting to Know Fabric** • Fabric is a flexible material with a wide range of properties. The properties of fabrics determine their uses. • Fabric can be made of woven threads. • Fabrics can absorb, transmit, or repel water. • Wet fabric dries when water evaporates, leaving the fabric unchanged. • Land, air, water and trees are natural resources. • People reuse and recycle to conserve natural resources.	• Observe and compare the properties of ten kinds of fabric • Search for different ways fabrics are used. • Take apart fabrics to learn how they are woven from threads. • Investigate how fabrics interact with water. • Consider the properties of different fabrics and decide which fabric are good choices for clothing. • Plan how they can conserve, reuse, and recycle.	• Patterns • Cause and effect • Structure and function

	• The Sun warms Earth's surface. • Engineers design and test solutions to problems Key Terms: burlap, cloth, conserve, corduroy, denim, fabric, fleece, hot, knit, magnet, natural resource, nubby, recycle, reuse, ripstop nylon, satin, seersucker, slippery, soak, sparkle organza, structure, temperature, terry cloth, thread, warp, waterproof, woof, woven	• Observe the warming effect of the sun and design a structure to reduce the effect of heating.	
K-PS2-1 K-PS2-2 K-2-ETS 1-1 K-2-ETS 1-2 K-2-ETS 1-3	**Motion** • Pushing or pulling on an object can change the speed or direction of its motion and can start or stop it. • Gravity pulls things down. • A bigger push or pull makes things go faster. • When objects touch or collide, they push on one another and can change motion. Key Terms: cause, collide, collision, direction, distance, effect, fast, gentle, gravity, motion, move, pull, push, rocket, roll, rolling, ramp, slope, slowly, speed, strength, stop	• Investigate the strength of pushes and pulls needed to move objects. • Use gravity to pull balls down slopes to investigate collisions. • Find ways to change the strength and direction of the pull on a rolling ball to meet design challenges. • Students change the strength of the push on a balloon rocket flying on a line to explore cause and effect	• Patterns • Cause and effect • Scale, proportion, and quantity • Systems and system models

Science Unit Materials and Motion
Kindergarten

TIME FRAME	TOPIC	PERFORMANCE TASKS ACTIVITIES/PROJECTS ASSESSMENTS	RESOURCES/INTERDISCIPLINARY CONNECTIONS
January *6 periods*	Getting to Know Wood	FOSS Investigation 1: Getting to Know Wood Part 1: Observing Wood Part 2: Wood and Water Part 3: Testing a Raft Part 4: Sanding Wood Part 5: Sawdust and Shavings Part 6: Making Particle Board Part 7: Making Plywood **Assessment:** Teacher Observation	**Science Resource Book** *"The Story of a Chair"* *"Are You an Engineer?"* **Video** *What is Agriculture?* **Supplemental Resources** *Floating and Sinking* by Honey Andersen *Wood* by Kate McGough *Would You Believe It* by Catherine Chambers BrainPOP Jr.: Sink or Float "I Am Wood" Song
February March *8 periods*	Getting to Know Paper	FOSS Investigation 2: Getting to Know Paper Part 1: Paper Hunt Part 2: Using Paper Part 3: Paper and Water Part 4: Paper Recycling Part 5: Paper Mache **Assessment:** Teacher Observation	**Science Resource Book** *"The Story of a Box"* **FOSS Online Activity** *Where is the Wood?* **Supplemental Resources** *Around the World* by Margaret Hall Ground Hog Day Activities Charcoal drawings

			Saw dust shaving pictures
March April *6 periods*	Getting to Know Fabric	FOSS Investigation 3: Getting to Know Fabric Part 1: Feely Boxes and Fabric Hunt Part 2: Taking Fabric Apart Part 3: Water and Fabric Part 4: Graphing Fabric Uses Part 5: Reuse and Recycle Resources Part 6: Building Structures **Assessment:** Teacher Observation	**Science Resource Book** *"What is Fabric Made From?"* *"How Are Fabrics Used?"* *"Land, Air, and Water"* *"I Am Wood"* **Video** *What is Agriculture?* *Environmental Health* *Clothing and Building Materials* **FOSS Online Activity** *Weave a Pattern* *Recycling Center* **Supplemental Resources** Scholastic Reader *Paper, Paper, Everywhere* by Gail Gibbons
April May *4 periods*	Motion	FOSS Investigation 4: Getting Things to Move Part 1: Pushes and Pulls Part 2: Colliding Objects Part 3:Rolling Outdoors Part 4:Balloon Rockets **Assessment:** Teacher Observation	**Science Resource Book** *"Pushes and Pulls"* *"Collisions"* **FOSS Online Activity** *Build a Roller Coaster*

UNIT: Animals Two by Two
Kindergarten

ENDURING UNDERSTANDINGS	ESSENTIAL QUESTIONS
✔ All living organisms have specific characteristics in common. ✔ Fish and animals have basic needs ✔	✔ *What structures help organism live and grow?* ✔ *What do animals need to live?* ✔ *How to organism differ?*

NJSLS-S	KNOWLEDGE Students will know:	SKILLS/ PRACTICES Students will be able to:	CROSSCUTTING CONCEPTS Students will apply:
K-LS1-1 K-ESS2-2 K-ESS3-1	**Guppies** ✔ Fish are animals that have basic needs. ✔ Fish have structures that help them live and grow. ✔ Different kinds of fish have similar but different structures and behaviors. ✔ Birds are animals that have basic needs. ✔ Different kinds of birds have similar but different structures and behaviors. Key Terms: Animal, aquarium, bill, bird, feather, female, fin, fish, fly, food, freshwater, gill, goldfish, guppy, male, mouth, plant, prefer, scale, swim, tail, tunnel, water, wing	• Observe the structures and behaviors of goldfish. • Feed the fish and enrich the environment in which the fish live. • Compare the structures and behaviors of the goldfish to those of other fish, guppies. • Compare photos of fish and read about fish. • Go bird watching in the schoolyard and compare features and behaviors of birds.	• Patterns • Cause and effect • Systems and system model • Structure and function

K-LS1-1 K-ESS2-2 K-ESS3-1	**Snails** • Different kinds of snails have some structures and behaviors that are the same and some that are different. • Snails are animals and have basic needs-water, air, food, and space with shelter. • There is great diversity among snails. • Shells differ in size, shape, pattern, and texture. • Snails have senses. Key Terms: Dark, float, foot, land snail, large, light, rough, sea animal, shell, sideways, small, smooth, tentacle, terrarium, upside down, vial, water snail	• Observe the structures and behaviorsof two kinds of water snails. • Work witha variety of seashells, discussing similarities and differences in their size, shape, color, and texture. • Match shell pairs, make designs, and create patterns. • Explore the schoolyard to find local land snails and compare their structures and behaviors to water snails.	• Patterns • Cause and effect • Systems and system model • Structure and function
K-LS1-1 K-ESS2-2 K-ESS3-1	**Worms** • Worms are animals and have basic needs. • Worms have identifiable structures. • Different kinds of worms have similar structures and behaviors; they also have differences (size, color). • Worm behavior is influenced by conditions in the environment. • Worms change plant material into soil. Key Terms: Body, bristle, clitellum, earthworm, moist, night crawler, red worm, segment, soil, swollen, top	• Dig for red worms, rinse them off, and look at their structures. • Study the behavior of red worms • Construct worm jars and provide for the needs of the composting worms. • Observe how the worms change the plant material into soil. • Compare the red worms to night crawlers. • Compare photos and read about worms and their activities in soil.	• Patterns • Cause and effect • Systems and system model • Structure and function
K-LS1-1 K-ESS2-2 K-ESS3-1	**Pill and Sow Bugs** • Isopods are animals and have basic needs-water, air, food, and space with shelter. • Different kinds of isopods have some structures and behaviors that are the same and some that are different. • There is great diversity among isopods.	• Observe structures of two kinds of isopods. • Identify which are pill bugs and which are sow bugs. • Hold isopod races. • Make a terrarium in which all the land animals live together.	• Patterns • Cause and effect • Systems and system model • Structure and function

	● Isopod behavior is influenced by conditions in the environment. Key Terms: antenna, ball, carapace, flat, isopod, jagged, living, moisture, nonliving, pill bug, protect, race, roll up, round, section, sow bug, turn over	● Compare photos and read about isopods. ● Read about and compare illustrations of a variety of animals. ● Discuss the differences between living and nonliving things.	

Science Unit Animals Two by Two
Kindergarten

TIME FRAME	TOPIC	PERFORMANCE TASKS ACTIVITIES/PROJECTS ASSESSMENTS	RESOURCES/INTERDISCIPLINARY CONNECTIONS
September October *7 periods*	Guppies	FOSS Investigation 1: Goldfish and Guppies Part 1: The Structure of Goldfish Part 2: Caring for Goldfish Part 3: Goldfish Behavior Part 4: Comparing Goldfish to Guppies Part 5 : Comparing School Yard Birds **Assessment:** Teacher Observations	**Science Resource Book** *"Fish Same and Different"* *"Fish Live in Many Places"* *"Birds Outdoors"* **Video** *The Urban Habitat of Peregrine Falcons in Is This a House for Hermit Crab?*
October November *6 periods*	Snails	FOSS Investigation 2: Water and Land Snails Part 1: Observing Water Snails Part 2: Shells Part 3: Land Snails **Assessment**: Teacher Observations	**Science Resource Book** *"Water and Land Snails"* **Video** *Seashore Surprises*
November December *7 periods*	Worms	FOSS Investigation 3: Big and Little Worms Part 1: The Structure of Red worms Part 2: Red worm Behavior Part 3: Comparing Red worms to Night Crawlers **Assessment:** Teacher Observations	**Science Resource Book** *"Worms in Soil"*
November December *7 periods*	Bugs	FOSS Investigation 3: Pill Bugs and Sow Bugs Part 1: Isopods Observations Part 2: Identifying Isopods Part 3: Isopod Movement Part 4: Animals Living Together **Assessment:** Teacher Observations	**Science Resource Book** *"Isopods"* *"Animals All Around Us"* *"Living and Nonliving"* **Book** *Animals Two by Two* **FOSS Online Activity** *Find the Parent*

Science

Grade 1

UNIT: Air and Weather
Grade 1

ENDURING UNDERSTANDINGS	ESSENTIAL QUESTIONS
✔ The Earth's weather is always changing. ✔ Meteorologists use tools to measure weather factors ✔ The sun is the ultimate energy source for all of Earth's processes. ✔ The Sun and Moon can be observed moving across the sky ✔ Each season has a typical weather pattern	✔ What can air do? ✔ How does weather work? ✔ What is the relationship between the sun, moon, and stars? ✔ How does the temperature and weather change over the seasons?

NJSLS-S	KNOWLEDGE Students will know:	SKILLS/ PRACTICES Students will be able to:	CROSSCUTTING CONCEPTS Students will apply:
2-PS1-1 K-2 ETS1-1 K-2 ETS1-2 K-2 ETS1-3	**Exploring Air** ● Air is a gas and is all around us. ● Air matter and takes up space. ● Air makes object move. ● Air moves from place to place. Moving air is wind. ● Air resistance affects how things move. ● Air can be compressed. ● The pressure from compressed air can move things, including water. Key Terms: air, air resistance, barrel, blow, bubble, compress, engineer, gas, matter, move, parachute, plunger, pressure, push, rocket, submerge, syringe, system, tube, wind	● Explore properties of a common gas mixture—air. ● Use vials, syringes, and tubing, to discover air is matter, takes up space, can be compressed, and compressed air builds up pressure that can push objects around. ● Construct and compare parachutes and balloon rockets that use air.	● Cause and effect ● Systems and system models ● Structure and function
1-ESS1-1 1-ESS1-2 K-ESS2-1	**Observing the Sky** ● Weather describes conditions in the air outside. ● Temperature describes how hot or cold the air is. Temperature is measured with a thermometer.	● Use instruments for 4–8 weeks to observe and record weather on a class calendar and in science notebooks. ● Monitor temperature with a thermometer and (optionally) rainfall with a rain gauge.	● Patterns ● Cause and effect ● Stability and change

	• Clouds are made of liquid water drops that fall to Earth as rain. Wind moves clouds in the sky. • The Sun and Moon can be observed moving across the sky; we see them at different locations in the sky, depending on the time of day or night. Key Terms Change, cirrus, cloud, cold, , cumulus, day, degrees Celsius, Fahrenheit, hot, meteorologist, moon, night, overcast, partly cloudy, pattern, rain gauge, rainy, record, snowy, star, stratus, sun, sunrise, sunset, symbol, thermometer, temperature, water vapor, weather instruments, weather conditions	• Identify three basic cloud types by matching their observations with a cloud chart. • Monitor times of sunrise and sunset and record the number of daylight hours each day.	
K-ESS2-1 K-ESS3-3	**Wind Exploration** • Wind is moving air. • Meteorologists use wind scales (models) to describe the strength of the wind. • Meteorologists use anemometers to measure the speed of the wind. • A wind vane points in the direction the wind is coming from. • Weather conditions include air movement or wind. . Key Terms: Anemometer, calm, direction, east, breeze, kite, north, pinwheel, south, west, wind speed, wind vane	• Look for evidence of moving air. • Observe and describe wind speed using pinwheels, an anemometer, and a wind scale. • Observe bubbles and construct wind vanes to find the wind's direction. • Fly kites to feel the strength of the wind and the direction it is moving. • Discuss how wind influences your activities for the day • Apply understanding of wind to authentic scenarios	• Patterns • Cause and effect • Scale, proportion, and quantity • Structure and function
1-ESS1-1 1-ESS1-2 K-ESS2-1	**Looking for Change** • Daily changes in temperature and weather type can be observed, compared, and predicted over a month. • The Sun and Moon can be observed moving across the sky; we see them at different	• Organize monthly weather data, using graphs to describe weather trends. • Monitor weather throughout the year, comparing the seasons and looking for weather patterns. • Use observations they have recorded on the calendar to look for monthly	• Patterns • Stability and change

	locations in the sky, depending on the time of day or night. ● Each season has a typical weather pattern that can be observed, compared and predicted. The number of hours of daylight changes predictably through the seasons. . <u>Key Terms:</u> Fall, graph, hibernate, migrate, seasons, spring, summer, winter	patterns of the Moon and annual patterns of daylight hours.	

Air Weather Unit
Grade 1

TIME FRAME	TOPIC	PERFORMANCE TASKS ACTIVITIES/PROJECTS ASSESSMENTS	RESOURCES/INTERDISCIPLINARY CONNECTIONS
September *3 periods*	Exploring Air	FOSS Investigation 1: Exploring the Air Part 1: Air is There Part 2: Parachutes Part 3: Pushing on Air Part 4: Air and Water Part 5: Balloon Rockets **Assessment:** Science Notebook entry, performance assessment, Investigation 1 I-Check	**Science Resource Book** "*What is All around Us?* **Video** *Friction and Air Resistance*
September *2 periods*	Observing the Sky	FOSS Investigation 2: Observing the Sky Part 1: Weather Calendars Part 2: Measuring Temperature and Daylight Part 3: Watching Clouds Part 4: Observing the Moon **Assessment:** Science Notebook entry, performance assessment, Investigation 2 I-Check	**Science Resource Book** *"What is the Weather Today?"* *"Clouds"* *"Water in the Air"* *"Changes in the Sky"* **FOSS Online Activity** Cloud Catcher Us Naval Observatory Complete Sun and Moon Data **Supplemental Resources** *Oh Say Can You Say What's the Weather Today?: All About Weather* by Tish Rabe *What Will the Weather Be* by Lynda DeWitt Discovery Education: A First Look at Weather Discovery Education: Weather Patterns SMART Notebook Lesson: Weather – What do I wear? Discovery Education: Magic School Bus Kicks up a Storm Discovery Education: Clouds, Weather, and Life

September October *6 periods*	Wind Exploration	FOSS Investigation 3: Wind Exploration Part 1: Bubbles in the Wind Part 2: Wind Speed Part 3: Pinwheels Part 4: Wind Vanes Part 5: Kites **Assessment:** Science Notebook entry, performance assessment, Investigation 3 I-Check	**Science Resource Book** *"Understanding the Weather"* *"Resources"* **FOSS Online Activity** Wind Speed **Supplemental Resources** Discovery Education: Wind
October *4 periods*	Looking for Change	FOSS Investigation 4: Looking for Change Part 1: Changes Over a Month Part 2: Daylight through the Year Part 3: Comparing the Seasons **Assessment:** Science Notebook entry, performance assessment, Investigation 4 I-Check	**Science Resource Book** *"Changes in the Sky"* *"Seasons"* *"Getting through the Winter"* **FOSS Online Activity** What's the Weather **Supplemental Resources** BrainPOP Jr.: The Sun BrainPOP Jr.: The Moon BookFlix: Happy Birthday, Moon! BookFlix: Stars! Stars! Stars! Harcourt School: Phases of the Moon Discovery Education: Forecasting the Weather Song: Whether the Weather *Cloudy with a Chance of Meatballs by* Judi Barrett

UNIT: Sound and Light
Grade 1

ENDURING UNDERSTANDINGS	ESSENTIAL QUESTIONS
✔ Sounds can convey information ✔ Vibrating objects make sound ✔ Light can be used to communicate over long distances	✔ What information does sound give us? ✔ How can we use sound to communicate over long distances? ✔ How can we communicate with light?

NJSLS-S	KNOWLEDGE Students will know:	SKILLS/ PRACTICES Students will be able to:	CROSSCUTTING CONCEPTS Students will apply:
1-PS4-1	**Sound and Vibrations** ● Vibration is a rapid back-and-forth motion. ● Vibrating objects make sound; a sound always comes from a vibrating source. ● Sounds can make objects vibrate. ● Sound sources can be natural or human-made. ● Ears are one kind of sound receiver. ● Sounds can convey information. Key Terms: back and forth motion, compare, hear, identify, information, listen, loud, observe, pluck, property, soft, sound, sound receiver, sound source, table fiddle, tuning fork, vibrate, vibration	● Explore the production of sound with a table fiddle, tuning forks, a tone generator, cups, sticks, and rubber bands. ● Look for vibrations at the sound source and come up with words to describe different sounds. ● Discriminate between different kinds of sounds and what information sounds convey. ● Find out about sounds that different animals make.	● Cause and effect
1-PS4-1 1-PS4-4 1-LS1-1 K-2 ETS1-1 K-2 ETS1-2	**Changing Sound** ● Vibrating objects make sound; sound always comes from a vibrating source.	● Use simple instruments (xylophone, one-string guitar) to investigate how to change the volume of sound (loud and soft) and the pitch of sound (high and low).	● Patterns ● Cause and effect ● Systems and system models

	• Sound vibrations travel from a source through a medium (matter) to reach a receiver (ear). • Volume is how loud or soft a sound is. • Pitch is how high or low a sound is. • High-pitched sounds come from sources that vibrate quickly. • Large objects tend to vibrate slower than small objects. Key Terms: communicate, direction, gentle, guitar, hard, high pitch, instrument, kalimba, length, low pitch, medium pitch, message, spoon gong system, string, system, travel, volume, xylophone	• Using a spoon gong, students develop a model of how sound travels from a source to a receiver. • Redesign the spoon gong to make a device to both send and receive sound. • Investigate sound receivers used by different animals.	
1-PS4-3	**Light and Shadows** • Light sources are objects or systems that radiate, such as lamps, flashlights, candles, and the Sun. • Light travels from a source in all directions. • Shadows are the dark areas that result when light is blocked. • Some materials block light entirely or partially; other materials allow light to travel through. • The length and direction of a shadow depends on the position of the light source Key Terms: block, dark, flashlight, light, light source, opaque, shade, shadow, sun, sunlight, translucent, transparent	• Use flashlights, sunlight, and solid materials that block light to create and change shadows. • Investigate how light interacts with objects that are transparent, translucent, and opaque.	• Patterns • Cause and effect
1-PS4-2 1-PS4-3 1-PS4-4 K-2 ETS1-1	**Light and Mirrors** • Light travels in straight lines. A mirror can be used to redirect light.	• Position mirrors to reflect images so they can see their own eyes and view objects behind them.	• Patterns • Cause and effect • Systems and system models

K-2 ETS1-2 K-2 ETS1-3	• Mirror images are the result of light reflected from a surface. An image produced by something that reflects, such as a mirror, is always reversed. • Light is necessary for animals to see. • Animal eyes are not all the same. • Light can be used to communicate over long distances. Key Terms: Angle, eye, light detector, mirror, model, redirect, reflect, reflection, vision	• Investigate how to use one and two mirrors to direct light to different locations. • Experience what they can see when there is no light, and learn that objects can be seen only when light is available. • Explore the shapes and location of eyes on different animals. • Read about devices that use light to communicate information.	

