

South Brunswick School District



ELEMENTARY SCIENCE

Parent Curriculum Guide

Date of Last Curriculum Revision: September 2022

District Mission

The South Brunswick School District will prepare students to be lifelong learners, critical thinkers, effective communicators and wise decision makers. This will be accomplished through the use of the Next Generation Science Standards (NGSS) and/or the New Jersey Student Learning Standards (NJSLS) at all grade levels. The schools will maintain an environment that promotes intellectual challenge, creativity, social and emotional growth and the healthy physical development of each student.

~Adopted August 2017



Curriculum Aligned to New Jersey Student Learning Standards (NJSLS)

**Board Approval of Science Curriculum
September 2022**

This curriculum is approved for all regular education programs as specified and for adoption or adaptation by all programs including those for Special Education,

English Language Learners, At-Risk Students and Gifted and Talented Students in accordance with Board of Education Policy.

Science Acknowledgments

We are appreciative of the leadership provided by our curriculum specialists and the knowledge, skills, work and effort of the teachers who served on our curriculum writing teams. In many cases, our units are “home-grown.” While aligning with state and/or national standards, they are designed with the needs of the South Brunswick student population in mind.

Articulation

The Supervisors, Specialists, Curriculum Chairpersons, Technology Staff Developers, Directors and the Assistant Superintendent for Curriculum and Instruction meet for articulation at regular roundtables and ongoing content meetings throughout the year.

Among the topics of discussion are the following: curriculum review cycle, curriculum mapping, resources (ordering, budgeting, inventory), lesson plans, observation look-fors, professional development, NJ Quality Single Accountability Continuum and academic achievement, placement, acceleration, enrichment, basic skills, instructional support, technology proficiencies and content-specific technologies, formative and summative assessments, and various curriculum tasks.

Science Curriculum Development Teams comprised of teachers along with representatives of special education meet together throughout the year as needed. In a time period of major revision, the teams will meet with greater frequency.



The important thing in science is not so much to obtain new facts as to discover new ways of thinking about them. ~William Lawrence Bragg

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For every fact there is infinity of hypotheses.
 ~Robert M. Pirsig
Zen and the Art of Motorcycle Maintenance

Overview of Science Instruction

Mission Statement

It is the intention of South Brunswick Schools to graduate all of its students with the scientific knowledge, skills and habits of mind needed to be lifelong-learners, critical thinkers, effective communicators and wise decision-makers. Students will develop and use the skills necessary for full participation in a world shaped by science and technology.

Our vision is that all students will...

- Be curious about how the world works.
- Be scientifically honest, willing to reevaluate ideas when new data are presented.
- Respect the world around them and work to protect both the local and global environment.
- Understand that science is not a static body of knowledge but is continually evolving as new information emerges.
- Be able to evaluate scientific ideas from an historical perspective.
- Be adept in the use of electronic technology, choosing the appropriate technology for the problems and tasks with which they are confronted.
- Be able to apply knowledge, skills, and processes from science, math, and technology to solve complex, real-world problems.
- Be tenacious in solving problems.
- Be able to use reason and relevant data to support conclusions and opinions.
- Be able to effectively communicate scientific ideas and information orally, visually, and in writing using a variety of medium.
- Be able to work effectively independently and interdependently to solve problems.

Best Instructional Practices in Science

Effective classroom teachers:

1. Help students develop scientific Habits of Mind.
An effective science experience will **foster student's natural curiosity** about the world around them, encourage students to **be open to new ideas** and promotes **appropriate skepticism**.
2. Help students to use scientific thinking skills.
An essential element for a student to be a scientific investigator is knowing how to **find answers to questions**. The skills of scientific inquiry include questioning, hypothesizing, observing, experimenting, measuring, interpreting data, drawing conclusions, and communicating findings.
3. Make science part of everyday life in the classroom.
Science isn't a subject that just happens once or twice a week. By making materials available, modeling scientific thinking, and responding to events that occur in the environment, **science is part of everyday life**.
4. Provide materials to encourage scientific exploration.
Include materials that are **interesting to explore** as part of the physical environment to create a setting in which students **spontaneously ask questions and conduct both**

formal and informal investigations. Displays can consist of computer programs, videos, filmstrips, books, newspaper articles, and magazines related to particular topics, creations made by children, and objects collected by the teacher or students. A tank of fish, hermit crabs, turtles, or a frog can be a catalyst for ongoing science discussions and observations.

5. Provide tools for scientific investigations.
An important part of science is becoming familiar with the **purposeful use of tools** and beginning to recognize the way tools relate to mathematical and scientific thinking. Some tools such as scales, measuring cups, thermometers, calculators, and rulers are for measuring. Other tools such as magnifiers, microscopes, and cameras aid observation.
6. Serve as scientific role models.
Model scientific thinking by being observant and pointing out specific events when they happen. For example, when water forms on a glass, you might ask, “What do you think is happening here? What’s causing the water to form on the glass?” The goal is to encourage children to be curious and consider cause and effect. By inviting students to talk about their experiences or discoveries and encouraging the others to ask questions, teachers help students think like investigators.
7. Select topics for long-term studies in science.
Students learn best by having time for **extensive exploration** of a few topics during the year. It is a good idea to resist the temptation to touch briefly on many topics. Select topics that allow students to conduct first-hand research and use scientific thinking skills. Because you can only do so much, you will also want to consider which topics provide natural linkages to other subjects you will be studying.
8. Have students work in a variety of settings.
The **choice of settings** – cooperative groups, pairs of students, individuals, and whole groups- depends on the teacher’s objective and the specific content of the lesson. Students should be exposed to each kind of setting throughout the year.
9. Design, develop, implement and evaluate digital-age learning experiences and assessments.
For example, use of classroom technologies such as interactive whiteboards, projection devices, digital hardware and software.

Program Delivery

Our Science classrooms are effective standards-based environments that foster understanding of big ideas and help students make connections between present, past and future. Below are the varied “Science paths” that students follow during their course of study in South Brunswick.

Elementary School:

- **Kindergarten-** Weather, Forces: Pushes and Pulls, Needs of Living Things
- **First Grade-** Patterns and Change in the Sky, Light and Sound, Structures Functions and Information Processing
- **Second Grade-**Earth’s Land and Water, Properties of Matter, Characteristics of Living Things

- **Third Grade-** Life Cycles and