Sound and Light Unit
Grade 1

TIME FRAME	TOPIC	PERFORMANCE TASKS ACTIVITIES/PROJECTS ASSESSMENTS	RESOURCES/INTERDISCIPLINARY CONNECTIONS
January *3 periods*	Sounds and Vibrations	FOSS Investigation 1: Sounds and Vibrations Part 1: Making Sound Part 2: Hearing Sound Part 3: Outdoor Sounds **Assessment:** Science Notebook entry, performance assessment, Investigation 1 I-Check	**Science Resource Book** *"Vibrations and Sounds"* *"Listen to This"* **FOSS Online Activity** Sorting Sound Sound Cards **Supplemental Resources**
January *3 periods*	Changing Sound	FOSS Investigation 2: Changing Sound Part 1: Changing Volume Part 2: Changing Pitch Part 3: Spoon Gong System Part 4: Sound Challenges **Assessment:** Science Notebook entry, performance assessment, Investigation 2 I-Check	**Science Resource Book** *"Animal Ears and Hearing"* *"Strings in Motion"* *"More Musical Instruments"* **Video** *All About Sound* **Supplemental Resources**
February *5 periods*	Lights and Shadows	FOSS Investigation 3: Lights and Shadows Part 1: Making Shadows Part 2: Sun and Shadows Part 3: Light and Materials **Assessment:** Science Notebook entry, performance assessment, Investigation 3 I-Check	**Science Resource Book** *"Playing in the Light"* **Video** Light and Shadows All about Light

			My Shadow **Supplemental Resources**
February *4 periods*	Light and Mirror	FOSS Investigation 4: Light and Mirrors Part 1: Mirrors and Light Beams Part 2: Reflections Part 3: Eyes and Seeing Part 4: Designing with Light **Assessment:** Science Notebook entry, performance assessment, Investigation 4 I-Check	**Science Resource Book** *"Reflections"* *"Seeing the Light"* *"Communicating with Light"* **Video** Light and Darkness **Supplemental Resources**

UNIT: Plants and Animals
Grade 1

ENDURING UNDERSTANDINGS	ESSENTIAL QUESTIONS
✔ Seeds are alive and grow into new plants ✔ Individuals of the same kind (of plant or animal) look similar but also vary in many ways ✔ Plants and animals live in different environments and have structures and behaviors that help them survive ✔ Engineers learn from nature to solve problems	✔ How does a seed grow? ✔ How can we make a new plant from an old one? ✔ What structures or behaviors do plants and animals have that help them live in their habitat? ✔ What do animal parents do to help their young survive?

NJSLS-S	KNOWLEDGE Students will know:	SKILLS/ PRACTICES Students will be able to:	CROSSCUTTING CONCEPTS Students will apply:
1-LS1-1 1-LS3-1	**Grass and Seeds** ● Seeds need water to grow into new plants. ● Not all plants grow alike. ● Plant roots take in water and nutrients, and leaves make food from sunlight. ● Seeds are alive and grow into new plants. ● Plants have different structures that function in growth and survival. ● Individuals of the same kind (of plant or animal) look similar but also vary in many ways. Key Terms: Alfalfa, blade, fertilizer, function, grain, lawn, leaf, light, mow, nutrient, observe, plant, root, ryegrass, seed, soil, sprout, stem, structure, variation, wheat	● Plant miniature lawns with ryegrassand alfalfa. ● Mow the lawns and observethe response of grass and alfalfa to cutting. ● Plant individual wheat seeds in clear straws and observe how seeds germinate and grow, observing variation in the growth of the same kind of seed. ● Conduct a plant hunt in the schoolyard and continue to look for variation. ● Use media to look at variation in animals and how animals use their senses to gather information about their surroundings to help them survive.	● Patterns ● Cause and effect ● Structure and function

1-LS1-1 1-LS3-1	**Stems** ● Leaves, twigs, and roots develop on stems at nodes. ● Potatoes are underground stems; potato eyes are nodes where buds grow. ● New plants can grow from the stems of mature plants. ● Plants are living organisms that need, water, air, nutrients, light, and space to grow. Key Terms: Bud, cutting, eye, node, potato, tuber	● Make new plants from stems of houseplants. ● Put sections of stems into water and look for evidence that a new plant is forming. ● Plant pieces of potatoes (modified stems) and observe them grow. ● Communicate results to class	● Patterns ● Cause and effect ● Structure and function
1-LS1-1 K-2 ETS 1-2	**Terrariums** ● Plants need water, nutrients, air, space, and light; animals need water, food, air, and space with shelter. ● A habitat is a place where plants and animals live. It provides what a plant or animals needs to live. ● Plants and animals live in different environments and have structures and behaviors that help them survive. Animals use sensory structures to take in information about their surroundings and act on it. ● Engineers learn from nature to solve problems Key Terms: behavior, desert, forest, grassland, habitat, map, map key, ocean, pond, predator, rain forest, shelter, survive, system, terrarium, tundra	● Set up terrariums using seeds and plants from investigations 1 and 2. ● Add local animals such as snails and isopods and provide for the needs of the plants and animals. ● Learn about other animals and plants through readings and multimedia and compare and sort structures and functions. ● Through an outdoor simulation, students learn about variations in how squirrels store food for winter survival. ● Read about how engineers learn from nature to solve human problems.	● Systems and system models ● Structure and function

1-LS1-2 1-LS3-1	**Growth and Change** ● Plant bulbs are alive and grow new structures when provided with water. ● Some parts of roots will grow into new plants if they are provided with water. Other parts will not. ● Plants grow and change. Plants can produce new plants in many ways. ● Adult animals can have young (offspring), and the young resemble their parents. ● In many kinds of animals, parents and the offspring engage in behaviors that help the offspring survive. Key Terms: bulb, carrot, garlic, offspring, parent, radish, vermiculite	● Plant onion or garlic bulbs in moist cotton and observe as they develop into new plants. ● Plant parts of roots—carrots and radishes—to discover which parts will develop into new plants. ● Adopt a schoolyard plant and compare it to other plants. ● Use media to learn about the behavior of animals and their young and how these behaviors help the young to survive. ● Observe how young plants and animals resemble their parents.	● Patterns ● Cause and effect ● Structure and function

Plants and Animals
Grade 1

TIME FRAME	TOPIC	PERFORMANCE TASKS ACTIVITIES/PROJECTS ASSESSMENTS	RESOURCES/INTERDISCIPLINARY CONNECTIONS
January *3 periods*	Grass and Seeds	FOSS Investigation 1: Grass and Grain Seeds Part 1: Lawns Part 2: Mowing the Lawn Part 3: Wheat Part 4: Variation in Plants and Animals **Assessment:** Science Notebook entry, performance assessment, Investigation 1 I-Check	**Science Resource Book** *"What Do Plants Need?"* *"The Story of Wheat"* *"Variation"* **Video** How Plants Grow Animal Growth **Supplemental Resources**
January *3 periods*	Stems	FOSS Investigation 2: Stems Part 1: Rooting Stem Cuttings Part 2: Spuds Part 3: New Plants from Cuttings **Assessment:** Science Notebook entry, performance assessment, Investigation 2 I-Check	**Supplemental Resources**
February *5 periods*	Terrariums	FOSS Investigation 3: Terrariums Part 1: Setting up Terrariums Part 2: Animals in Terrariums Part 3: Habitat Match Part 4: Squirrel Behavior **Assessment:** Science Notebook entry, performance assessment, Investigation 3 I-Check	**Science Resource Book** *"What do Animals Need?"* *"Plants and Animals around the World"* *" Learning from Nature"* **Video** How Plants live in Different Places Animal Growth **Supplemental Resources**

February *4 periods*	Growth and Change	FOSS Investigation 4: Growth and Change Part 1: Planting Bulbs Part 2: Planting Roots Part 3: Plant and Animal Growth **Assessment:** Science Notebook entry, performance assessment, Investigation 4 I-Check	**Science Resource Book** "*Animals and Their Young*" **Video** Animal Offspring and Caring for Animals **Online Activity** Watch it Grow Find the Parent **Supplemental Resources**

Science

Grade 2

UNIT: Pebbles, Sand and Silt
Grade 2

ENDURING UNDERSTANDINGS	ESSENTIAL QUESTIONS
✔ Rocks can be described by their properties ✔ Some Earth events happen rapidly; others occur slowly over time ✔ Earth materials are natural resources ✔ Wind and water can change the shape of the land	✔ How river are rocks the same? ✔ How do people use earth materials? ✔ Where is water found din our community? ✔ How can soil erosion be reduced?

NJSLS-S	KNOWLEDGE Students will know:	SKILLS/ PRACTICES Students will be able to:	CROSSCUTTING CONCEPTS Students will apply:
2-ESS1-1 2-PS1-1	**First Rocks** ● Rocks can be described by their properties. ● Smaller rocks (sand) result from breaking (weathering) of larger rocks. ● Rocks are the solid material of Earth. ● Rocks are composed of minerals. ● Volcanoes are mountains build up by melted rocks that flow out of weak areas in Earth's crust. Key Terms: basalt, bubble, color, data, dull, earth material, flat, geologist, granite, group, mineral, pattern, pointed, property, rock, rough, round, sand, scoria, shape, sharp, shiny, size, smooth, sort, texture, tuff, weathering	● Investigate several kinds of volcanic rocks and begin to understand the properties of the rocks. ● Observe rocks (using hand lenses), ● Rub rocks, wash rocks, sort rocks, and describe rocks. ● Organize a class rock collection. ● Investigate the properties of rocks and the colorful minerals they contain. ● Apply understanding of rock properties to authentic scenarios	● Cause and effect ● Stability and change
2-ESS1-1 2-ESS2-1 2-ESS2-2 2-ESS2-3 2-PS1-1	**River Rocks** ● Rocks are earth materials. ● Rocks can be described by the property of size. ● Rock sizes include clay, silt, sand, gravel, pebbles, cobbles, and boulders.	● Investigate a mixture of different-sized river rocks. ● Separate the rocks using a series of three screens to identify five sizes of rocks: large pebbles, small pebbles, large gravel, small gravel, and sand. ● Add water to a vial of sand to discover silt and clay. ● Investigate how sand is formed	● Cause and effect ● Scale, proportion, and quantity ● Stability and change

	• Weathering, caused by wind or water, causes larger rocks to break into smaller rocks. • Some Earth events happen rapidly; others occur slowly over a very long period of time. Key Terms: beach, boulder, butte, canyon, clay, cobble, delta, erosion, gravel, layer, mesa, mixture, model, particle, pebble, plain, plateau, sand, sand dune, screen, separate, settle, shake, silt, valley, volcano	• Compare slow changes of weathering and erosion to rapid changes due to volcanic eruptions. • Apply understanding of weathering to authentic scenarios	
2-PS1-1 2-PS1-2 K-2 ETS1-1 K-2 ETS1-2 K-2 ETS1-3	**Using Rocks** • Earth materials are natural resources. • The properties of different earth materials make each suitable for specific uses. • Different sizes of sand are used on sandpaper to change the surface of wood from rough to smooth. • Earth materials are commonly used in the construction of buildings and streets. Key Terms: asphalt, brick, build, coarse, concrete, engineer, fine, harden, matrix, medium, mortar, natural resources, sandpaper, sculpture, sidewalk	• Investigate how people use earth materials to construct objects. • Make rubbings from sandpaper, sculptures from sand, decorative jewelry from clay, and bricks from clay soil. • Go on a schoolyard field trip to look for places where earth materials occur naturally and where people have incorporated earth materials into building materials. • Apply understanding of using rocks as resources to authentic scenarios	• Cause and effect • Scale, proportion, and quantity • Energy and matter
2-ESS1-1 2-ESS2-1 2-ESS2-2 2-ESS2-3 K-2 ETS1-1 K-2 ETS1-2 K-2 ETS1-3	**Soil and Water** • Earth materials are natural resources. • Soils can be described by their properties (color, texture, ability to support plant growth). • Soil is made partly from weathered rock and partly from organic material. Soils vary by location.	• Put together and take apart soils. • Investigate humus as an ingredient in soil. • Homemade and local soils are compared, using techniques introduced in Investigation 2. • Read about sources of natural water • Sort images of water sources, both fresh and salt	• Cause and effect • Scale, proportion, and quantity • Stability and change

	● Natural sources of water include streams, rivers, ponds, lakes, marshes, and the ocean. Sources of water can be fresh or salt water. ● Water can be a solid, liquid, or gas. ● Wind and water can change the shape of land. ● The shapes and kinds of land and water can be represented by various models. <u>Key Terms:</u> decay, fresh water, gas, humus, lake, liquid, ocean, pond, retain, river, salt water, soil, solid, stream	● Discuss where water is found in their community. ● Compare different solutions presented in readings to slow the effects of wind and water erosion. ● Investigate different ways to represent landforms and bodies of water	

Pebbles, Sand, Silt
Grade 2

TIME FRAME	TOPIC	PERFORMANCE TASKS ACTIVITIES/PROJECTS ASSESSMENTS	RESOURCES/INTERDISCIPLINARY CONNECTIONS
January *3 periods*	First Rocks	FOSS Investigation 1: River Rocks Part 1: Three Rocks Part 2: Washing Three Rocks Part 3: First Sorting Part 4: Start a Rock Collection Part 5: Sorting Activity **Assessment:** Science Notebook entry, performance assessment, Investigation 1 I-Check	**Science Resource Book** "Exploring Rocks" "Colorful Rocks" **Video** *All about Volcanoes* **Online Activities** *Rock Sorting* *Property Chain* **Supplemental Resources**
January *3 periods*	River Rocks	FOSS Investigation 2: River Rocks Part 1: Screening River Rocks Part 2: River Rocks by Size Part 3: Sand and Silt Part 4: Exploring Clay and Landforms **Assessment:** Science Notebook entry, performance assessment, Investigation 2 I-Check	**Science Resource Book** "The Story of Sand" "Rocks Move" "Landforms" **Video** *All about Land Formations* **Supplemental Resources**
February *5 periods*	Using Rocks	FOSS Investigation 3: Using Rocks Part 1: Rocks in Use Part 2: Observing Sandpaper Part 3: Sand Sculptures Part 4: Clay Beads Part 5: Making Bricks	**Science Resource Book** *"Making Things With Rocks"* *"What are Natural Resource?"* **Online Activities** Find Earth Materials

		Assessment: Science Notebook entry, performance assessment, Investigation 3 I-Check	**Supplemental Resources**
February *4 periods*	Soil and Water	FOSS Investigation 4: Soil and Water Part 1: Homemade Soil Part 2: Local Soil Part 3: Natural Sources of Water Part 4: Land and Water **Assessment:** Science Notebook entry, performance assessment, Investigation 4 I-Check	**Science Resource Book** *"What is in Soil?"* *"Testing Soil"* *"Where is Water Found?"* *"States of Water"* *"Erosion"* *"Ways to Represent Land and Water"* **Video** *All About Soil* *All about Landforms* **Supplemental Resources** BrainPOP Jr.: Soil Discovery Education: Getting to Know Soil Discovery Education: The Dirt on Soil - Soil Properties *Soil* by Alice K. Flanagan

UNIT: Solids and Liquids
Grade 2

ENDURING UNDERSTANDINGS	ESSENTIAL QUESTIONS
✔ Substances are either a solid, liquid, or a gas. ✔ Substances have different properties that interact in different ways. ✔ Solid materials can occur as masses of small particles. ✔ The structure of matter is affected by energy.	✔ How do solids and liquids behave? ✔ What makes one substance different than another? ✔ *How can mixtures of particles be separated?* ✔ *How do properties of materials change when they are heated or cooled?*

NJSLS-S	KNOWLEDGE Students will know:	SKILLS/ PRACTICES Students will be able to:	CROSSCUTTING CONCEPTS Students will apply:
2PS1-1 2PS1-2 2PS1-3 K-2 ETS1-1 K-2 ETS1-2 K-2 ETS1-3	**Solids** ✔ Solid is one state or phase of matter. ✔ Objects are described and identified by their properties. ✔ Objects are made of one or more materials. ✔ Natural and human-made objects occur outdoors. ✔ Many common objects are solids. ✔ Solids retain their shape regardless of the container they occupy. ✔ Engineers are scientists who use their knowledge of materials to design useful objects and structures. Solids are useful for building because they retain their shape. Key Terms: solid, gas, liquid, matter, observe, property, sort, flexible, hard, texture, opaque, transparent, engineer, construct	● Explore solid objects, such as pieces of wood, plastic, and metal. ● Observe, describe, and sort objects according to their properties. ● Construct towers (and other structures), using the properties inherent in the materials to accomplish the task. ● Discover solid objects in the schoolyard environment, and sort the found objects into natural and human-made ● Develop and apply an operational definition of "solid" ● Apply understanding of solids to authentic scenarios	● Patterns ● Systems and system models ● Structure and function

2PS1-1 2PS1-2	**Liquids** ● Liquid is one common state of matter. ● Liquids move freely in containers. ● Liquids have many properties that help identify them. ● Liquids take the shape of their containers. ● The surfaces of liquids are flat and level. ● Liquids pour and flow. ● Many common substances are liquids. Key Terms: liquid, property, colorless, translucent, transparent, viscous, tornado, gravity, liquid level, surface	● Investigate liquids in a variety of settings to become familiar with their properties. ● Learn precise liquids vocabulary, using liquid-property cards. ● Use representational materials to enhance understanding of the unique behaviors of liquids. ● Explore the properties of water puddles in the schoolyard. ● Develop and apply an operational definition of "liquid" ● Apply understanding of liquids to authentic scenarios	● Patterns ● Cause and effect ● Scale, proportion, and quantity
2PS1-1 2PS1-2	**Bits and Pieces** ● Solid materials can occur as masses of small particles. ● A mass of particulate matter can form piles and support a more dense object on its surface. ● Particulate solids can be separated by size (with screens). ● Masses of particulate matter can pour. ● The surface of a mass of particles is not flat and level. ● Particulate matter occurs naturally in the outdoors. Key Terms: maintain, cornmeal, bean, rice, grain, particle, powder, pour, separate, screen, sieve, mixture, sift, funnel	● Work with beans, rice and cornmeal to find out how solids behave when the pieces are small. ● Shake, rattle, and roll the materials in bottles, pour them from container to container, and separate them by using screens. ● Go outdoors to find particulate solid materials. ● Observe the particles when poured on a flat surface and compare the particles to water on the same surface. ● Continue to modify and apply operational definitions of "solid" and "liquid" ● Apply understanding of mixtures to authentic scenarios	● Patterns ● Cause and effect
2PS1-1 2PS1-2 2PS1-3 2PS1-4	**Solids and Liquids with Water** ● Some solids change when mixed with water. ● Some solids dissolve in water.	● Investigate interactions between solids and water and liquids and water.	● Cause and effect ● Energy and matter ● Stability and change

	● Water can be separated from a mixture through evaporation; evaporation leaves the solid behind. ● Some liquids mix with water; others form layers. ● Some materials have properties of both solids and liquids. ● Melting is the change from solid to liquid. ● Freezing is the change from liquid to solid. ● Heat causes materials to melt; cold causes them to freeze; changes can be reversible or irreversible. <u>Key Terms:</u> evaporate, change, dissolve, disappear, swollen, layer, beaker, colloid	● Observe, describe, record, and organize results. ● Test toothpaste to determine if it is a solid or a liquid. ● Investigate melting and freezing of familiar liquids. ● Collect solid materials outdoors and mix them with water. ● Look for changes in the color and clarity of the water as evidence that something mixed with the water. ● Continue to modify and apply operational definitions of “solid” and “liquid” ● Apply understanding of mixtures to authentic scenarios	

Solids and Liquids Unit
Grade 2

TIME FRAME	TOPIC	PERFORMANCE TASKS ACTIVITIES/PROJECTS ASSESSMENTS	RESOURCES/INTERDISCIPLINARY CONNECTIONS
January *3 periods*	Solids	FOSS Investigation 1: Solids Part 1: Solid Objects Part 2: Solid Materials Part 3: Group Solid Objects Part 4: Construct with Solids Part 5: Outdoor Solids **Assessment:** Science Notebook entry, performance assessment, Investigation 1 I-Check	**Science Resource Book** *"Everything Matters"* *" Solid Objects and Materials"* *"Tower"* *"Bridges"* **Video** *Clothing and Building Materials* *Properties of Materials* *Inv. 1.5 Properties of Materials* **Supplemental Resources** *Galimoto* by Karen Lynn Williams *Is it rough? Is it smooth? Is it shiny?* by Tana Hoban BrainPOP Jr.: What is Matter? BrainPOP Jr.: Solids, Liquids, and Gasses SMART Notebook Lesson: Is it a solid or a liquid? Discovery Education: Solids Discovery Education: Magic School Bus: Under Construction Game: Who Wants To Be A Millionaire Quiz
January *3 periods*	Liquids	FOSS Investigation 2: Liquids Part 1: Liquids in a Bottle Part 2: Properties of Liquids Part 3: Liquid Levels Part 4: Puddles **Assessment:** Science Notebook entry, performance assessment, Investigation 2 I-Check	**Science Resource Book** *"Liquids"* **Video** *All About Properties of Matter* **Online Activities** *Falling Bottle Puzzle*

			Supplemental Resources Discovery Education: Liquids Discovery Education: Describing Liquids
February *5 periods*	Bits and Pieces	FOSS Investigation 3: Bits and Pieces Part 1: Solids in a Container Part 2: Separating Soup Mix Part 3: Solids in Bottles Part 4: Beads and Screens Part 5: Spills **Assessment:** Science Notebook entry, performance assessment, Investigation 3 I-Check	**Science Resource Book** *" Pouring"* *"Comparing Solids and Liquids"* **Video** **Supplemental Resources**
February *4 periods*	Solids and Liquids With Water	FOSS Investigation 4: Solids and Liquids with Water Part 1: Solids and Water Part 2: Liquids and Water Part 3: Toothpaste Investigation Part 4: Changing Properties Part 5: Tea Time **Assessment:** Science Notebook entry, performance assessment, Investigation 4 I-Check	**Science Resource Book** *"Mix it Up"* *"Heating and Cooling"* *"Is Change Reversible?"* **Video** *Solids and Liquids* **Online Activities** *Change It* **Supplemental Resources** *Bartholomew And The Oobleck* by Dr. Seuss *Horrible Harry and The Green Slime* by Suzy Kline BrainPOP Jr.: Sink or Float Solids in Water interactive game

UNIT: Insects and Plants
Grade 2

ENDURING UNDERSTANDINGS	ESSENTIAL QUESTIONS
✔ Insects have characteristics and structures and behaviors ✔ Plants need water, air, nutrients, light and space ✔ Variations exist within a group of related organisms ✔ Life cycles are different for different animals	✔ How does a young plant change as it grows? ✔ How do insects grow and change? ✔ What is the life cycle of the lady butterfly?

NJSLS-S	KNOWLEDGE Students will know:	SKILLS/ PRACTICES Students will be able to:	CROSSCUTTING CONCEPTS Students will apply:
3-LS1-1 2-LS4-1	**Meal Worms** ✔ Insects need air, food, water, and space. ✔ The life cycle of the beetle is egg, larva, pupa, and adult, which produces eggs. ✔ Insects have characteristic structures and behaviors. ✔ Adult insects have a head, thorax, and abdomen. ✔ Insects have predictable characteristics at different stages of development. Key Terms: abdomen, adult, air, antenna, bran, darkling beetle, dead, dropping, egg, exoskeleton, food, habitat, insect ,larva, leg, life cycle, living, mealworm, molt, observe, organism, pupa, segment, space, structure, thorax, water	• Care for and observe larval mealworms in a vial to care for and observe. • Observe the larvae grow, molt, pupate, and turn into beetles (adults), which mate, lay eggs, and die. • Read an article about insects in the environment	• Patterns • Structure and function
3-LS1-1 2-LS2-1 2-LS2-2 2-LS4-1 K-2 ETS 1-2	**Seeds** • Plants need water, air, nutrients, light, and space. • As plants grow, they develop roots, stems, leaves, buds, flowers, and seeds in a sequence called a life cycle. Seeds develop into new plants that look like the parent plant.	• Plant tiny rapid-cycling brassica seeds in a planter cup. • Study pollination through video and by cross-pollinating their brassica plants. • Observe and record the complete life cycle from seed to seed.	• Patterns • Cause and effect • Structure and function

	• Animals disperse seeds, moving them from one location to another where they grow. • Bees and other insects help some plants by moving pollen from flower to flower. Key Terms: brassica, bud, fertilizer, flower, fruit, germinate, leaf, light, nutrient, plant, pollen, pollination, root, seed, seedling, seedpod, soil, sprout, stem	• Search for seeds outdoors and learn about ways that animals disperse seeds to new locations.	
3-LS1-1 2-LS4-1 K-2 ETS1-1 K-2 ETS1-2 K-2 ETS1-3	**Milkweed Bugs** • Insects need air, food, water, and appropriate space including shelter; different insects meet these needs in different ways. • The life cycle of some insects is egg, nymph stages, and adult, which produces eggs. • Variations exist within a group of related organisms. • As insects grow, they molt their exoskeleton. Key Terms: bug, female, hatch, male, mating, milkweed bug, nymph, proboscis, shelter	• Prepare a habitat for the Milkweed bugs, providing air, food, water, and space, including shelter. • Observe structure, pattern, and behavior as the insects advance through simple metamorphosis. • Go outdoors to search for insects living naturally on the ground and on plants and design an insect habitat.	• Patterns • Structure and function
3-LS1-1 2-LS4-1	**Silkworms** • Insects need air, food, water, and appropriate space including shelter; different insects meet these needs in different ways. • The life cycle of some insects involves complete metamorphosis-egg, larva, pupa, and adult, which produces eggs. Key Terms: clasper, cocoon, engineering, evidence, eyespot, metamorphosis, mulberry leaf, proleg, silk, silkworm, spinneret spiracle	• Observe the life history of one of the most commercially successful insects, silkworms. • Start with eggs and observe the growth and changes to larvae, pupae, and adults, which produce eggs. • Search the schoolyard for evidence of plants being eaten by insects.	• Patterns

3-LS1-1 2-LS4-1 K-2 ETS1-2	**Butterflies** ● The life cycle of the butterfly involves complete metamorphosis. Butterflies construct chrysalises when they pupate. ● Insects pollinate plants. ● Life cycles are different for different animals. Key Terms: Butterfly, caterpillar, chrysalis, nectar, offspring, painted lady, predict, waste	● Observe painted lady larvae grow, pupate, and emerge as adult butterflies. ● Observe the stages of complete metamorphosis and compare the behaviors of moths and butterflies. ● Study pollination through video and outdoor plant observations.	● Patterns ● Structure and function

Insects and Plants Unit
Grade 2

TIME FRAME	TOPIC	PERFORMANCE TASKS ACTIVITIES/PROJECTS ASSESSMENTS	RESOURCES/INTERDISCIPLINARY CONNECTIONS
January *3 periods*	Mealworms	FOSS Investigation 1: Mealworms Part 1: Mealworms Part 2: Larva, Pupa, Adult Part 3: Life Cycle **Assessment:** Science Notebook entry, performance assessment, Investigation 1 I-Check	**Science Resource Book** *"Animals and Plants in Their Habitat"* " **Supplemental Resources**
January *3 periods*	Seeds	FOSS Investigation 2: Brassica Seeds Part 1: Planting Brassica Part 2: Observing Brassica Growth Part 3: Plant Life Cycle Part 4: Planting Outdoors **Assessment:** Science Notebook entry, performance assessment, Investigation 2 I-Check	**Science Resource Book** *"Flowers and Seeds"* "How Seeds Travel" Review **Video** *How Plants Grow* *What is Pollination?* *How Seeds Get Here… and There* **Online Activities** *Watch it Grow!* **Supplemental Resources**
February *5 periods*	Milkweed Bugs	FOSS Investigation 3: Milkweed Bugs Part 1: Eggs Part 2: Habitats Part 3: Growing Milkweed Bugs Part 4: Insect Search **Assessment:** Science Notebook entry, performance assessment, Investigation 3 I-Check	**Science Resource Book** *" So Many Kinds, So Many Places"* **Online Activity** Insect Hunt **Supplemental Resources**

February *4 periods*	Silkworm	FOSS Investigation 4: Silkworms Part 1: Eggs and Larva Part 2: Silkworms Structures Part 3: Pupae and Adults Part 4: Plant Eaters **Assessment:** Science Notebook entry, performance assessment, Investigation 4 I-Check	**Science Resource Book** *"Insect Shapes and Colors"* *"Insect Life Cycles"* **Supplemental Resources**
	Butterflies	FOSS Investigation 5: Butterflies Part 1: Caterpillars Part 2: Chrysalises Part 3: Adult Butterflies Part 4: Flower Powder **Assessment:** Science Notebook entry, performance assessment, Investigation 5 I-Check	**Science Resource Book** *"Life Goes Around"* **Video** What is Pollination? **Supplemental Resources** Caterpillar to Chrysalis Video

Science

Grade 3

UNIT: Water and Climate
Grade 3

ENDURING UNDERSTANDINGS	ESSENTIAL QUESTIONS
✔ Water expands when heated and contracts when cooled ✔ A material that floats in water is less dense than the water; a material that sinks is more dense ✔ Evaporation and condensation contribute to the movement of water through the water cycle. ✔ The Sun's energy drives weather ✔ The energy of flowing water can be used to do work.	✔ What happens outdoors when rain falls on natural materials? ✔ What happens to water when it gets hot? Cold? ✔ How does surface affect evaporation? ✔ What are typical weather conditions for our region? ✔ What happens when water is mixed with other earth materials?

NJSLS-S	KNOWLEDGE Students will know:	SKILLS/ PRACTICES Students will be able to:	CROSSCUTTING CONCEPTS Students will apply:
2-ESS2-3 3-ESS3-1	**Water** ● Water forms beads on waterproof materials and soaks into absorbent materials. ● Water moves downhill. The angle of slope and the amount of water affect flow. Key Terms: absorb, bead, data, direction, dome, earth material, evidence, gravity, move, natural material, observation, opinion, relationship, repel, slope, surface, waterproof	● Investigate properties of water. ● Compare the way water interacts with four different surfaces. ● Compare the rates of different amounts of water flowing downhill. ● Explore how sponges interact with water to soak upspills. ● Go outdoors to explore how water interacts with natural materials.	● Patterns ● Cause and effect
2-ESS2-3 3-ESS2-1 2-PS1-1 5-PS1-1	**Temperature** ● Temperature is a measure of how hot matter is. ● Water expands when heated and contracts when cooled. ● A material that floats in water is less dense than the water; a material that sinks is more dense.	● Observe the properties of water as it is heated, cooled, and frozen. ● Make a water thermometer and find that water expands as it is heated. ● Compare the density of water at different temperatures and find that warm water is less dense than cool water, and that ice is less dense than liquid water.	● Cause and effect ● Scale, proportion, and quantity

	• Cold water is more dense than warm water. • Water expands when it freezes; ice is less dense than liquid water. • Ice melts when heated; water freezes when cooled Key Terms: bulb, cold, contract, degree Celsius, expand, float, freeze, hot, less dense, liquid, mass, melt, more dense, sink, solid, state, temperature, thermometer, volume	• Go outdoors to compare melting of ice in different conditions (above ground and underground).	
3-ESS2-1 2-PS1-1 5-PS1-1	**Weather and Water** • Weather is measured using observations and tools such as thermometers, wind vanes, and rain gauges. • Evaporation is the process by which liquid (water) changes into gas (water vapor). • High temperatures, greater surface area, and moving air (wind) increase the rate of evaporation. • Condensation is the process by which gas (water vapor) changes into liquid water; it occurs on a cool surface. • Evaporation and condensation contribute to the movement of water through the water cycle. Key Terms: compass, condensation, evaporation, forecast, gas, meteorologist, meteorology, precipitation, rain gauge, surface area, water cycle, water vapor, weather, wind vane	• Compare weather data that they observe and collect to meteorologists' forecasts and historical weather data. • Explore the effects of environmental conditions and surface area on rates of evaporation. • Set up condensation chambers and consider how evaporation and condensation contribute to the water cycle.	• Patterns • Cause and effect • Scale, proportion, and quantity
3-ESS2-1 3-ESS2-2 3-ESS3-1	**Seasons and Climate** • Typical weather in a region often varies with seasons. High and low temperatures and amount of precipitation are the main ways to describe seasonal weather changes. • The Sun's energy drives weather.	• Work in groups to organize and analyze local daily weather data for 4 months of the previous year (January, April, July, and October). • Through media, students are introduced to ways that people	• Patterns • Cause and effect • Scale, proportion, and quantity

	• Weather data in tables and in graphic displays, may show patterns over time. • Climate is the average or typical weather than can be expected to occur in a region, based on long-term observation and data analysis. • Weather-related natural hazards include tornadoes, hailstorms, blizzards, lightning, floods, and drought. • People often modify their homes and their way of life to deal with floods. • Wetland protection and restoration is one way to prevent floods Key Terms: blizzard, climate, climatologist, drought, embankment, flood, floodplain, hailstorm, hurricane, lightning, monsoon, natural hazard, season, sluice gate, tornado, typical, wetland	manage the problems associated with floods. • Discuss engineering methods to deal with these weather-related hazards.	
3-ESS3-1 3-5 ETS 1-1 3-5 ETS 1-2 3-5 ETS 1-3	**Waterworks** • Soil is rock particles mixed with organic material called humus. • Soils retain more water than rock particles alone. • Water drains more easily through some earth materials than through others. • The energy of flowing water can be used to do work; waterwheels are machines powered by flowing water. Key Terms: blade, constraint, criteria, criterion, drainage, energy, gravel, humus, load, natural resources, renewable resource, retain, shaft, soil, system, water retention, waterwheel	• Compare what happens when water is poured through two different earth materials, soil and gravel. • Test soil in a number of locations on the schoolyard to compare the drainage rates. • Construct a waterwheel and use it to lift objects, learning about the power of water. • Investigate renewable natural resources and ways to conserve them..	• Cause and effect • Systems and system models

Water and Climate Unit
Grade 3

TIME FRAME	TOPIC	PERFORMANCE TASKS ACTIVITIES/PROJECTS ASSESSMENTS	RESOURCES/INTERDISCIPLINARY CONNECTIONS
January *3 periods*	Water	FOSS Investigation 1: Water Observations Part 1: Drops of Water Part 2: Water on a Slope Part 3: Soaking Sponges Part 4: Water in Nature **Assessment:** Science Notebook entry, performance assessment, Investigation 1 I-Check	**Science Resource Book** *"A Report from the Blue Planet"* *"Surface Tension"* *"Which Way Does it Go?"* *"Opinion and Evidence"* *"Water Everywhere"* **Video** Aquatic Surface Dwellers Aquatic Insect Adaptations **Online Activities** Surface Tension Measuring Volume Measuring Mass Reading a Graduated Cylinder Measuring Volume in Mass Kilogram Hunt Metric Mystery **Supplemental Resources**
January *3 periods*	Temperature	FOSS Investigation 2: Hot Water, Cold Water Part 1: Measuring Temperature Part 2: Build a Thermometer Part 3: Sinking and Floating Part 4: Water as Ice Part 5: Ice Outdoors	**Science Resource Book** *"Vacation Aggravation"* *"Celsius and Fahrenheit"* *"Ice is Everywhere"* " Water: Hot and Cold" **Online Activities**

		Assessment: Science Notebook entry, performance assessment, Investigation 2 I-Check	*Measuring Temperature* *Reading a Thermometer* *Bottle Thermometer* *Density of Hot and Cold Water* *Hot and Cold Water Density* *Expansion and Contraction of Water* **Supplemental Resources**
February *5 periods*	Weather and Water	FOSS Investigation 3: Weather and Water Part 1: Measuring Weather Part 2: Evaporation Part 3: Surface Area Part 4: Evaporation Locations Part 5: Condenstation **Assessment:** Science Notebook entry, performance assessment, Investigation 3 I-Check	**Science Resource Book** *" Studying Weather"* *"Drying Up"* *"Surface Area Experiment"* *"Condensation"* *"The Water Cycle"* **Video** All About Meteorology Water Cycle Weather Maps **Online Activity** Evaporation Experiment Water Cycle Weather Grapher **Supplemental Resources**
February *4 periods*	Season and Climate	FOSS Investigation 4: Season and Climate Part 1: Seasonal Weather Part 2: Describing Climate Part 3: Weather Related Natural Hazards **Assessment:** Science Notebook entry, performance assessment, Investigation 4 I-Check	**Science Resource Book** *"Climate Regions"* *"Wetlands for Flood Control"* *"Conserving Water during Droughts"* **Video** All About Climate and Seasons Come a Tide

			Floods **Online Activities** Climate Regions Maps **Supplemental Resources**
	Waterworks	FOSS Investigation 5: Waterworks Part 1: Water in Earth Materials Part 2: Water in Soil Part 3: Waterwheels **Assessment:** Science Notebook entry, performance assessment, Investigation 5 I-Check	**Science Resource Book** *"Water: A Vital Resource"* *"Natural Resources"* *"Ellen Swallow Richards: An Early Ecologist"* *"Making Drinking Water Safe"* *"Using the Energy of Water* **Online Activities** Virtual Investigation: Water Retention of Soils **Supplemental Resources**

UNIT: Motion and Matter
Grade 3

ENDURING UNDERSTANDINGS	ESSENTIAL QUESTIONS
✔ The strength of the magnetic force between objects depends on the properties of the objects and their distances apart. ✔ Unbalanced forces (pushes or pulls) result in change of motion. ✔ The patterns of an object's motion in various situations can be observed and measured. ✔ Mass is neither created nor destroyed during physical and chemical interactions. Matter is conserved. ✔ The success of a designed solution is determined by considering the desired features of a solution (criteria) ✔	✔ What happens when magnets interact with other magnets? ✔ What causes change of motion? ✔ How can you improve the design of your cart? ✔ What happens when you mix two materials?

NJSLS-S	KNOWLEDGE Students will know:	SKILLS/ PRACTICES Students will be able to:	CROSSCUTTING CONCEPTS Students will apply:
3-PS2-1 3-PS2-2 3-PS2-3	**Forces** ● Magnetic force between objects does not require that the objects be in contact. ● The strength of the magnetic force between objects depends on the properties of the objects and their distance apart. ● The interaction between magnets depends on their orientation (sometimes they attract and sometimes they repel). ● Unbalanced forces (pushes or pulls) result in change of motion. ● Gravity is the force that pulls masses toward the center of Earth.	● Explore the forces of magnetismand gravity using magnets. ● Through investigations, students find that both magnetism and gravity can pull, and magnetism can sometimes push as well. ● Refine investigations and abilities to use science practices and collect data regarding observations of the interaction between paper clips and magnets. ● Use data to predict how far the magnetic field extends. ● Build on the experience of magnetic force	● Patterns ● Cause and effect

	Key Terms: attract, balanced, change of motion, data, direction, evidence, force, gravity, magnet, magnetic field, magnetic force, magnetism, model, motion, observe, pattern, practice, predict, pull, push, repel, science practices, strength, unbalanced	• Explore other pushes and pulls, considering strength and direction • Observe the effects of balanced and unbalanced forces.	
3-PS2-1 3-PS2-2	**Motion** • The patterns of an object's motion in various situations can be observed and measured. • When past motion exhibits a regular pattern, future motion can be predicted from it. • A wheel-and-axle system with two sizes of wheels describes a curved path when rolled down a slope. The system curves toward the smaller wheel. • A twirly bird is a simple winged system that spins when it interacts with air. Twirler performance is affected by variables. • Tops exhibit rotational motion (spinning) when torque is applied to the axial shaft. Top performance is affected by variables. Key Terms: axis, axle, friction, outcome, pattern of motion, ramp, rotate, shaft, slope, standard, system, top, twirly bird, variable, wheel.	• Use variety of systems to explore patterns of motion. • Design wheel-and-axle systems and roll the systems down ramps to observe the pattern of motion. T • Extend the rolling investigations to systems with big and little wheels and use the predictable curved rolling path to meet challenges. • Make twirly birds (flying spinners) and explore the variables involved in the interaction between twirlying systems, gravity, and air. • Design tops and explore the variables that result in the best spinning top.	• Patterns • Cause and effect • Systems and system models
3-PS2-1 3-PS2-2 3-PS2-4 3-5 ETS 1-1 3-5 ETS 1-2 3-5 ETS 1-3	**Engineering** • Possible solutions to a problem are limited by available materials and resources (constraints). • The success of a designed solution is determined by considering the desired features of a solution (criteria). • Research on a problem should be carried out before beginning to design a solution.	• Tackle an engineering design challenge in incremental steps. • Design a cart that can roll "from here to there," • Improve designs to meet a specific distance challenge. • Investigate gravity • Explore how start position on a ramp effects the distance the cart travels.	• Patterns • Cause and effect

	Testing a solution involves investigating how well it performs under a range of likely conditions. ● The pattern of an object's or a system's motion in various situations can be observed and measured. ● When past motion exhibits a pattern, it can be used to predict future motion Key Terms: bearing, centimeter, constraint, criterion, engineer, meter, metric system, solution, standard unit, start position	● Conduct final challenge incorporating knowledge of magnetism into cart design to meet new challenges. ● Develop understanding of engineering design concepts and engage in engineering practices.	
5-PS1-1	**Mixtures** ● A mixture is two or more materials distributed evenly throughout one another. ● A special class of mixture, a solution, results when a solid material dissolves (disappears) in a liquid. ● Starting materials change into new materials during chemical reactions. ● Mass is neither created nor destroyed during physical and chemical interactions. Matter is conserved. Key Terms: baking soda, calcium carbonate, chalk, chemical reaction, cloudy, conservation of mass, dissolve, mixture, salt, sand, solution, suspend, transparent, vinegar	● Build and extend grade two experiences with matter by making mixtures of two materials. ● Determine the mass of the materials prior to mixing and after mixing. ● Confirm that the mass of the solution is equal to the starting masses of the water and salt. ● Mix vinegar and baking soda and observe a bubbling reaction. ● Determine that the mass of the ending mixtures is less than the mass of the original material. ● Design and conduct a metric field day to creatively apply their understanding of standards of measurement.	● Cause and effect ● Scale, proportion, and quantity ● Energy and matter

Motion and Matter Unit
Grade 3

TIME FRAME	TOPIC	PERFORMANCE TASKS ACTIVITIES/PROJECTS ASSESSMENTS	RESOURCES/INTERDISCIPLINARY CONNECTIONS
January *3 periods*	Force	FOSS Investigation 1: Forces Part 1: Two Forces Part 2: Magnetic Force Investigation Part 3: More About Forces **Assessment:** Science Notebook entry, performance assessment, Investigation 1 I-Check	**Science Resource Book** *"Magnetism and Gravity"* *"What Scientists Do"* *"Change of Motion"* **Video** All about Motion and Balance All about Magnets **Online Activities** Magnetic Poles **Supplemental Resources**
January *3 periods*	Motion	FOSS Investigation 2: Patterns of Motion Part 1: Wheel and Axle System Part 2: Predicting Motion of New Systems Part 3: Twirly Birds Part 4: Tops **Assessment:** Science Notebook entry, performance assessment, Investigation 2 I-Check	**Science Resource Book** *"Patterns of Motion"* *"What Goes Around"* **Online Activities** Roller Coaster Builder **Supplemental Resources**
February *5 periods*	Engineering	FOSS Investigation 3: Engineering Part 1: From Here to There Part 2: Distance Challenge Part 3: Investigating Start Position Part 4: Cart Tricks	**Science Resource Book** *" What Engineers Do"* *"Science Practices"* *"Engineering Practices"* *"Soap Box Delivery"*

		Assessment: Science Notebook entry, performance assessment, Investigation 3 I-Check	*"The Metric System"* *"How Engineers and Scientists Work Together"* *"Magnets at Work"* **Online Activity** Measuring Length Measuring Logic **Supplemental Resources**
February *4 periods*	Mixtures	FOSS Investigation 4: Mixtures Part 1: Mixing Solids and Liquids Part 2: Reactions Part 3: Metric Field Day **Assessment:** Science Notebook entry, performance assessment, Investigation 4 I-Check	**Science Resource Book** *"Mixtures"* *"Reactions"* *"Careers You Can Count On"* **Online Activities** Measuring Mass Conservation of Mass Measuring Volume and Mass Measuring Volume Chemical Reactions Metric Mystery Measuring Length Measuring Logic Change of State States of Matter Virtual Investigation Measuring Volume and Mass **Supplemental Resources**

UNIT: Structures of Life
Grade 3

ENDURING UNDERSTANDINGS	ESSENTIAL QUESTIONS
✔ All living organisms have specific characteristics in common. ✔ Plants and animals have different structures that serve different functions in growth, survival and reproduction. ✔ Plants and animals have life cycles and they vary by species. ✔ Living organisms convert the sun's energy into stored energy to be used within the organism or passed through the food chain. ✔ The number and kinds of bones in an organism are characteristics inherited from the parent or organisms	✔ How do you know if something is a living thing? ✔ How do organisms grow and develop? ✔ What is needed to sustain a food chain? ✔ What are the functions of the skeletal system? ✔ How are fingerprints alike and different?

NJSLS-S	KNOWLEDGE Students will know:	SKILLS/ Practices Students will be able to:	CROSS CUTTING CONCEPTS Students will apply:
3-LS1-1 3-LS3-1	**Seeds** ● Seeds develop in the plant part called a fruit. ● Different kinds of fruits have different kinds and numbers of seeds; seeds have a variety of properties. ● A seed in an organism, a living thing. ● Seeds undergo changes in the presence of water. ● A seed contains the embryo plant and stores food. A seed grows into a new plant (reproduction). ● Seed-dispersal mechanisms (wind, water, and animals) move seeds away from parent plants.	● Conduct a seed hunt by opening fresh fruit and locating the seeds. ● Describe and compare seed properties. ● Examine and sort a selection of seeds—bean, pea, sunflower, and corn. ● Investigate the effect water has on seeds by setting up seed sprouters and observing and recording changes over a week. ● Systematically find out how much water lima beans soak up in a day. ● Investigate seed dispersal mechanisms of plants. ● Develop and apply an operational definition of "living"	● Patterns ● Cause and effect ● Structure and function

	Key Terms: compete, cotyledon, disperse, dormant, embryo, fruit, function, living, organisms, parent plant, reproduce, seed, seed coat, structure, survive	• Develop and use evidence-based criteria to determine if an unfamiliar object is living or nonliving • Apply understanding of seeds to authentic scenarios	
3-LS1-1 3-LS3-1	**Plant Growth** • Germination is the onset of a seed's development. • Plants need water, light, space, and nutrients to grow. • The life cycle is the sequence of stages during which a seed grows into an adult (mature) plant and produces seeds, which in turn produce new plants of the same kind. • The fruit of the plant develops from the flower. • Roots function to take up water and nutrients so they can be transported to other parts of the plant. Different kinds of plants have different root systems. • Plants are organisms that grow. All organisms grow and develop in a predictable manner. Key Terms: adult, fibrous root, flower, germination, growth, hydroponics, inherit, leaf, life cycle, nutrient, root, seedling, shoot, stem, taproot	• Examine germinated seeds to determine similarities and differences in the way the organisms grow. • Set up a hydroponic garden to observe the life cycle of a bean plant. • Go outdoors to investigate the roots and shoots of various plants. • Use tools to dig up plants and compare the structures above ground to those below ground. • Through direct experience and readings, students learn about plant structures and functions. • Apply understanding of growth and life cycles to authentic scenarios	• Patterns • Cause and effect • Structure and function
3-LS2-1 3-LS3-1 3-LS3-2 3-LS4-2 3-LS4-3 3-LS4-4	**Crayfish** • Crayfish have observable structures and behaviors that serve various functions in growth, survival, and reproduction. • Different organisms can live in different environments; organisms have adaptations	• Observe and record some of the structures of a crustacean, the crayfish, and compare it to other organisms. • Establish a feeding and maintenance schedule for the organisms.	• Patterns • Cause and effect • Systems and system models • Stability and change

	that allow them to survive and reproduce in those environments. ● Organisms are related in feeding relationships called food chains. ● Difference in characteristics between individuals of the same species may provide an advantage in surviving. ● Some animals claim a territory that they defend against others of their kind. Some organisms live in social groups that many help the individuals in the group survive. Key Terms: adaptation, antenna, appendage, behavior, carapace, carnivore, crayfish, crustacean, elodea, energy, environment, food chain, genus, habitat, herbivore, molt, offspring, omnivore, pincer, population, predator, prey, protective coloring, species, sustain, swimmeret, territory, trait, variation.	● Investigate crayfish behavior and map where the crayfish spend time within their habitat. ● Through readings, organism cards, and a video, students learn about adaptations of organisms in different environments ● Use a computer simulation to study variation of traits in species and explore how variation might affect survival of individuals. ● Engage in an outdoor simulation activity to explore food chains. ● Apply understanding of structure and function, habitat, behavior, and food chains to authentic scenarios	
3-LS3-1 3-LS3-2 3-LS4-1 3-LS4-2 3-LS4-3 3-LS4-4	**Human Body** ● A skeleton is a system of interacting bones. Humans have about 206 bones. Bones have several functions: support, protection, and movement. ● The number and kinds of bones in an organism are characteristics inherited from the parents of the organism. ● Muscles attach across joints to move bones. ● Fossils are important evidence about extinct organisms and past environments. ● Fingerprints can be sorted into the three groups based on basic patterns: whorl, arch, and loop. Key Terms: arch, ball and socket joint, bone, fingerprint, fossil, gliding joint, hinge joint, loop, movement, muscle, opposable thumbs, pattern,	● Observe the articulated human skeletal system in action ● Use posters and a sense of touch to estimate and refine a count of the 206 human bones ● Build skeleton puzzles from memory. ● Dissect rodent bones from owl pellets and compare them to human bones. ● Explore joints and their role in movement focusing on opposable thumbs. ● Build operational models of muscle-bone systems to see how muscles move bones.	● Scale, proportion, and quantity ● Systems and system models ● Structure and function

	protection, skeletal muscle, skeletal system, skull, tendon, tissue, torso, whorl	● Investigate their skin by making and analyzing fingerprint patterns.	

Structures of Life Unit
Grade 3

TIME FRAME	TOPIC	PERFORMANCE TASKS ACTIVITIES/PROJECTS ASSESSMENTS	RESOURCES/INTERDISCIPLINARY CONNECTIONS
September *14 periods*	Seeds	FOSS Investigation 1: Origins of Seeds Part 1: Seed Search Part 2: The Sprouting Seed Part 3: Seed Soak Part 4: Seed Dispersal **Assessment:** Science Notebook entry, performance assessment, response sheet, Investigation 1 I-Check	**Science Resource Book** *"The Reason for Fruit"* *"The Most Important Seed"* *"Barbara McClintock"* *"Nature Journal- How Seeds Travel"* **Video** How Seeds Get Here… and There Plants Basic Needs **Supplemental Resources** Discovery Education: How Plants Grow Discovery Education: Magic School Bus-Goes to Seed SMART Notebook Lesson: Seed Dispersal
October *16 periods*	Plant Growth	FOSS Investigation 2: Growing Further Part 1: Germination and Growth Part 2: Life Cycle of the Bean Part 3: Roots and Shoots **Assessment:** Science Notebook entry, response sheet, Investigation 2 I-Check	**Science Resource Book** *"Germination"* *"Life Cycles"* **Video** How Plants Get Food All about Animals and Life Cycles Structure and Function of Plants What is Pollination? **Supplemental Resources**

			BrainPOP Jr.: Plant Life Cycle BrainPOP Jr.: Parts of a Plant SMART Notebook Lesson: Life Cycle of a Bean Song: Photosynthesis
October *16 periods* *Concurrently with Plants*	Crayfish	FOSS Investigation 3: Meet the Crayfish Part 1: Crayfish Structures Part 2: Adaptation Part 3: Crayfish Territory Part 4: Compare Crayfish to Other Animals Part 5: Food Chains **Assessment:** Science Notebook entry, performance assessment, response sheet, Investigation 3 I-Check	**Science Resource Book** *"Crayfish"* *"Adaptations"* *"Life on Earth"* *" Inside a Snail's Shell"* *"A Change in the Environement"* *"Food Chains"* **Online Activities** Walking Stick Survival Where does it Live? What Doesn't Belong? Organism Match Habitat Gallery Crayfish vs Snail vs Mantis Life Cycles **Video** Animals Basic Needs All About Animal Adaptations Behavior All About Animal Behavior and Communication **Supplemental Resources** BBC Food Chain Discovery Education: Crustaceans Scholastic Food Webs
November *12 periods*	Human Body	FOSS Investigation 4: Human Body Part 1: Counting Bones Part 2: Owl Pellet Part 3: Joints and Muscles	**Science Resource Book** *"The Human Skeleton"* *"Barn Owls"* *"Fossils"*

		Part 4: Fingerprints **Assessment:** Science Notebook entry, performance assessment, response sheet, Investigation 3 I-Check, Posttest	*"Skeletons on the Outside"* *"Crayfish, Snails, and Humans"* *"Your Amazing Opposable Thumbs"* *"Joints and Muscles"* *"Fingerprints"* *"Super twins"* **Online Activities** Mr. Bones **Video** All About Fossils **Supplemental Resources**

Science

Grade 4

UNIT: Soils, Rocks, and Landforms
Grade 4

ENDURING UNDERSTANDINGS	ESSENTIAL QUESTIONS
✔ Soils are composed of different kinds and amounts of earth materials and humus. ✔ Fossils provide evidence of organisms that lived long ago as well as clues to changes in the landscape and past environments ✔ The rate and volume of erosion relates directly to the amount of energy in moving water or wind ✔ The surface of Earth is constantly changing; sometimes those changes take a long time to occur and sometimes they happen rapidly. ✔ Natural resources are natural materials taken from the environment and used by humans	✔ What causes big rocks to break down into smaller rocks? ✔ How does slope and floods affect erosion and disposition? ✔ How do fossils get in rocks and what can they tell us about the past? ✔ How can scientists and engineers help reduce the impacts that events like volcanic eruptions might have on people? ✔ How do people use natural resources to make or build things?

NJSLS-S	KNOWLEDGE Students will know:	SKILLS/ Practices Students will be able to:	CROSS CUTTING CONCEPTS Students will apply:
4-ESS2-1	**Soils and Weathering** ● Soils can be described by their properties. ● Soils are composed of different kinds and mounts of earth materials and humus. ● Weathering is the breakdown of rocks and minerals at or near Earth's surface. ● The physical-weathering process of abrasion and freezing break rocks and minerals into smaller pieces. ● Chemical weathering occurs when exposure to water and air changes rocks and minerals into something new.	● Investigate properties of soil by comparing four different soils. ● Explore how rocks break into smaller pieces through physical and chemical weathering. ● Go outdoors to explore and compare properties of local soils. ● Apply understanding of soil properties to authentic scenarios	● Patterns ● Cause and effect ● Systems and system models

	Key Terms: abrasion, acid rain, basalt, calcite, chemical reaction, chemical weathering, clay, conglomerate, earth material, expand, freeze, granite, gravel, humus, limestone, marble, model, pebble, physical weathering, rock, sand, sandstone, silt, soil, system, weathering		
4-ESS1-1 4-ESS2-1 4-ESS2-2	**Landforms** ● Use stream-table models to observe that water moves earth materials from one location to another. ● Investigate the variables of slope and water quantity and plan and conduct their own stream-table investigations. ● Look for evidence of erosion and deposition outdoors. ● Think about what happens to sediments over long periods of time as sediments layer on top of each other. ● Investigate different processes that can result in fossils and how fossils provide evidence of life and landscapes from the ancient past. Key Terms: alluvial fan, basin, canyon, cast, delta, deposition, erosion, flood, floodplain, fossil, imprint, landform, meander, mold, mountain, petrification, preserved remains, river channel, river mouth, sediment, sedimentary rock, shale, slope, superposition, valley	● Weathered rock material can be reshaped into new landforms by the slow processes of erosion and deposition. ● Erosion is the transport (movement) of weathered rock material (sediments) by moving water or wind. ● Deposition is the settling of sediments when the speed of moving water or wind declines. ● The rate and volume of erosion relate directly to the amount of energy in moving water or wind. ● The energy of moving water depends on the mass of water in motion and its velocity. The greater the mass and velocity, the greater the energy. ● Fossils provide evidence of organisms that lived long ago as well as clues to changes in the landscape and past environments. ● Apply understanding of soil properties to authentic scenarios	● Patterns ● Cause and effect ● Scale, proportion, and quantity ● Systems and system models ● Stability and change

4-ESS2-2 4-ESS3-2	**Earth's Surface** ● A topographic map uses contour lines to show the shape and elevation of the land. ● The change in elevation between two adjacent contour lines in always uniform. The closer the contour lines, the steeper the slope and vice versa. ● A profile is a side view or cross-section representation of a landform, and can be derived from the information on a topographic map. ● The surface of Earth is constantly changing; sometimes those changes take a long time to occur and sometimes they happen rapidly. ● Catastrophic events have the potential to change Earth's surface quickly. ● Scientists and engineers can do things to reduce the impacts of natural Earth processes on humans. Key Terms: contour interval, contour line, crust, earthquake, elevation, landslide, lava, magma, mantle, profile, satellite cone, sea level, topographic map, volcano	● Build a model of a landform ● Use the foam model of mount Shasta to create a topographic map, ● Use maps to produce another representation of the landforms— a profile of the mountain. ● Investigate volcanoes ● Use the topographer's tools to analyze the impact of the mount St. Helens eruption. ● Investigate landslides, earthquakes, floods, and volcanoes. ● Apply understanding of soil properties to authentic scenarios	● Patterns ● Cause and effect ● Systems and system models ● Stability and change
4-ESS3-2 3-5-ETS1-1	**Natural Resources** ● Natural resources are natural materials taken from the environment and used by humans. ● Rocks and minerals are natural resources important for shelter and transportation. ● Concrete is an important building material made from earth materials (limestone to make cement, sand and gravel for aggregates, and water for mixing).	● Review what they have learned in Investigations 1–3. ● Focus on earth materials as renewable and nonrenewable natural resources ● Investigate the importance of earth materials as resources. ● Make a stepping stone out of concrete ● Conduct a schoolyard walk to find objects and structures and	● Scale, proportion, and quantity ● Structure and function

	• Some natural resources are renewable (sunlight, air and wind, water, soil, plants, and animals) and some are nonrenewable (minerals and fossil fuels). • Alternative sources of energy include solar, wind, and geothermal energy. • Scientists and engineers work together to improve the use of natural resources to make them more durable and useful. <u>Key Terms:</u> aggregate, cement, concrete, fossil fuel, geothermal resource, nonrenewable resource, renewable resource, solar energy, wind power	consider what natural resources were used to construct them. • Apply understanding of soil properties to authentic scenarios	

Soils, Rocks and Landforms
Grade 4

TIME FRAME	TOPIC	PERFORMANCE TASKS ACTIVITIES/PROJECTS ASSESSMENTS	RESOURCES/INTERDISCIPLINARY CONNECTIONS
September *14 periods*	Soils and Weathering	FOSS Investigation 1: Soils and Weathering Part 1: Soil Composition Part 2: Physical Weathering Part 3: Chemical Weathering Part 4: Schoolyard Soils **Assessment:** Science Notebook entry, performance assessment, response sheet, Investigation 1 I-Check	**Science Resource Book** *"What is Soil?"* *"Weathering"* **Online Activities** *Virtual Investigation: Water Retention in Soils* **Video** Weathering and Erosion Weathering Tutorial Soils **Supplemental Resources**
October *16 periods*	Landforms	FOSS Investigation 2: Landforms Part 1: Erosion and Deposition Part 2: Stream Table Investigation Part 3: Schoolyard Erosion and Deposition Part 4: Fossil Evidence **Assessment:** Science Notebook entry, performance assessment, response sheet, Investigation 2 I-Check	**Science Resource Book** *"Erosion and Deposition"* *"Landforms Photo Album"* *"Fossils Tell a Story"* *"Pieces of a Dinosaur Puzzle"* **Online Activities** *Geology Lab: Stream Tables* *Tutorial- Stream Tables: Slope and Flood* *Virtual Investigation- Stream Tables* *Tutorial- Soil Formation* *Tutorial- Fossils* **Video**

			Weathering and Erosion Fossils Steam Table: High Flow Vs Low Flow Stream Table: High Slope Vs Low Slope Stream Table: Homogeneous vs Heterogeneous **Supplemental Resources**
October *16 periods* *Concurrently with Plants*	Mapping Earth's Surface	FOSS Investigation 3: Mapping Earth's Surface Part 1: Making a Topographic Map Part 2: Drawing a Profile Part 3: Mount St. Helen Case Study Part 4: Rapid Change **Assessment:** Science Notebook entry, performance assessment, response sheet, Investigation 3 I-Check	**Science Resource Book** *"Topographic Maps"* *The Story of Mount Shasta"* *"It Happened so Fast!"* **Online Activities** *Topographer* **Video** *Volcanoes* *Mount St. Helen Impact* **Supplemental Resources**
November *12 periods*	Natural Resources	FOSS Investigation 4: Natural Resources Part 1: Introduction to Natural Resources Part 2: Making Concrete Part 3: Earth Materials in Use **Assessment:** Science Notebook entry, performance assessment, response sheet, Investigation 4 I-Check, Posttest	**Science Resource Book** *"Monumental Rocks"* *"Geoscientists at Work"* *"Making Concrete"* *"Earth Materials in Art"* *"Where Do Rocks Come From?* **Online Activities** *Resource ID* *Virtual Investigation: Natural Resources* **Video**

			Natural Resources **Supplemental Resources**

UNIT: Energy
Grade 4

ENDURING UNDERSTANDINGS	ESSENTIAL QUESTIONS
✔ Energy is evident whenever there is motion, electric current, sound, light, or heat. ✔ Energy can transfer from place to place ✔ Magnets interact with each other and with some materials ✔ Objects in motion have energy ✔ An electromagnet is made by sending electric current through an insulated wire wrapped around an iron core.	✔ Which design is better for manufacturing long strings of lights series or parallel? ✔ What happens to the force of attraction between two magnets as the distance between them changes? ✔ How can you reinvent the telegraph using your knowledge of energy and electromagnetism? ✔ What happens when objects collide?

NJSLS-S	KNOWLEDGE Students will know:	SKILLS/ Practices Students will be able to:	CROSS CUTTING CONCEPTS Students will apply:
4-PS3-2 4-PS3-4 3-5 ETS1-1 3-5 ETS1-2 3-5 ETS 1-3	**Energy and Circuits** ● Energy is evident whenever there is motion, electric current, sound, light, or heat. Energy can transfer from place to place. ● An electric circuit is a system that includes a complete pathway through which electric current flows from an energy source to its components. ● Conductors are materials through which electric current can flow; all metals are conductors. ● In a series circuit, there is a single pathway from the energy source to the components; in a parallel circuit, each	● Investigate electric current and circuits, the pathways through which electricity flows. ● Work with a variety of components—D-cells, lightbulbs, motors, switches, and wires ● Explore conductors and insulators ● Explore series and parallel circuits and compare the functioning of the components in each circuit. ● Formulate and justify predictions, based on their observations of electricity transferring energy to produce light and motion. ● Apply understanding of energy and circuits to authentic scenarios	● Cause and effect ● Systems and system models ● Energy and matter

	component has its own direct pathway to the energy source. ● The energy of two energy sources (D-cells or solar cells) adds when they are wired in series, delivering more power than a single source. Two cells in parallel have the same power as a single cell. Key Terms: battery, bulb base, bulb casing, circuit, closed cicuit, conductor, d-cell, electric current, electricity, energy, energy source, filament, insulator, light, lightbulb, metal, motion, motor, open circuit, parallel circuit, series circuit, shaft, short circuit, switch, system, terminal, transfer, wire		
3-PS2-3 4-PS3-4	**The Force of Magnetism** ● Magnets interact with each other and with some materials. ● Magnets stick to (attract) objects that contain iron. Iron is the only common metal that sticks to magnets. ● All magnets have two poles, a north pole at one end (side) and a south pole at the other end (side). Like poles of magnets repel each other, and opposite poles attract. ● Magnets are surrounded by an invisible magnetic field, which acts through space and through most materials. ● When an iron object enters a magnetic field, the field induces magnetism in the iron object, and the object becomes a temporary magnet. ● The magnetic force acting between magnets declines as the distance between them increases.	● Investigate the properties of magnets and their interactions with materials and each other. ● Go outdoors to find objects in the environment that are attracted to magnets. ● Conduct an investigation to determine if like or opposite poles of a magnet attract. ● Construct a simple compass and use it to detect magnetic effects. ● Discover that magnetism can be induced in a piece of iron. ● Investigate the strength of the force of attraction between two magnets by graphing data to look for patterns of interaction. ● Apply understanding of magnetism to authentic scenarios	● Patterns ● Cause and effect ● Energy and matter

	• Earth has a magnetic field. Key Terms: attract, compass, force, gravity, induced magnetism, interact, iron, magnet, magnetism, north pole, permanent magnet, pole, repel, South pole, steel, temporary magnet		
3-PS2-3 3-PS2-4 4-PS3-2 4-PS3-4 4-PS4-3 3-5 ETS1-3	**Electromagnets** • A magnetic field surrounds a wire through which electric current is flowing. • The magnetic field produced by a current-carrying wire can induce magnetism in a piece of iron or steel. • An electromagnet is made by sending electric current through an insulated wire wrapped around an iron core. • The number of winds of wire in an electromagnet coil affects the strength of the magnetism induced in the core (more winds = more magnetism). • The amount of electric current flowing in an electromagnet circuit affects the strength of the magnetism in the core (more current = stronger magnetism). • A telegraph system is an electromagnet-based technology used for long-distance communication. Key Terms: code, coil, core, electromagnet, electromagnetism, key, rivet, telegraph	• Learn how to use electricity to make an electromagnet. • Explore the variables that influence the strength of the magnetism produced by their electromagnets. • Use all the concepts they have learned to engineer a simple telegraph system and communicate using a click code. • Apply understanding of electromagnets to authentic scenarios	• Patterns • Cause and effect • Systems and system models • Energy and matter
4-PS3-1 4-PS3-2 4-PS3-3	**Energy Transfer** • Energy is evident whenever there is motion, electric current, sound, light, or heat. Energy can be transferred from place to place. • Objects in motion have energy. The faster a given object is moving, the more kinetic energy it has.	• Observe energy transfer that resultsin heat, light, sound, and motion • Conduct structured investigations with steel balls and ramps to discover how the variable of starting position on the ramp	• Patterns • Cause and effect • Systems and system models • Energy and matter

	• When objects collide, energy can transfer from one object to another, thereby changing their motion. • Kinetic energy is energy of motion; potential energy of position. For identical objects at rest, the objects at higher heights have more potential energy than the objects at lower heights. Key Terms: collide, collision, friction, fuel, heat, kinetic energy, potential energy, sound, stationary, transfer of energy	affects the speed of the rolling ball. • Using controlled experiments, test the variables of mass and release position to find out how these variables affect energy transfer. • Apply understanding of energy transfer to authentic scenarios	
4-PS3-2 4-PS3-4 4-PS4-1 4-PS4-2 3-5 ETS1-1 3-5 ETS1-2 3-5 ETS 1-3	**Waves** • Waves are a repeating pattern of motion that transfer energy from place to place. Some electromagnetic waves can be detected by humans (light); others can be detected by designed technologies (radio waves, cell phones). • There are sound waves, light waves, radio waves, microwaves, and ocean waves. • Waves have properties- amplitude, wave length, and frequency. • Light travels in straight lines and can reflect (bounce) off surfaces. • Light can refract (change direction) when it passes from one transparent material into another. • Matter can absorb light. • An object is seen only when light from that object enters and is detected by an eye. • White light is a mixture of all colors (wavelengths) of visible light.	• Experience waves through firsthand experiences using ropes, demonstrations with waves in water, spring toys, and a sound generator. • Use videos, animations, and readings to gather information. • Analyze compression waves (sound waves) to learn the general properties of waves—amplitude, wavelength, and frequency • Use mirrors to experience reflecting light. • Use mirrors outdoors to see objects behind them and to reflect a bright image of the Sun onto walls. • Use flashlights, mirrors, and water to observe light in numerous ways, reinforcing the idea that light can reflect and refract. • Build a conceptual model about how light travels.	• Patterns • Cause and effect • Systems and system models • Energy and matter

	● Solar cells are designed technologies to transfer visible light into electricity. ● The energy of two energy sources (D-cells or solar cells) adds when they are wired in series, delivering more power than a single source. ● Two cells in parallel have the same power as a single cell. Key Terms: amplitude, compression, cycle, frequency, peak, trough, wave, wavelength	● Design series and parallel solar cell circuits and observe the effect on the speed of a motor. ● Observe that cells in series make the motor run faster, but cells in parallel do not deliver additional power to the motor. ● Read about alternative energy sources. ● Apply understanding of waves to authentic scenarios	

Energy
Grade 4

TIME FRAME	TOPIC	PERFORMANCE TASKS ACTIVITIES/PROJECTS ASSESSMENTS	RESOURCES/INTERDISCIPLINARY CONNECTIONS
September *14 periods*	Energy and Circuits	FOSS Investigation 1: Energy and Circuits Part 1: Lighting a Bulb Part 2: Conductors and Circuits Part 3: Series and Parallel Part 4: Solving the strings of Lights Problem **Assessment:** Science Notebook entry, performance assessment, response sheet, Investigation 1 I-Check	**Science Resource Book** *Edison Sees the Light* *Energy Sources* *Series and Parallel Circuits* *Science Practices* *Engineering Practices* *Thinking Like an Engineer* *Engineering a Solar Light Solution* **Online Activities** Lighting a Bulb Flow of Electricity Tutorial Simple Circuits Tutorial Conductors and Insulators Conductor Detector D-Cell Orientation Turn on the Switch Tutorial Series and Parallel Circuits **Supplemental Resources**
October *16 periods*	The Force of Magnetism	FOSS Investigation 2: The Force of Magnetism Part 1: Magnets and Materials Part 2: Magnetic Fields Part 3: Magnetic Force	**Science Resource Book** *When Magnet Meets Magnet* *Magnificent Magnetic Models* *Make a Magnetic Compass* “

		Assessment: Science Notebook entry, performance assessment, response sheet, Investigation 2 I-Check	**Online Activities** *Virtual Investigations What Sticks and What Conducts?* *Tutorial Magnetic Poles* *Magnetic Poles* *Magnetic Poles Quiz* *Tutorial Magnetic Fields* *Tutorial Making Graphs* *Tutorial Interpreting Graphs* **Video** *All About Magnets* **Supplemental Resources**
October *16 periods* *Concurrently with Plants*	Electromagnets	FOSS Investigation 3: Electromagnets Part 1: Building Electromagnets Part 2: Changing the Strength Part 3:Reinventing the Telegraph **Assessment:** Science Notebook entry, performance assessment, response sheet, Investigation 3 I-Check	**Science Resource Book** *Electricity Creates Magnetism* *Using Magnetic Fields* *Electromagnets Everywhere* *Morse Gets Clicking* **Online Activities** *Kitchen Magnets* *Tutorial Electromagnets* *Virtual Electromagnets* *Tutorial Making Graphs* *Tutorial Interpreting Graphs* **Supplemental Resources**

November *12 periods*	Energy Transfer	FOSS Investigation 4: Energy Transfer Part 1: Presence of Energy Part 2: Rolling Balls Down Slopes Part 3: Collisions **Assessment:** Science Notebook entry, performance assessment, response sheet, Investigation 4 I-Check, Posttest	**Science Resource Book** *Energy* *What Causes Change of Motion?* *Bowling* *Force and Energy* *Potential and Kinetic Energy at Work* **Video** *Soccer* *Ball on Table* *Wagon* *All About the Transfer of Energy* *Candle Video* **Supplemental Resources**
	Waves	FOSS Investigation 5: Waves Part 1: Forms of Waves Part 2: Light Travel Part 3: Engineering with Solar Cells **Assessment:** Science Notebook entry, performance assessment, response sheet, Investigation 5 I-Check, Posttest	**Science Resource Book** *Waves* *More about Sound* *Light Interactions* *Throw a Little Light on Sight* *More Light on the Subject* *Alternative Sources of Electricity* *Ms.Osgood's Class Report* **Online Activities** *Reflecting Light* *Colored Light* *Tutorial Reflection* *Virtual Investigation Color* **Video** *Sound Energy* *Waves* *Real World Science Sound* *All about Waves* *All about Light*

			Wave **Supplemental Resources**

UNIT: Environments
Grade 4

ENDURING UNDERSTANDINGS	ESSENTIAL QUESTIONS
✔ Each species in an ecosystem plays a unique role in its interactions with other species and the environment. ✔ Today's decisions influence our future environment. ✔ Organisms interact in feeding relationships in ecosystems ✔ Adaptations are structures and behaviors of an organism that help it survive and reproduce.	✔ How do species interact in their environment? ✔ How do humans affect the ecosystem? ✔ What are the roles of organisms in a food chain? ✔ What are some benefits of having variations within a population? ✔ What are some examples of plat adaptations?

NJSLS-S	KNOWLEDGE Students will know:	SKILLS/ PRACTICES Students will be able to:	CROSSCUTTING CONCEPTS Students will apply:
4-LS1-1 4-LS1-2	**Environmental Factors** ✔ An environment is everything living and nonliving that surrounds and influences an organism. ✔ A relationship exists between environmental factors and how well organisms grow. ✔ Animals have structures and behaviors that function to support survival, growth, and reproduction. ✔ Every organism has a set of preferred environmental conditions.	● Observe and describe the living and nonliving components (biotic and abiotic factors) in terrestrial environments. ● Set up a mealworm environment at two temperatures and observethe life cycle over time. ● Investigate how isopods respond to environmental factors such as water and light ● Set up an isopod environment. ● Investigate small animals that live in leaf- litter and study their structures.	● Cause and effect ● Systems and system models ● Structure and function

	Key Terms: adult, antennae, behavior, condition, environment, factor, function, inference, larva, life cycle, mealworm, molting, nonliving, pill bug, pupa, pupate, sow bug, stage, structure biotic, abiotic, organism, ecosystem, terrarium, terrestrial, controlled experiment, variable, isopod, darkling beetle	• Predict the impact of altering biotic and abiotic factors has on an ecosystem and its organisms • Describe the impact on the survival of a species during environmental changes • Design and conduct a controlled experiment to determine the environmental preferences of organisms. Collect and analyze data, create and communicate arguments based on experimental evidence • Apply understanding of terrestrial environments and experimental design to authentic scenario	
4-LS1-1 4-LS1-2 3-LS4-4	**Ecosystems** • Aquatic environments include living and nonliving factors (water and temperature). • An ecosystem is the interactions of organisms with one another and with the nonliving environment. • Organisms interact in feeding relationships in ecosystems (food chains and food webs). • Producers make their own food, which is also used by animals (consumers); decomposers eat dead plant and animal materials and recycle the nutrients in the system; organisms may compete for resources in an ecosystem. Key Terms: algae, aquarium, aquatic, carnivore, carrying capacity, competition, consumer, decomposer, ecosystem, elodea, energy, food chain, food web, freshwater, herbivore, home range, interaction, microorganism, omnivore,	• Set up a freshwater aquarium with different kinds of fish, plants, and other organisms. • Monitor the environmental factors in the system and look for feeding interactions among the populations. • Learn about the role of producers, consumers, and decomposers in food chains and food webs in terrestrial and aquatic systems, including a marine ecosystem. • Through an outdoor simulation, students learn about how food affects a population's home range. • Collect and analyze data, create and communicate arguments based on experimental evidence • Apply understanding of ecosystems to authentic scenarios	• Systems and system models • Energy and matter • Stability and change

	phytoplankton, population, predator, prey, producer, zooplankton.		
4-LS1-1 3-LS4-2 3-LS4-3 3-LS4-4 4-ESS3-1	**Brine Shrimp** ● Organisms have ranges of tolerance for environmental factors; there are optimum conditions that produce maximum growth. ● Brine shrimp eggs can hatch in a range of salt concentrations, but more hatch in environments with optimum salt concentration. ● When environments change, some organisms survive and reproduce; others move; some die. ● Individuals of the same kind differ in their characteristics differences may give individuals an advantage in surviving and reproducing. Key Terms: Brine shrimp, concentration, controlled experiment, inherited trait, migrate, optimum, range of tolerance, reproduce, salinity, salt lake, survive, thrive, tolerance, variation, viable	● Conduct a controlled experiment to determine which of four salt concentrations allow brine shrimp eggs to hatch. ● Determine range of tolerance and optimum conditions for brine shrimp hatching. ● Students, throughan outdoor simulation, look at variation in a population, and consider how variation among individuals contributes to survival of a population. ● Apply understanding of aquatic environments to authentic scenarios	● Cause and effect ● Scale, proportion, and quantity ● Systems and system models
4-LS1-1 3-LS4-1 3-LS4-3 3-LS4-4	**Range of Tolerance** ● Organisms have ranges of tolerance for environmental factors; there are optimum conditions that produce maximum growth. ● Adaptations are structures and behaviors of an organism that help it survive and reproduce Key Terms: Adaptation, dominant plant, drought, irrigate, plant distribution, salt sensitive, salt tolerance	● Set up and monitor experiments to determine the range of tolerance of water for germination of four kinds of seeds: corn, pea, barley, and radish. ● Test the effect of salinity on these seeds. ● Study local plants by mapping schoolyard plants and relate plant distribution to environmental factors. ● Students look at plant adaptations. ● Apply understanding of salt tolerance to authentic scenarios	● Patterns ● Cause and effect ● Structure and function

Environments Unit
Grade 4

TIME FRAME	TOPIC	PERFORMANCE TASKS ACTIVITIES/PROJECTS ASSESSMENTS	RESOURCES/INTERDISCIPLINARY CONNECTIONS
February *12 periods*	Environmenta l Factors	Investigation 1: Environmental Factors Part 1: Observing Meal Worms Part 2: Desiging an Isopod Environment Part 3: Leaf Litter Critters **Assessment:** Science Notebook entry, performance assessment, response sheet, Investigation 1 I-Check	**Science Resource Book** *Two Terrestrial Environments* *Darkling Beetles* *Setting up a Terrarium* *Isopods* *Amazon Rain Forest Journal* **Supplemental Resources** Song: We're All Connected Song: Put It to the Test Song: Pure Proof
February March *12 periods*	Ecosystem	Investigation 2: Ecosystems Part 1: Desiging an Aquarium Part 2: Food Chains and Food Webs Part 3: Population Simulations Part 4: Sound Off **Assessment:** Science Notebook entry, performance assessment, response sheet, Investigation 2 I-Check,	**Science Resource Book** *Freshwater Environements* *What is an Ecosystem?* *Food Chains and Food Webs* *Human Ctivties and Aquatic Ecosystem* *Comparing Aquatic and Terrestrial Ecosystems* *Animals Sensory Systems* *Saving Murrelets Through Mimicry* **Online Activities** Virtual Terrarium Virtual Aquarium **Video** Animal Language and Communication **Supplemental Resources**

			BrainPOP: Ecosystem Song: We're All Connected Song: Put It to the Test Song: Pure Proof
March April *12 periods*	Brine Shrimp	Investigation 3: Brine Shrimp Hatching Part 1: Setting up the Experiment Part 2: Determining Range of Tolerance Part 3: Determining Viability Part 4: Variation in a Population **Assessment:** Science Notebook entry, performance assessment, response sheet, Investigation 3 I-Check,	**Science Resource Book** *Brine Shrimp* *The Mono Lake Story* *What Happens When Ecosystems Change?* *The Shrimp Club* *Variation and Selection* **Online Activities** Food Webs Trout Range of Tolerance **Videos** The Mono Lake Story **Supplemental Resources** SMART Notebook Lesson: Food Chains
April May *20 periods*	Range of Tolerance	Investigation 4: Range of Tolerance Part 1: Water or Salt Tolerance and Plants Part 2: Plant Patterns Part 3: Plant Adaptation **Assessment:** Science Notebook entry, performance assessment, response sheet, Investigation 4 I-Check, Posttest	**Science Resource Book** *Environmental Scientists* *Range of Tolerance* *How Organisms Depnd on One Another* *Animals from the Past* **Online Activities** Analyzing Environmental Experiments **Video** All about Plant Adaptations Tutorial: Fossils **Supplemental Resources**

Science

Grade 5

UNIT: Earth and Sun
Grade 5

ENDURING UNDERSTANDINGS	ESSENTIAL QUESTIONS
✔ Observable, predictable patterns of movement occur in the Sun, Earth and Moon. ✔ Weather is describe in terms of several variables ✔ The different energy transferring properties of earth materials can lead to uneven heating of earth's surface ✔ Evaporation and condenstation contribute to the movement of water through the water cycle.	✔ What patterns can we observe and predict because of the Earth, Sun, and Moon? ✔ How do meterologists measure and record weather variables? ✔ What happens to earth materials when they are exposed to sunlight? ✔ What is the water cycle and why is it important?

NJSLS-S	KNOWLEDGE Students will know:	SKILLS/ PRACTICES Students will be able to:	CROSSCUTTING CONCEPTS Students will apply:
5-ESS1-2	**The Sun** ✔ Shadows are the dark areas that result when light is blocked. ✔ Shadows change during the day because the position of the Sun changes in the sky. ✔ The length and direction of a shadow depends on the Sun's position in the sky. ✔ Day is the half of Earth's surface being illuminated by sunlight; night is the half of Earth's surface in its own shadow. ✔ The cyclical change between day and night is the result of Earth's rotating around the stationary Sun.	● Trace their shadows in the morning and afternoon. ● Use data to monitor the position of the Sun as it moves across thesky. ● Use a compass to determine cardinal directions ● Use a compass to orient a Sun tracker ● Make hourly records of the position of the shadow cast by a golf tee. ● Use flashlights to reproduce shadow movements. ● Model an observer on Earth (their head) and position themselves around a lamp to observe day and night.	● Patterns ● Cause and effect ● Scale, proportion, and quantity ● Systems and system models

	Key Terms: axis, compass, day, night, north pole, north star, orbit, orientation, revolution, rotation, shadow, sun, sunrise, sunset	• Discover that rotation of Earth produces day and night. • Apply understanding of the Earth/Sun relationship to authentic scenarios	
5-PS2-1 5-ESS1-1 5-ESS1-2	**Planetary Systems** • The solar system includes the Sun and the objects that orbit it, including Earth, the Moon, seven other planets, their satellites, and smaller objects. • The Moon is much smaller than Earth and orbits at a distance equal to about 30 Earth diameters. • The Sun is 12,000 Earth diameters away from Earth and is more than 100 times larger than Earth. • The pulling force of gravity keeps the planets and other objects in orbit by continuously changing their direction of travel. • A great deal of light travels through space to Earth from the Sun and from distant stars. • Stars are at different distances from Earth. • Stars are different sizes and have different brightness Key Terms: asterorid, asteroid belt, comet, constellation, dwarft planet, force, gas giant, gravity, Kuiper belt, moon, night sky, phase, planet, solar system, star, terrestrial planet	• Take a field trip to the schoolyard to look for the Moon. • Record the Moon's appearance every day for a month • Analyze observation data to discover the sequence of changes. • Build a model of the Earth/Moon/Sun system. • Organize a model of the solar system. • Investigate constellations as patterns of stars. • Simulate Earth's rotation to observe the appearance of stars rising in the east and setting in the west. • Observe a demonstration of why different stars are visible in different seasons. • Apply understanding of the lunar cycle to authentic scenarios	• Patterns • Cause and effect • Scale, proportion, and quantity • Systems and system models
5-PS1-1 5-ESS2-1 5-ESS2-2	**Earth's Atmosphere**	• Explore air by working with syringesand tubes to discover that air takes up spaceand is compressible.	• Cause and effect • Scale, proportion, and quantity • Systems and system models

	• Air is a mixture of gases held by gravity near Earth's surface. Air has mass, takes up space, and is compressible. • Most of Earth's air resides in the troposphere, the layer of the atmosphere closest to Earth's surface. • Weather happens in the troposphere. • Weather is the condition of Earth's atmosphere at a given time in a given place. • Meteorology is the science of weather, and meteorologists are the scientists who study Earth's weather. • Weather is described in terms of several variables. Key Terms: air, air pressure, atmosphere, barometer, compress, forecast, humidity, hygrometer, mass, meteorologist, precipitation, pressure, temperature, thermometer, troposphere, visiability, weather, wind, wind direction, wind speed, wind vane	• Investigate the atmosphere as a mixture of gases with properties that change with altitude above Earth's surface. • Review local weather reports and determine the variables that combine to produce the weather. • Use a weather station to monitor the weather and look for patterns. • Apply understanding of weather to authentic scenarios	
5-PS1-1 5-ESS2-1 5-ESS3-1 3-5 ETS1-2 3-5 ETS1-3	**Heating Earth** • The Sun is the major source of energy that heats Earth. • The different energy-transferring properties of earth materials (soil and water) can lead to uneven heating of Earth's surface. • The atmosphere is heated by conduction between Earth's surfaces and air particles as a result of contact, and by absorption of energy radiated directly from the Sun and reradiated from Earth's surfaces. • Convection is the circulation of fluid (liquid or gas) that results in energy transfer.	• Investigate energy transfer on Earth. • Investigate uneven heating by recordingand graphing temperature changes when two earth materials absorb solar energy. • Observe examples of energy transfer by radiation and conduction and discuss mechanisms of energy transfer to and from the air. • Observe convection currents in water as a model of what happens in air. • Test different designs forsolar water heaters. • Consider how the atmosphere, hydrosphere, and geosphere interact.	• Patterns • Cause and effect • Systems and system models • Energy and matter

	Convection currents are driven by uneven heating of Earth's surface. ● A solar water heater is a system that uses solar energy to heat water. Key Terms: absorb, conduction, contract, convention current, earth material, energy transfer, expand, experiment, fluid, geosphere, hydrosphere, less dense, more dense, radiant energy, radiation, ray, reflect, reradiation, solar collector, solar energy, solar energy exposure, solar water heater, uneven heating, variable	● Apply understanding of heating earth to authentic scenarios	
5-PS1-1 5-ESS2-1 5-ESS2-2 5-ESS3-1	**Water Planet** ● Evaporation and condensation contribute to the movement of water through the water cycle, redistributing water over Earth's surface. ● As temperature increases, the rate of evaporation increases. ● Most of Earth's water (97%) is salt water in the ocean; Earth's fresh water is found in the atmosphere, lakes and rivers, soil, ground ice, groundwater, and glaciers. ● The Sun's energy drives weather. ● Climate is the average or typical weather that can be expected to occur in a region of Earth's surface. Key Terms: climate, climatologist, condenstation, condense, dew, drought, evaporate, evaporation, fog, freshwater, frost, glacier, groundwater, hurricane, ice cap, lake, ocean, recycle, river, salt water, severe weather, thunderstorm, tornado, water cycle, water vapor	● Consider why Earth is called the water planet. ● Investigate systems to observe condensation on cold surfaces and determine the components of the water cycle. ● Explore the conditions that promote evaporation. ● Simulate the travels of a drop of water through the water cycle to explore the complexities of the process. ● Investigate world climate regions and global climate change.	● Cause and effect ● Scale, proportion, and quantity ● Systems and system models ● Energy and matter

Earth and Sun
Grade 5

TIME FRAME	TOPIC	PERFORMANCE TASKS ACTIVITIES/PROJECTS ASSESSMENTS	RESOURCES/INTERDISCIPLINARY CONNECTIONS
September *10 periods*	The Sun	Investigation 1: The Sun Part 1: Shadow Shifting Part 2: Sun Tracking Part 3: Day and Night **Assessment**: Survey, Science Notebook entry, response sheet, Investigation 1 I-Check	**Science Resource Book** *Changing Shadows* *Sunrise and Sunset* **Online Activities** Tutorial Sun Tracking Shadow Tracker Seasons Seasons US Navy Data **Supplemental Resources** Interactive Activity: Earth, Sun, Moon Interactive Activity: Light and Shadows
September October *16 periods*	Planetary Systems	Investigation 2: Planetary Systems Part 1: Night-Sky Observations Part 2: How Big and How Fast? Part 3: Phases of the Moon (optional) Part 4: The Solar System Part 5: Stars **Assessment**: Science Notebook entry, performance assessment, response sheet, Investigation 2 I-Check	**Science Resource Book** *The Night Sky* *Looking through Telescopes* *Comparing the Size of Earth and the Moon* *Apollo 11 Space Mission* *How Did Earth's Moon Form?* *Chnaging Moon* *Lunar Cycle* *Eclipses* *Exploring the Solar System* *Planets of the Solar System* *Why Doesn't Earth Fly Off into Space?* *Stargazing* *Star Scientists* *Our Galaxy* **Video** All about the Moon

			The Planets and the Solar System All about Stars **Online Activities** Lunar Calendar Star Maps Stellar Motions **Supplemental Resources** *The Moon Book* by Gail Gibbons *Moon Bear* by Frank Asch *Magic School Bus – Space Adventures* DVD BrainPOP: The Moon Discovery Education: Voyage to the Moon NASA: Virtual Reality Moon Phases Song: Moon Cycle Video: Phases of the Moon Video: Phases of the Moon
October November *10 periods*	Earth's Atmosphere	Investigation 3: Earth's Atmosphere Part 1: The Air around Us Part 2: The Atmosphere Part 3: Local Weather **Assessment**: Science Notebook entry, performance assessment, response sheet, Investigation 3 I-Check	**Science Resource Book** *What is Air?* *Earth's Atmosphere* *Weather Instruments* **Video** Ball on a Scale Fizz Keeper Experiment Soda Can Experiment Earth's Atmosphere All about Meteorology **Online Activities** Tutorial Air and Atmosphere Weather Grapher **Supplemental Resources** Weather Channel Weather Underground National Weather Service

November December *10 periods*	Heating the Earth	Investigation 4: Heating the Earth Part 1: Heating Earth Materials Part 2: Conduction Part 3: Convection Part 4: Color and Energy **Assessment**: Science Notebook entry, performance assessment, response sheet, Investigation 4 I-Check	**Science Resource Book** *Uneven Heating* *Heating the Air Radiation and Conduction* *Wind and Convection* *Wind Power* *Solar Technology* **Online Activities** Tutorial Radiation Virtual Investigation Uneven Heating Particles in Solids, Liquids, Gases Energy Transfer **Videos** Aluminum and Steel Stripes Convection **Supplemental Resources**
	Water Planet	Investigation 5: Water Planet Part 1: Condenstation Part 2: Evaporation Part 3: Water Cycle Part 4: Climate **Assessment**: Science Notebook entry, performance assessment, response sheet, post test	**Science Resource Book** *Condensation* *Where is Earth's Water?* *The Water Cycle* *Severe Weather* *Earth's Climates* *Global Climate Change* **Online Activities** Water Cycle Game Climate Regions Map **Videos** Water Cycle Climate and Seasons **Supplemental Resources**

UNIT: Mixtures and Solutions
Grade 5

ENDURING UNDERSTANDINGS	ESSENTIAL QUESTIONS
✔ Everything is made up of matter. ✔ The structure of matter is affected by energy. ✔ When equal volumes of two salt solutions are weighed, the heavier one is more concentrated	✔ What is matter and how does it behave? ✔ How does energy affect matter? ✔ What is the relationship between salt solution concentration and density?

NJSLS-S	KNOWLEDGE Students will know:	SKILLS/ PRACTICES Students will be able to:	CROSSCUTTING CONCEPTS Students will be able to apply
5-PS1-1 5-PS1-2 3-5 ETS 1-1 3-5 ETS 1-2 3-5 ETS 1-3	**Mixtures** ✔ A mixture is two or more materials intermingled. ✔ An aqueous solution is a mixture in which a substance disappears (dissolves) in water to make a clear liquid. ✔ Mixtures can be separated into their constituents by using screens, filters, and evaporation. ✔ The mass of a mixture is equal to the mass of its constituents. ✔ Possible solutions to a problem are limited by available materials and resources (constraints). ✔ The success of a designed solution is determined by considering the desired features of a solution (criteria). Key Terms: constraint, criteria, crystal, diatomaceous earth, engineer, extract, gravel, magnet, mass, powder, property, salt, screen, separate, transparent, mixture, solution, solute, solvent, dissolve, filter, evaporation	● Make mixtures of water and solid materials and separate the mixtures with screens and filters. ● Discover that water and salt make a special kind of mixture, a solution, which cannot be separated with a filter but only through evaporation. ● Investigate how to separate a mixture of three dry solid materials. ● Go outdoors to see what natural materials make solutions with water. ● Apply understanding of mixtures and solutions to authentic scenarios	● Cause and effect ● Scale, proportion, and quantity

5-PS1-1 5-PS1-2	**Models** ● Models are explanations of objects, events, or systems that cannot be observed directly. ● Models are representations used for communicating and testing. ● Developing a model is an iterative process, which may involve observing, constructing, analyzing, evaluating, and revising. ● Dissolving is an interaction between two (or more) substances: a solute which dissolves, and a solvent, which does the dissolving and into which the solute disappears. ● Melting is a change in a single substance from solid to liquid caused by heat (energy transfer). ● The amount of matter is conserved when it changes form. Key Terms: analyze, collaboration, condensation, consensus, construct, freezing, melting, model, phase change, revise, siphon, water vapor	● Make multisensory observations of sealed black boxes in an effort to determine what is inside. ● Develop models and try to reach consensus with other students who investigated the same boxes. ● Construct physical models of black boxes in an effort to replicate the behaviors of the original black boxes. ● Investigate melting and freezing in terms of models and conservation of mass and clarify the difference between the processes of melting and dissolving	● Cause and effect ● Systems and system models ● Energy and matter
5-PS1-1 5-PS1-2	**Concentration** ● Concentration is the amount of dissolved solid material per unit volume of water. ● Solutions with a lot of solid dissolved in a volume of water are concentrated; solutions with little solid dissolved in a volume of water are dilute. ● When equal volumes of two salt solutions area weighed, the heavier one is more concentrated. ● Density is mass per unit volume. ● More concentrated salt solutions are denser. ● Solutions form layers based on density. Key Terms: concentration, concentrated, dilute, density, equal volumes, layer, less dense, more dense	● Observe and compare soft-drink solutions that differ in the amount of powder (water held constant) and in the amount of water (powderheld constant) in order to develop the concept of concentration. ● Make salt solutions of different concentrations and compare them, using a balance. ● Determine the relative concentrations of three mystery solutions made from the same solid material by comparing the mass of equal volumes of the solutions. ● Layer salt solutions to determine their relative concentrations.	● Cause and effect ● Scale, proportion, and quantity ● Systems and system models ● Energy and matter

		• Apply understanding of concentration to authentic scenarios	
5-PS1-1 5-PS1-3 3-5 ETS1-1 3-5 ETS1-2	**Saturation** • A substance is a single, pure material. • Solutions are composed of a solvent (liquid) and a solute (solid), which is dissolved in the solvent • Solubility is the property that indicates how readily a solute dissolves in a solvent. • A solution is saturated when as much solid materials as possible has dissolved in the liquid. • Solubility varies from substance to substance. • Substances form predictable, identifiable crystals. • Engineers plan designs, select materials, construct products, evaluate results, and improve ideas. Key Terms: citric acid, Epsom salts, insoluble, saturated solution, solubility, substance, supersaturated	• Make a saturated solution by adding salt to water until no more salt will dissolve. • Make a saturated epsom salts solution. • Using a balance, compare the solubility of the two solid materials by comparing the mass of the salt and epsom salts dissolved in the saturated solutions. • Use the property of solubility to identify an unknown material. • Analyze local water samples, using separation techniques and design a way to remove salt from ocean water • Apply understanding of saturation to authentic scenarios	• Patterns • Cause and effect • Scale, proportion, and quantity • Systems and system models • Energy and matter

5-PS1-1 5-PS1-2 5-PS1-3 5-PS1-4	**Chemical Reactions** ● Some mixtures result in a chemical reaction. ● During reactions, starting substances (reactants) change into new substances (products). ● A gas or precipitate is evidence of a reaction. ● Some products of reactions are soluble and can be identified by crystal structure after evaporation. ● Calcium carbonate reacts with acid. Key Terms: baking soda, calcium carbonate, calcium chloride, carbon dioxide, chalk, gas, chemical reaction, reactant, product, precipitate	● Make three solutions with water, calcium chloride, baking soda, and citric acid. ● Systematically mix pairs of those solutions and observe changes that occur. ● Repeat the reactions in sealed zip bags to observe the volume of gas produced. ● Identify reactants and products in a chemical reaction ● Describe a chemical reaction with a word formula ● Compare the properties of reactants with the properties of the products when two or more substances are combined and react chemically ● Use observed changes in properties to make and communicate claims as to whether a chemical reaction has taken place ● Design and conduct an independent investigation. Collect and analyze data, create and communicate arguments based on experimental evidence ● Apply understanding of chemical reactions to authentic scenarios	● Cause and effect ● Scale, proportion, and quantity ● Systems and system models ● Energy and matter

Mixtures and Solutions Unit
Grade 5

TIME FRAME	TOPIC	PERFORMANCE TASKS ACTIVITIES/PROJECTS ASSESSMENTS	RESOURCES/INTERDISCIPLINARY CONNECTIONS
November *8 periods*	Mixtures	Investigation 1: Separating Mixtures Part 1: Making and Separating Mixtures Part 2: Separating a Salt Solution Part 3: Separating a Dry Mixture Part 4: Outdoor Solutions **Assessmen**t: Survey. Science Notebook entry, performance assessment, response sheet, Investigation 1 I-Check	**Science Resource Book** *Mixtures* *Taking Mixtures Apart* *Science Practices* *Engineering Practices* *Extracts* *The Story of Salt* **Online Activities** Tutorial Solutions Tutorial Mixtures Seperating Mixtures Virtual Investigations: Seperating Mixtures **Videos** Elements, Compounds and Mixtures **Supplemental Resources** BrainPOP: Crystals Discovery Education: Separating Mixtures Harcourt School: The Mixtures Lab SMART Notebook lesson: Mixtures Activity Discovery Education: Mixtures- Together But Separate *Understanding Student Ideas in Science* Vol. 1 – Lemonade, pg. 55
	Models	Investigation 2: Developing Models Part 1: Black Boxes Part 2: Drought Stopper	**Science Resource Book** *Beachcombing Science* *Solid to Liquid*

		Part 3: Models for Change in Properties **Assessment**: Survey. Science Notebook entry, performance assessment, response sheet, Investigation 2 I-Check	*Liquid and Gas Changes* *Celsius and Fahrenheit* **Online Activities** Black Box Tutorial Models **Videos** Changes in Properties of Matter **Supplemental Resources**
December *8 periods*	Concentration	Investigation 3: Concentration Part 1: Soft Drink Recipes Part 2: Salt Concentration Part 3: Mystery Solutions Part 4: Liquid Layers **Assessment**: Science Notebook entry, performance assessment, response sheet, Investigation 3 I-Check	**Science Resource Book** *Solutions Up Close* *Concentrated Solutions* *The Air* *Famous Scientists* *Carbon Dioxide Concentration in the Air* *The Frog Story* **Online Activities** Tutorial: Conservation of Mass Tutorial Concentration Virtual Investigation Saltwater Concentration Tutorial Density **Videos** Why Are Oceans Salty? **Supplemental Resources**
November December *8 periods*	Saturation	Investigation 2: Reaching Saturation Part 1: Salt Saturation Part 2: Epsom Salt Saturation Part 3: The Saturation Puzzle	**Science Resource Book** *The Bends* *A Sweet Solution* *Sour Power*

		Part 4: What's in your Water? **Assessment**: Science Notebook entry, performance assessment, response sheet, Investigation 4 I-Check	*East Bay Academy for Young Scientists* *Drinking Ocean water* *Creative Solutions* **Online Activities** Tutorial Saturation Virtual Investigation Solubility **Videos** The Water Cycle **Supplemental Resources** PhET: Salts and Solubility Interactive
January *12 periods*	Chemical Reactions	Investigation 4: Fizz Quiz Part 1: Chemical Reactions Part 2: Reaction Products Part 3: Reaction in a Zip Bag Part 4: **Assessment**: Science Notebook entry, performance assessment, response sheet, posttest	**Science Resource Book** *Ask a Chemist* *When Substances Change* *Air Bags* **Online Activities** Fizz Quiz Tutorial Reaction or Not? **Videos** Chemical Reactions Changes in Properties of Matter **Supplemental Resources** PhET: Salts and Solubility Interactive BrainPOP: Compounds and Mixtures SMART Notebook lesson: Chemical Reactions Song: Don't Try This at Home

UNIT: Living Systems
Grade 5

ENDURING UNDERSTANDINGS	ESSENTIAL QUESTIONS
✔ A system is a collection of interacting objects, ideas, and/or procedures that together define a physical entity or process. ✔ Plants make their own food by photosynthesis. Green plant cells make sugar (food) from carbon dioxide and water in the presence of sunlight, and release oxygen. ✔ Animals obtain nutrients by eating other organisms. ✔ Instinctive behaviors, such as knowing what to eat, how to find shelter, and how to migrate, help organisms survive.	✔ How can you identify a system? ✔ How do plants and animals get the nutrients they need? ✔ What behaviors are instinctive and what behaviors are learned?

NJSLS-S	KNOWLEDGE Students will know:	SKILLS/ PRACTICES Students will be able to:	CROSSCUTTING CONCEPTS Students will be able to apply
5-PS3-1 5-LS2-1 5-ESS2-1	**Systems** ✔ A system is a collection of interacting objects, ideas, and/or procedures that together define a physical entity or process. ✔ Earth can be described as the interaction of four earth systems: The rocky part (the geosphere), the atmosphere, the water (hydrosphere), and the complexity of living organisms (the biosphere). ✔ Food webs are made up of producers (organisms that make their own food), consumers (organisms that eat other organisms to obtain food), and decomposers (organisms that consume and recycle dead organisms and organic waste). ✔ A kelp forest has similarities to a rain forest (vertical layering). Phytoplankton are the major	● Explore earth as a system, focusing on the biosphere and describing ecosystems by looking at feeding relationships and energy transfers, described as food webs. ● Model food chains and food webs in a wood ecosystem and a marine ecosystem. ● Set up a redworm habitat to study detritivores and the role of decomposition in ecosystems. ● Apply understanding of systems to authentic scenarios	● Scale, proportion, and quantity ● Systems and system models ● Energy and matter ● Stability and change

	producers in most aquatic systems (both marine and freshwater). ✔ Food webs and competition for resources exist in marine systems. Key Terms: aquatic ecosystem, algea, atmosphere, bacteria, biosphere, carnivore, compost, consumer, decomposer, ecosystem, energy, food chain, food web, freshwater, geosphere, herbivore, hydrosphere, interact, kelp forest, living, marine, microorganism, nonliving, omnivore, phytoplankton, predator, prey, producer, recycle, red worm, terrestrial, subsystem, system, zooplankton		
5-PS3-1 5-LS1-1 5-LS2-1	**Nutrients** ● Yeast is a single-celled fungus. Dormant yeast cells can become active when provided with water, warmth, and sugar as a food source. Carbon dioxide is a waste by-product of yeast metabolism. ● Chlorophyll is the green pigment that absorbs sunlight in the cells of producer organisms. ● A nutrient is a substance, such as sugar or starch, that is used by a cell to produce the energy needed to perform the functions of life. ● Plants make their own food by photosynthesis. Green plant cells make sugar (food) from carbon dioxide and water in the presence of sunlight, and release oxygen. ● Animals obtain nutrients by eating other organisms. ● Digestion is the process used by animals to break down complex food items into simple nutrients. Key Terms: bloodstream, by product, carbon dioxide, cell, chlorophyll, digestion, digestive system, dormancy, esophagus, fungus, large intestine, metabolism, nutrient, photsynthesis, small intestine, stomach, sugar, waste, yeast	● Investigate nutrient systems of yeast, plants, and animals. ● Design an investigation to determine the necessary conditions for activating dry yeast. ● Plant wheat and observe the seedlings to determine which plants have chlorophyll. ● Infer that the plants growing in light are producing food to provide nutrientsto their cells. ● Investigate how animals acquire nutrients by eating and digesting food. ● Apply understanding of nutrients to authentic scenarios	● Scale, proportion, and quantity ● Systems and system models ● Energy and matter

5-PS3-1 5-LS1-1 5-LS2-1	**Transport System** • In vascular plants, xylem tubes carry water and minerals from the plant's roots to all the cells in a one-way flow; phloem tubes carry sugar from the leaves to all the cells that need it. • Vascular bundles are arranged in predictable patterns of veins in the leaves of vascular plants. • In the human circulatory system, blood transports oxygen to the blood and carbon dioxide from the blood. • In humans, the respiratory system transports oxygen to the blood and carbon dioxide from the blood. • All cells have basic needs: water, food, gas exchange, and waste disposal. Multicellular organisms have systems for transporting nutrients and wastes. Key Terms: alveoli, artery, capillary, circulatory system, classify, diaphragm, heart , heart valve, leaf vein, left ventricle, lung, palmate, parallel, phloem, pinnate, respiratory, right ventricle, sap, transpiration, vascular bundle, vascular system, vein, vital capacity, xylem	• Learn that all cells have basic needs: water, food, gas exchange, and waste disposal. • Explore the transport systems that multicellular organisms have for moving nutrients and wastes. • Investigate leaf transpiration, model a human heart system • Investigate their lung volume to find out about the interacting parts of the vascular system in plants and the circulatory and respiratory system in humans. • Apply understanding of transport systems to authentic scenarios	• Patterns • Scale, proportion, and quantity • Systems and system models • Energy and matter • Structure and Function
5-PS3-1 5-LS2-1 4-LS1-2 5-ESS2-1 5-ESS3-1	**Sensory System** • A stimulus is something that triggers (starts) a response. A stimulus is often information received through the senses. • A response is a reaction of a living thing to a stimulus. • Animal adaptations include pattern and color that attract attention to warn predators off or to attract a mate.	• Through video, text, and simulations, students learn about the role of sensory and motor neurons in brain messages. • Explore ways that animals communicate through sound, visual displays, and smell. • Investigate the roles that instinct and learned behavior plays in the life of animals.	• Scale, proportion, and quantity • Systems and system models • Energy and matter • Stability and Change

	● Animals communicate to warn others of their kind, including family members. ● Instinctive behaviors, such as knowing what to eat, how to find shelter, and how to migrate, help organisms survive. ● Marine ecosystems have biotic (living) and abiotic (nonliving parts). The ocean plays an important role in the carbon cycle. <u>Key Terms:</u> adaptation, behavior, brain, central nervous system, inherited trait, instinct, learned behavior, neuron, receptor, reflex, response, response time, stimulus	● Students revisit the redworm habitats established in Investigation 1 and take a final look at the process of decomposition. ● Investigate the north Atlantic Ocean ecosystem and its importance in the carbon cycle. ● Apply understanding of sensory systems to authentic scenarios	

Living Systems Unit
Grade 5

TIME FRAME	TOPIC	PERFORMANCE TASKS ACTIVITIES/PROJECTS ASSESSMENTS	RESOURCES/INTERDISCIPLINARY CONNECTIONS
November *8 periods*	Systems	Investigation 1: Systems Part 1: Everyday Systems Part 2: The Earth System Part 3: Kelp Forest Food Web Part 4: Recycling **Assessment**: Survey. Science Notebook entry, performance assessment, response sheet, Investigation 1 I-Check	**Science Resource Book** *Introduction to Systems* *Is the Earth a System?* *The Biosphere* *Monterey Bay National Marine Sanctuary* *Comparing Aquatic and Terrestrial Ecosystems* *Nature's Recycling System* **Online Activities** Simulation Food Webs **Videos** Web of Life: Life in the Sea Geography for Students Physical Systems **Supplemental Resources**
	Nutrients	Investigation 2: Nutrient Systems Part 1: Yeast Nutrition Part 2: Plant Nutrition Part 3: Animal Nutrition **Assessment**: Survey. Science Notebook entry, performance assessment, response sheet, Investigation 2 I-Check	**Science Resource Book** *There's Yeast in my Bread* *Producers* *Getting Nutrients* *The Human Digestive System* **Videos** Food Chains Digestion and Excretory Systems **Supplemental Resources**

December *8 periods*	Transport System	Investigation 3: Transport System Part 1: Plant Vascular System Part 2: Circulatory System Part 3: Respiratory System **Assessment**: Science Notebook entry, performance assessment, response sheet, Investigation 3 I-Check	**Science Resource Book** *Leaf Classification* *Plant Vascular System* *The Story of Maple Syrup* *The Human Circulatory System* *The Human Respiratory System* *Other Circulatory and Respiratory System* **Online Activities** Plant Vascular System Mammalian Circulatory System **Videos** Plant Structure and Growth Circulatory and Respiratory Systems **Supplemental Resources**
November December *8 periods*	Sensory Systems	Investigation 2: Sensory Systems Part 1: Stimulus Response Part 2: Attention Part 3: Instinct and Learning Part 4: Ecosystems **Assessment**: Science Notebook entry, performance assessment, response sheet, Investigation 4 I-Check	**Science Resource Book** *Stimulus and Response in Humans* *Sensory Systems* *Animal Communications* *Monarch Migration* *North Atlantic Ocean Ecosystems* **Online Activities** Response Timer **Videos** The Brain and Nervous System Animal Behavior and Communication Bugs Incredible Journeys: A Butterflies Relay Marine Ecosystems **Supplemental Resources**

Organisms Unit
Grade 1

TIME FRAME	TOPIC	PERFORMANCE TASKS ACTIVITIES/PROJECTS ASSESSMENTS	RESOURCES/INTERDISCIPLINARY CONNECTIONS
March *2 periods*	Needs of Organisms	Lesson 1: Sharing What We Know about Organisms	SMART Notebook Lesson: Living Things and Nonliving Things Discovery Education: Living and Nonliving Things

April *6 periods*	Plants	Lesson 2: Observing and Describing Seeds Lesson 3: Planting Our Seeds Lesson 4: Observing Woodland Plants Lesson 5: Observing Freshwater Plants Lesson 6: How Have Our Seeds Changed?	BrainPOP Jr.: Parts of a Plant BrainPOP Jr.: Plant Life Cycles BrainPOP Jr: Making Observations Diagram: Seed Growth Discovery Education: How a Seed Grows Discovery Education: Planting the New Seed Discovery Education: Plants in the Woods Discovery Education: Pond Habitat FOSSWeb Game: Watch it Grow! Harcourt School: Seeds SMART Notebook Lesson: All About Plants SMART Notebook Lesson: Predicting Based on Patterns
May *5 periods*	Animals	Lesson 7: Observing Freshwater Snails Lesson 8: Observing Guppies: How Do They Compare with the Snails? Lesson 9: Observing Pill Bugs Lesson 10: Observing Bess Beetles or Millipedes: How Do They Compare with the Pill Bugs?	BookFlix: Bugs! Bugs! Bugs! SMART Notebook Lesson: Animal Needs FOSSWeb Game: Insect Hunt Blank Diagram: Label the Snail Blank Diagram: Label the Guppy Picture: Pill Bug Harcourt School: Animals and Their Young Harcourt School: How Fish Get Oxygen Song: Insects Rule
May June *5 periods*	Making Comparisons	Lesson 11: What's Happening in the Aquarium? Lesson 12: What's Happening in the Terrarium? Lesson 13: Freshwater and Woodland Plants: How Do They Compare? Lesson 14: Freshwater and Woodland Animals: How Do They Compare? Lesson 15: How Are Our Plants and Animals Alike and Different?	BookFlix: In the Small, Small Pond SMART Notebook Lesson: Adaptive Traits SMART Notebook Lesson: Why are Plants Important? Blank Diagram: Label the Millipede Picture: Millipede
June *2 periods*	Human Organisms	Lesson 16: Taking a Look At Ourselves Supplemental Investigations: Inherited Traits	FOSSWeb Game: Find the Parent SMART Notebook Lesson: Human Life Cycle

Hillside Township School District

Soils Unit
Grade 2

TIME FRAME	TOPIC	PERFORMANCE TASKS ACTIVITIES/PROJECTS ASSESSMENTS	RESOURCES/INTERDISCIPLINARY CONNECTIONS
October *4 periods*	Soil Properties	Lesson 1: What Is in Soil? Lesson 3: Introducing Sand, Clay, and Humus	BrainPOP Jr.: Soil Discovery Education: Getting to Know Soil FOSSWeb Game: Find Earth Materials Harcourt School: Soil Formation Harcourt School: Soil Horizons
October *2 periods*	Compost	Lesson 2: Where Do Dead Plants Go? Lesson 13: Opening the Compost Bags	BookFlix: Diary of a Worm Compost Slideshow Harcourt School: Composting
October *8 periods*	Soil Testing (wetting, settling, absorption)	Lesson 4: When Soils Get Wet Lesson 5: More About Wet Soils Lesson 6: How Quickly Do Soils Settle in Water? Lesson 7: More Settling a Few Days Later Lesson 11: Can Soil Hold Water? Lesson 12: How Water Moves Through Sand and Clay	Discovery Education: The Dirt on Soil - Soil Properties Harcourt School: Soil Composition
November *4 periods*	Planting (roots)	Lesson 9: Growing Plants in Different Soils Lesson 10: Why Do Plants Have Roots in Soils?	*What Do Roots Do?* by Kudlinski and Schuppert
November *2 periods*	Soil Testing on Unfamiliar Mixtures	Lesson 8: What Is Your Mystery Mixture	What Plants Need Activity

November *6 periods*	Local Soil	Lesson 14: Exploring Your Local Soil Lesson 15: More About Your Local Soil Lesson 16: What Is Your Local Soil?	*Soil* by Alice K. Flanagan

UNIT: Balance and Motion
Grade 2

Balance and Motion Unit
Grade 2

TIME FRAME	TOPIC	PERFORMANCE TASKS ACTIVITIES/PROJECTS ASSESSMENTS	RESOURCES/INTERDISCIPLINARY CONNECTIONS
March *8 periods*	Balance	Investigation 1: Balance Part 1: Trick Crayfish Part 2: Triangle and Arch Part 3: The Pencil Trick Part 4: Mobiles	*Balance and Motion* by Lisa Trumbauer Discovery Education: Operation Seesaw Harcourt School: How Things Fall
March *8 periods*	Spinners	Investigation 2: Spinners Part 1: Tops Part 2: Zoomers Part 3: Twirlers	*Ways Things Move* by Robin Nelson Discovery Education: How Things Move SMART Notebook Lesson: On the Move Song: Spin Around
April *7 periods*	Rollers	Investigation 3: Rollers Part 1: Rolling Wheels Part 2: Rolling Cups Part 3: Rolling Spheres	*Around and Round* by Patricia J. Murphy BrainPOP Jr.: Pushes and Pulls Forces & Movement Activity Forces in Action Activity FOSSWeb Game: Roller Coaster Builder Harcourt School: How things move SMART Notebook Lesson: Forces and Movement

UNIT: Life Cycle of the Butterfly
Grade 2

ENDURING UNDERSTANDINGS	ESSENTIAL QUESTIONS
✔ All living organisms have specific characteristics in common. ✔ Plants and animals have different structures that serve different functions in growth, survival and reproduction. ✔ Plants and animals have life cycles and they vary by species.	✔ How do you know if something is a living thing? ✔ How do organisms grow and develop?

NJCCCS	KNOWLEDGE Students will know:	SKILLS Students will be able to:
5.2.2.A.1 5.3.2.A.1 5.3.2.D.2	**Caterpillars** ● Caterpillars are organisms that have basic needs in order to survive, including air, water, food, shelter and appropriate temperature. ● Caterpillars have parts used for specific purposes to meet their needs. ● A caterpillar is going through a specific stage of development with predictable characteristics. Key Terms: caterpillar, metamorphosis, mallow, molt, bristles, spiracles, spinneret, prolegs, true legs, frass, silk, abdomen, thorax	● Develop and apply an operational definition of "living" ● Relate structures of an organism to their essential life functions ● Predict and observe changes in an organism as it grows and develops ● Apply understanding of organism needs to authentic scenarios
5.2.2.A.1 5.3.2.D.2	**Chrysalis** ● Chrysalises have parts used for specific purpose to meet their needs. ● A chrysalis is going through a specific stage of development with predictable characteristics. Key Terms: exoskeleton, molting, spinneret, silk, chrysalis, proboscis, silk button, abdomen, antenna, wing, eye	● Continue to modify and apply an operational definition of "living" ● Relate structures of an organism to their essential life functions ● Predict and observe changes in an organism as it grows and develops ● Compare human growth and development to that of other organisms ● Apply understanding of organism changes to authentic scenarios

5.2.2.A.1 5.3.2.A.1 5.3.2.D.2	**Butterflies** ● Butterflies have parts used for specific purposes to meet their needs. ● All living things grow and develop in a predictable manner. ● A butterfly is going through a specific stage of development with predictable characteristics. Key Terms: butterfly, antennae, proboscis, meconium, nectar, abdomen, thorax, head, wings, legs, environment	● Continue to modify and apply an operational definition of "living" ● Relate structures of an organism to their essential life functions ● Predict and observe changes in an organism as it grows and develops ● Recognize that life cycle stages happen in a specific predictable order in an organism ● Apply understanding of life cycles to authentic scenarios
5.3.2.A.1 5.3.2.D.2	**Reflecting and Analyzing** ● Butterflies have predictable characteristics used for specific purposes to meet their needs. ● All insects have unifying characteristics. Key Terms: life cycle, insect	● Continue to modify and apply an operational definition of "living" ● Compare the needs of an organism and its structures during various phases of its life cycle ● Classify organisms based on shared characteristics ● Apply understanding of life cycles to authentic scenarios
5.3.2.A.1 5.3.2.C.3	**Other Life Cycles and Human Impact** ● Humans can change the natural habitats of butterflies in ways that can be helpful or harmful. ● All organisms have a life cycle. During this life cycle, they grow (increase in size) and develop (change in form). Key Terms: life cycle, growth, development	● Continue to modify and apply an operational definition of "living" ● Determine the characteristic changes that occur during the life cycle of plants and animals by examining a variety of species, and distinguish between growth and development ● Describe the impact that humans have on the habitats of butterflies and other organisms ● Apply understanding of life cycles to authentic scenarios

Life Cycle of the Butterfly Unit
Grade 2

TIME FRAME	TOPIC	PERFORMANCE TASKS ACTIVITIES/PROJECTS ASSESSMENTS	RESOURCES/INTERDISCIPLINARY CONNECTIONS
May *5 periods*	Caterpillars	Lesson 1: Getting Ready for Caterpillars Lesson 2: Caring for Caterpillars Lesson 3: Learning More About Caterpillars Lesson 4: Observing the Caterpillars	*From Caterpillar to Butterfly* by Deborah Heiligman *The Very Hungry Caterpillar* by Eric Carle
May *5 periods*	Chrysalis	Lesson 5: Observing Change: Growth and Molting Lesson 6: Silk Spinning Lesson 7: From Caterpillar to Chrysalis Lesson 8: Observing the Chrysalis	Caterpillar to Chrysalis Video
May *5 periods*	Butterflies	Lesson 9: The Butterfly Emerges Lesson 10: Feeding the Butterflies Lesson 11: The Butterfly's Body Lesson 12: The Butterflies Go Free	BookFlix: Waiting For Wings/Butterflies BrainPOP Jr.: Butterfly Discovery Education: Complete Metamorphosis
May June *4 periods*	Reflecting and Analyzing	Lesson 13: Using Our Data Lesson 14: Discovering that Butterflies are Insects	Insect Worksheets Insect Songs SMART Notebook Lesson: Monarch Butterfly Life Cycle Song: Insects Rule Song: Life Cycle
June *4 periods*	Other Life Cycles and Human Impact	Lesson 15: Other Life Cycles Supplemental Investigations on Human Impact	BookFlix: Tadpole/Polliwog SMART Notebook Lesson: All About Life Cycles

Earth Materials Unit
Grade 3

TIME FRAME	TOPIC	PERFORMANCE TASKS ACTIVITIES/PROJECTS ASSESSMENTS	RESOURCES/INTERDISCIPLINARY CONNECTIONS
December January *18 periods*	Rocks and Minerals	Investigation1: Mock Rock Investigation 2: Scratch Test ● Science Story: Read Treasure Underfoot Investigation 3: Calcite Quest ● Science Story: Old Man and the Rock ● Science Story: The Two Boys Investigation 4: Take it for Granite (optional) *Safety Note: some teachers or students may have allergic reactions to specific minerals. Modify or skip investigation 2 if an allergy is known or a reaction occurs.*	BrainPOP Jr.: Rocks and Minerals Discovery Education: Hardness Discovery Education: Rocks and Minerals Discovery Education: What Exactly Are Minerals? FOSSWeb Game: Moh's Hardness Scale FOSSWeb: Rock Database Rocks For Kids SMART Notebook Lesson: Properties of Rocks
January February *12 periods*	Rock Cycle	Supplemental Investigations	BrainPOP Jr.: Fast Land Changes Discovery Education: Rocks and Minerals Discovery Education: Volcanoes Rock Cycle Diagram Rock Cycle Songs- Rocks Go Round and Round Song: Rocks Rock Harder

UNIT: Matter and Energy
Grade 3

ENDURING UNDERSTANDINGS	ESSENTIAL QUESTIONS
✔ Everything is made up of matter. ✔ The structure of matter is affected by energy. ✔ Matter can be changed, but cannot be created or destroyed. ✔ Energy comes in different forms and can change from one form to another. ✔ The path of light energy can be predicted.	✔ How can we describe energy in the world around us? ✔ Where does energy go? ✔ What is matter and how does it behave? ✔ How does energy affect matter?

NJCCCS	KNOWLEDGE Students will know:	SKILLS Students will be able to:
5.2.2.D.1 5.2.4.C.1 5.2.4.C.3 5.4.4.E.1	**Energy** ✔ Energy makes things happen. ✔ Energy takes many forms, including stored chemical energy, heat (thermal energy) electricity, light, sound, and motion. ✔ Stored energy can be converted to other forms of energy. Machines and living things can convert stored energy into motion energy and heat energy. ✔ Most of the energy we use on the Earth comes from the Sun in the form of light energy that can transform into heat energy to warm the land, air, and water. <u>Key terms:</u> energy, chemical energy, thermal (heat) energy, electricity, light, sound, motion, convert	● Develop a working definition of "energy" ● Compare various forms of energy as observed in everyday life and describe their applications ● Draw and label diagrams showing several ways that energy can be transferred from one place to another to make something happen ● Observe energy transfers and account for the action performed, the energy source, and where the energy went after the action ● Apply understanding of energy to authentic scenarios
5.2.2.C.2 5.2.2.C.3 5.2.4.C.1 5.2.4.C.4	**Light Energy** ● Light is a form of energy that travels in straight lines (rays) from a light source. ● Light can reflect (bounce off) surfaces that it strikes, such as a mirror.	● Use mirrors to purposefully change the direction of light ● Predict the reflection of light based on the positioning of a mirror

	● Light can be absorbed by matter. ● White light is a mixture of all colors of light. When white light hits an object, some of the colors are absorbed and others are reflected. We see the object as the color of the reflected light. ● An object is seen only when light from that object enters the eye. ● A shadow is created when an opaque object blocks light. <u>Key Terms</u>: light, rays, light source, reflect, absorb, shadow, opaque, mirror, shadow, color	● Apply a variety of strategies to collect evidence that validates the principle that if there is no light, objects cannot be seen ● Present evidence that represents a relationship between a light source, solid object, and the resulting shadow ● Use evidence to create explanations about white light and colors ● Predict the color of a pigment in white light based on the appearance under lights of different colors ● Apply understanding of light to authentic scenarios
5.2.4.A.2 5.2.4.A.3	**Matter** ● Matter is anything that has mass and volume. ● Common matter on Earth has three forms (states): solid, liquid, and gas. Each state of matter has unique properties. Gases can be compressed, while solids and liquids cannot; the shape of a solid is independent of its container; liquids and gases take the shape of their container. ● The gram (g) is the standard unit of measure used to quantify mass in the metric system. The balance measures mass. ● Volume is a measure of the three-dimensional space occupied by matter. The liter (L) is the standard for measuring fluid volume in the metric system. The graduated cylinder measures volume. <u>Key Terms:</u> matter, state, solid, liquid, gas, shape, volume, weight, mass, gram(g), kilogram(kg), milligrams(mg), balance, graduated cylinder, metric system, liter(L), milliliter(mL)	● Determine the mass and volume of common objects using appropriate tools ● Plan and carry out an investigation to distinguish among solids, liquids, and gasses ● Differentiate between opinion and evidence in creating scientific explanations and arguments ● Apply understanding of mass and volume to authentic scenarios
5.2.4.B.1 5.2.4.C.2 5.2.4.C.3	**Changing Matter**	● Use a thermometer to accurately measure temperature

	● Degrees Celsius (°C) is the standard unit of measure used to quantify temperature in the metric system. The thermometer measures temperature. ● Many substances can be changed from one state to another by heating or cooling. Solids melt when heated. Liquids evaporate when heated. Change of state is a physical change. ● To heat a substance, energy must be added. Heat energy is transferred from warmer things to colder things. ● When two substances are combined, a reaction may occur, producing a new substance with unique properties. No matter is created or destroyed in this process. When a reaction happens, this is a chemical change. Key Terms: degree Celsius(°C), evaporation, reaction, substance, temperature, thermometer, physical change, chemical change	● 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 ● Describe the flow of heat energy between materials of different temperatures ● Account for all of the matter (mass) that goes into and comes out of a chemical reaction to support that no matter is created or destroyed ● Apply understanding of physical and chemical changes to authentic scenarios
5.4.4.F.1 5.4.4.G.1 5.4.4.G.2 5.4.4.G.3 5.4.4.G.4	**Energy and Matter in our Environment** ● Water can exist in all three phases. Properties of water depend on where the water is located: oceans, rivers, lakes, underground sources, (liquid) glaciers (solid) and the atmosphere (gas). ● Most of Earth's surface is covered by water. Water circulates through the crust, oceans, and atmosphere in what is known as the water cycle. Energy from the sun causes changes in phase. ● Clouds and fog are made of tiny droplets of water and, at times, tiny particles of ice. Rain, snow, and other forms of precipitation come from clouds; not all clouds produce precipitation. Condensation and precipitation happen when water changes from gas to liquid. ● Weather changes that occur from day to day and across the seasons can be measured and documented using basic instruments such as a thermometer, wind vane, anemometer, and rain gauge. Key Terms: water cycle, crust, oceans, atmosphere, rivers, lakes, glaciers, clouds, fog, rain, snow, precipitation, condensation	● Identify locations of solid, liquid, and gas water in our global environment ● Trace a path a drop of water might follow through the water cycle ● Model how the properties of water can change as water moves through the water cycle ● Explain how clouds form ● Observe daily cloud patterns, types of precipitation, and temperature, and categorize the clouds by the conditions that form precipitation ● Identify patterns in data collected from basic weather instruments ● Apply understanding of the water cycle to authentic scenarios

Matter and Energy
Grade 3

TIME FRAME	TOPIC	PERFORMANCE TASKS ACTIVITIES/PROJECTS ASSESSMENTS	RESOURCES/INTERDISCIPLINARY CONNECTIONS
February *14 periods*	Energy	Investigation 1: Energy ● Science Story: Energy Sources ● Video: All About the Transfer of Energy ● Science Story: Energy on the Move ● Science Story: Energy Conversion	BrainPOP Jr.: Heat BrainPOP Jr.: Pushes and Pulls Circuit Activity – Changing Circuits Discovery Education: Energy FOSSWeb Game: Resource ID Harcourt School: How a Battery Works SMART Notebook Lesson: Electricity
March *14 periods*	Light Energy	Investigation 2: Light ● Science Story: Reflection ● Science Story: A Little Light on Sight ● Video All About Light (23 min)	BrainPOP Jr.: Light Discovery Education: Light FOSSWeb Game: Colored Light FOSSWeb Game: Reflecting Light Shadow Online Activity Shadow Game
April May *14 periods*	States of Matter	Investigation 3: Matter ● Science Story: States of Matter	BrainPOP Jr.: Solids, Liquids, and Gasses SMART Notebook Lesson: Solids, Liquids, Gases SMART Notebook Lesson: Properties of Matter
May *14 periods*	Changing Matter	Investigation 4: Changing Matter ● Science Story: Change of State ● Science Story: Reactions ● Science Story: Summary- Changing Matter ● Video: All about Solids, Liquids, & Gases	BrainPOP Jr.: Changing States of Matter Discovery Education: Changes in Matter Harcourt School: Zooming in on Matter
May June *10 periods*	Matter and Energy in our	Supplemental Investigations	BrainPOP Jr.: Water Cycle Clouds Activity Discovery Education: Water Cycle

	Environment		

UNIT: <u>Human Body</u>
Grade 4

ENDURING UNDERSTANDINGS	ESSENTIAL QUESTIONS
✔ The human body is made up of different parts performing different functions and working together to sustain life. ✔ The actions of bones, muscles, and central nervous system work together to give us coordination.	✔ What is the relationship between the structure and function of our body parts? ✔ How do body systems work together?

NJCCCS	KNOWLEDGE Students will know:	SKILLS Students will be able to:
5.3.4.A.3	**Bones** ✔ The bones make up a skeleton which is the body's frame. ✔ Bones have several functions: support, protection, and locomotion. ✔ Bones have different shapes depending on where they are and what their purpose is. ✔ The skeletons of humans and other animals have many similarities. <u>Key Terms:</u> bone, skeleton, support, protection, movement	● Make observations of the human body in motion, focusing on the skeleton ● Identify bones in the human skeleton ● Create a model of the human skeleton ● Compare and critique models to improve them ● Compare and contrast rodent skeletal structures with human skeletal structures ● Apply understanding of bones to authentic scenarios
5.3.4.A.3	**Joints** ● The place where two bones come together is called a joint. ● Joints allow our bodies to perform many movements. Articulated joints are joined in sections and allow for more complex movements. ● An opposable thumb is positioned opposite the other fingers. Articulated joints in our hands help us to perform intricate tasks. ● Hinge, ball-and-socket, and gliding joints allow our bodies to move in different ways. ✔ The skeletons of humans and other animals have many similarities.	● Identify advantages of articulated joint function in human hands versus those with immobilized joints ● Categorize joints by similarity of operation ● Compare human skeletal joints to analogous mechanical structures ● Use model joints to develop explanations about join function as related to joint structure ● Compare and contrast rodent and chicken skeletal structures with human skeletal structures ● Apply understanding of joints to authentic scenarios

	Key Terms: joint, articulated, opposable thumb, immobilize, compensate, ball-and-socket joint, hinge joint, gliding joint	
5.3.4.A.3	**Muscles** ● Muscles contract when they work. Muscles attach across joints to move bones. ● Muscles are attached to bones with tissues called tendons. Tissues called ligaments attach bone to bone. ● Systems of the body (muscles and skeleton) interact to carry out everyday activities. Key Terms: tissue, muscle, contract, tendon, ligament	● Make observations of the human body in motion, focusing on the muscles ● Create a model of a human leg and foot with simulated muscles and tendons that emulate the actions of a leg and foot during jumping ● Create a model to emulate the movement of the thumb, with tendons and ligaments that make the thumb operate properly ● Create an arm model with biceps muscle that flexes the arm when it contracts ● Use models to create and revise explanations about the functions of muscles, tendons, and ligaments ● Apply understanding of muscles to authentic scenarios
5.3.4.A.3	**Coordination** ● Systems of the body interact to carry out everyday activities (coordination). ● A stimulus is something that starts (triggers) a reaction (response). A stimulus is often information received through the senses, which are nerve pathways and part of the nervous system. ● Response time is the length of time it takes a person to respond to a stimulus. This can be decreased by practicing the response, which increases muscle strength and reinforces nerve pathways. Key Terms: coordination, stimulus, trigger, response, response time, nerve pathway, nervous system	● Identify the stimulus and response in various scenarios ● Measure and compare responses times using hands and feet ● Investigate how practice affects response time ● Design and conduct an independent investigation. Collect and analyze data, create and communicate arguments based on experimental evidence ● Apply understanding of coordination to authentic scenarios
5.3.4.A.3	**Other Body Systems** ● Specialized systems carry out essential functions of the human body.	● Identify the major organs and how they contribute to the function of each major organ system ● Describe how two organ systems work together to accomplish a goal (example: circulatory system and

	● The digestive system breaks down the food we eat so that we can get energy and nutrients from it. Food is broken down and nutrients are absorbed as it travels through the mouth, esophagus, stomach, small intestine, and large intestine. ● The circulatory system transports materials around our bodies in the blood stream, including oxygen, carbon dioxide, nutrients, and wastes. The heart pumps blood through vessels called veins and arteries. ● The respiratory system works to allow us to breathe, exchanging oxygen for carbon dioxide. Air flows through the trachea to the lungs. The diaphragm muscle controls our breathing. ● The reproductive system produces male or female gametes that come together to form new organisms. <u>Key Terms:</u> organ, system, digestive system, mouth, esophagus, stomach, small intestine, large intestine, circulatory system heart, blood vessel, vein, artery, respiratory system, lung, trachea, diaphragm, reproductive system, male, female, gamete	respiratory system work to exchange gasses with the environment and then transport them around the body) ● Apply understanding of body systems to authentic scenarios

Human Body Unit
Grade 4

TIME FRAME	TOPIC	PERFORMANCE TASKS ACTIVITIES/PROJECTS ASSESSMENTS	RESOURCES/INTERDISCIPLINARY CONNECTIONS
December *10 periods*	Bones	Investigation 1: Bones Part 1: Counting Bones ● Jump rope activity, counting bones sheet ● Science Story: Marvelous Machines ● Science Story: Shape of Your Shape Part 2: Mr. Bones Puzzle ● Science Story: The Broken Radius Part 3: Owl Pellets ● Science Story: The Boneyard ● Science Story: Barn Owls	BrainPOP: Skeleton Interactive Information: Skeletal System Interactive Owl Pellets FOSSWeb Game: Mr. Bones Song: The Bone Song Song: Bones in My Body
January *10 periods*	Joints	Investigation 2: Joints Part 1: Looking at Thumb joints ● Taping thumb joints ● Science Story: Your Amazing Opposable Thumb Part 2: Doing Joint Tasks ● Joint Tasks (A & B), taping hand joints ● Science Story: Bone on the Outside Part 3: Naming Joints ● Science Story: Comparing Joints Part 4: Comparing Bones	BrainPOP: Joints Interactive Information: Ball and Socket Joint

January February *10 periods*	Muscles	Investigation 3: Muscles Part 1: Making a Leg Model ● Construct leg model ● Science Story: Muscles ● Science Story: Muscles and Bones: Working Together Part 2: Making a Thumb Model ● Construct thumb model ● Science Story: Space Race Part 3: Making an Arm Model ● Muscle Action ~ construct arm model ● Science Story: The Frozen Man	Discovery Education: Magic School Bus Flexes its Muscles BBC Human Body Information BrainPOP: Muscles
February *10 periods*	Coordin-ati on	Investigation 4: Coordination Part 1: Stimulus/Response ● Student stimulus/ response ~ Falling cup activity Part 2: Response and Practice ● Science Story: Smart Training Part 3: Timing Your Responses ● Science Story: The Circulatory System Part 4: Choosing Your Own Investigation ● Project Ideas & Proposal sheets ● Presentation Guidelines	BrainPOP: Balance BrainPOP: Circulatory System Main Information Link: Nervous System Discovery Education: Nervous System Harcourt School: How Hearing Works Song: Whatta Brain
March *15 periods*	Other Body Systems	Supplemental Investigations	BBC Interactive Body BrainPOP: Human Body BrainPOP: Digestive System Discovery Education: Magic School Bus: For Lunch Harcourt Health and Fitness Harcourt School: The Amazing Human Body Information: Circulatory System SMART Notebook Lesson: Digestive System Song: The Blood-Mobile Song: What Pair Song: Blood Stream

UNIT: Electric Circuits
Grade 4

ENDURING UNDERSTANDINGS	ESSENTIAL QUESTIONS
✔ Energy comes in different forms and can change from one form to another. ✔ The parts of an electric circuit work together and impact one another to transport and transform energy.	✔ How does electricity work? ✔ How can we describe energy in the world around us? ✔ Where does energy go?

NJCCCS	KNOWLEDGE Students will know:	SKILLS Students will be able to:
5.2.4.C.2 5.2.4.D.1 5.2.4.E.3	**Introduction to Electricity** ● A small light bulb can be lit with a simple battery, and a piece of wire. This is an example of a complete circuit in which there is a continuous path for electricity to travel from one end of the battery back to the other end, passing through the bulb on its way. When it passes through the bulb, the electrical energy is changed to light energy. There are multiple ways to make a complete circuit using these materials. ● A short circuit connects one end of a battery directly to the other without having a bulb in between. Short circuits create heat energy from electrical energy. In a house or car, a short circuit could start a fire. ● Electric current can affect a magnetic compass needle because both electricity and magnetism deal with positive and negative charges. Both a magnet and a battery have a positive and a negative end with a difference in charge between them. <u>Key Terms</u>: electricity, light bulb, battery, circuit, complete circuit, short circuits, electric energy, light energy, heat energy	● Share prior knowledge and generate questions about electricity ● Assemble a complete circuit using a single battery, bulb, and piece of wire ● Identify short circuits using evidence of heat from the wires ● Test and record the results of a variety of circuit configurations to develop explanations about what is needed for a complete circuit ● Observe the effects of an electric current on the movement of a magnetic compass needle ● Apply understanding of electricity to authentic scenarios
5.2.4.C.2 5.2.4.D.1	**Building Circuits**	● Investigate the number of batteries needed to light a household bulb and determine a relationship between

	• A bulb is made up of different parts that perform a function. The filament is the part of the bulb that lights up. • Battery holders, light bulb sockets, and Fahnstock clips hold circuit components in place, allowing us to create a variety of circuits. Electric circuits require a complete loop through conducting materials in which electric current can pass. • Troubleshooting techniques are used to check circuits. Possible problems with circuits include faulty battery, faulty bulb, and loose connection in the system. Key Terms: filament, Fahnestock clips, positive, negative, bulb holder, battery holder, troubleshooting	the number of batteries used and the brightness of the bulb • Repair an electric circuit by completing closed loop that includes wires, a battery (or batteries) and at least one other electrical component to produce observable change • Apply understanding of circuits to authentic scenarios
5.2.4.A.4 5.2.4.C.2 5.2.4.D.1	**Circuit Materials** • Objects vary in the extent to which they conduct heat and electricity. • Conductors allow electricity to pass through them. Metals are good conductors of electricity. Insulators are materials in which electricity does not flow. • The filament inside a light bulb changes some of the electrical energy that passes through it to light and heat energy, creating a glow. Key Terms: conductor, insulator, semi-conductors, filament,	• Categorize objects as conductors and insulators based on the ability to conduct electricity • Compare the flow of electricity through metals and nonmetals by taking and analyzing observations and measurements • Use nichrome wire to create a model filament and build explanations about its function. • Use evidence to develop and communicate an explanation of how an unknown device is wired. • Apply understanding of circuits to authentic scenarios
5.2.4.D.1 5.2.6.D.1	**Complex Circuits** • In a series circuit, electric current has only one path to travel. In a parallel circuit, electric current travels along more than one path around the circuit. There are advantages and disadvantages to both. • A flashlight that is set up using a series circuit will have a bulb that burns brighter than in a parallel circuit. A flashlight that is using a parallel circuit will burn longer than in a series circuit.	• Create and interpret circuit diagrams using appropriate symbols • Investigate the effects of series and parallel circuits on the brightness and life of a light-bulb. Use evidence from the investigation to create explanations • Create circuits containing working switches • Apply circuit knowledge to build a working flashlight

	● Switches are an important part of a circuit that can turn a flashlight on and off by completing and disconnecting a circuit. ● There are different strategies for making an effective wiring scheme. <u>Key Terms:</u> series circuit, parallel circuit, switch	● Apply circuit knowledge to plan for and implement a wiring scheme in a model home ● Apply understanding of complex circuits to authentic scenarios

Electric Circuits Unit
Grade 4

TIME FRAME	TOPIC	PERFORMANCE TASKS ACTIVITIES/PROJECTS ASSESSMENTS	RESOURCES/INTERDISCIPLINARY CONNECTIONS
April *5 periods*	Intro to Electricity	Lesson 1: Thinking about Electricity and Its Properties ● KWL Chart ● Draw what student knows about electricity Lesson 2: What Electricity Can Do ● Predict whether each of the diagrams would cause the bulb to light or not to light ● Complete a circuit Lesson 3: A Closer Look at Circuits ● Complete D-cell and bulb circuit (Figure 3-1)	BrainPOP: Static Electricity BrainPOP: Batteries Information: Scholastic Electricity Discovery Education: Static Electricity SMART Notebook Lesson: Electricity SMART Notebook Lesson: Electrical Energy Conversion FOSSWeb Game: Electromagnet Harcourt School: Water Current and Electric Current Harcourt School: How a Battery Works
April *5 periods*	Building Circuits	Lesson 4: What Is Inside a Light bulb? ● Complete a circuit ● Draw and label a diagram Lesson 5: Building a Circuit ● Activity sheet 2: Responses ● Draw and label a detailed drawing of a complete circuit Lesson 6: What's Wrong with the Circuit? ● Activity sheet 3 ● Review troubleshooting process	BrainPOP: Electric Circuits Interactive Activity: Blobz Guide to Electric Circuits Harcourt School: Electric Circuit SMART Notebook Lesson: Simple Circuits

April May *10 periods*	Circuit Materials	Lesson 7: Conductors and Insulators ● Identify and distinguish the characteristics of insulators and conductors Lesson 8: Making a Filament ● Generate heat, light and magnetism by constructing a device similar to a light bulb filament Lesson 9: Hidden Circuits ● Demonstrate how to figure how to figure out the wiring of a box ● Develop own circuit tester game	BrainPOP: Compass BrainPOP: Electromagnets BrainPOP: Magnetism BrainPOP: Thomas Edison, Wizard of Menlo Park FOSSWeb: Electromagnet FOSSWeb: Kitchen Magnets Harcourt School: Electromagnets Interactive Activity: Blobz Guide to Electric Circuits Interactive Activity: Circuit Builder Interactive Activity: Electricity and Magnetism SMART Notebook Lesson: Electromagnetism SMART Notebook Lesson: Electromagnets Song: Opposites Attract *Thomas Edison: Young Inventor* (Childhood of Famous Americans Series)
May June 20 *periods*	Complex Circuits	Lesson 11: Exploring Series and Parallel Circuits ● Construct and compare parallel and series circuits Lesson 12: Learning about Switches ● Construct switches Lesson 13: Constructing a Flashlight ● Build a working flashlight Lesson 15: Planning to Wire a House ● Devise a plan to wire a house Lesson 16: Wiring and Lighting the House Lesson 17: Post-Unit Assessment Supplemental Investigations	Interactive Activity: Series Circuits Interactive Blobz Activity: All About Switches SMART Notebook Question Set: Circuit SMART Notebook Lesson: Electric Circuits Information: How Stuff Works: Electricity Interactive Electricity Resources

Science

Grade 5

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UNIT: Landforms
Grade 5

ENDURING UNDERSTANDINGS	ESSENTIAL QUESTIONS
✔ The Earth can be separated into various spheres which interact dynamically. ✔ Changes in the Earth's surface are caused by constructive and destructive forces.	✔ How do Earth's systems work? ✔ Where does matter go?

NJCCCS	KNOWLEDGE Students will know:	SKILLS Students will be able to:
5.4.6.B.3 5.4.6.B.4 5.4.6.C.3 5.4.6.D.2	**Erosion and Deposition (Slow Changes)** ● Earth's landforms are created and altered gradually (over many human lifetimes) through constructive (deposition) and destructive (erosion) processes. ● Moving water, wind, and ice continually shape Earth's surface by eroding rock and soil in some areas and depositing them in others. ● Erosion plays an important role in the formation of soil, but too much erosion can wash away fertile soil from ecosystems, including farms. Key Terms: landform, weathering, erosion, transport, drainage, basin, deposition, elevation, sediment, basin, meander, channel, delta	● Observe erosion and deposition in a stream-table model and develop inferences and explanations for the observations ● Use a stream table to make and test tentative explanations and predictions about constructive and destructive forces that create landforms ● Locate areas that are being created (deposition) and destroyed (erosion) using maps and satellite images. ● Determine if landforms were created by processes of erosion (e.g., wind, water, and/or ice) based on evidence in pictures, videos, and/or maps ● Describe methods people use to reduce soil erosion ● Deduce the story of the tectonic conditions and erosion forces that created sample rocks or rock formations ● Apply understanding of erosion and deposition to authentic scenarios
5.4.6.B.2 5.4.6.D.1 5.4.8.D.2	**Earthquakes and Volcanoes (Fast Changes)** ● Earthquakes and volcanoes cause changes on the Earth's surface that we can see in our lifetimes.	● Examine Earth's surface features and identify those created on a scale of human life or on a geologic time scale. ● Present evidence to support arguments of the theory of plate tectonics

	● The Earth has many layers. The continents and ocean floors are attached to lithospheric plates that move on top of a hot molten layer. Interactions at the edges of these plates cause earthquakes and volcanoes. ● The Pacific Rim is referred to as the Ring of Fire because of the many volcanoes that exist along the boundary between two tectonic plates. <u>Key Terms:</u> volcano, earthquake, lithosphere, plate tectonics, Ring of Fire	● Apply understanding of the motion of lithospheric plates to explain why the Pacific Rim is referred to as the Ring of Fire ● Apply understanding of plate tectonics to authentic scenarios
5.4.4.B.1 5.4.6.B.1 5.4.6.C.2	**Rocks and Fossils** ● The rock cycle is a model of creation and transformation of rocks from one form to another (sedimentary, igneous, or metamorphic). ● Rock families are determined by the origin and transformations of the rock. o Sedimentary Rocks are formed when minerals from the breakdown of other rocks form layers that become cemented together. This often takes place near lakes and rivers. o Igneous Rocks are formed when other rocks undergo chemical changes due to temperature and pressure. This takes place deep underground. o Metamorphic Rocks form when other rocks melt and cool. This often takes place in or near volcanoes. ● Rocks and rock formations contain evidence that tell a story about their past. The story is dependent on the minerals, materials, tectonic conditions, and erosion forces that created them. ● Fossils provide evidence about the plants and animals that lived long ago, including whether they lived on the land or in the seas as well as ways species changed over time.	● Distinguish physical properties of sedimentary, igneous, or metamorphic rocks and explain how one kind of rock could eventually become a different kind of rock ● Use data gathered from observations of fossils to argue whether a given fossil is terrestrial or marine in origin ● Interpret a representation of a rock layer sequence to establish oldest and youngest layers, geologic events, and changing life forms. ● Apply understanding of rocks and fossils to authentic scenarios

	• Successive layers of sedimentary rock and the fossils contained in them tell the factual story of the age, history, changing life forms, and geology of the Earth. <u>Key Terms:</u> igneous rock, metamorphic rock, rock cycle, sedimentary rock, fossil, geology, paleontologist	

Landforms Unit
Grade 5

TIME FRAME	TOPIC	PERFORMANCE TASKS ACTIVITIES/PROJECTS ASSESSMENTS	RESOURCES/INTERDISCIPLINARY CONNECTIONS
September *10 periods*	Erosion and Deposition	Investigation 2: Stream Tables Part 1: Erosion Part 2: Deposition Investigation 3: Go With the Flow Part 1: Slope Part 2: Flood Part 3: Designing an Investigation	BrainPOP: Erosion Discovery Education: Geographical Landforms Discovery Education: Our Changing Earth FOSSWeb: Stream Table SMART Notebook lesson: Weathering Harcourt School: The Grand Canyon Song: Causing the Erosion
September October *10 periods*	Earthquakes and Volcanoes	Supplemental Investigations	BrainPOP: Volcanoes BrainPOP: Plate Tectonics Discovery Education: Geological Processes SMART Notebook questions: volcano SMART Notebook questions: plates SMART Notebook lesson: landforms Harcourt School: Types of Volcanoes Harcourt School: Types of Land
October *10 periods*	Rocks and Fossils	Supplemental Investigations	BrainPOP: Fossils BrainPOP: Rock Cycle Discovery Education: Sedimentary Rocks Discovery Education: The Rock Cycle Fossil Interactive Animations Harcourt School: How a fossil forms Harcourt School: The Rock Cycle Interactive Rock Cycle SMART Notebook lesson: Rock Cycle Activity Song: Fossil Man Song: I am a Paleontologist Stories From the Fossil Record

Resources

Appendix F Science & Engineering Practices

Appendix G Crosscutting Concepts

NJ Technology Resources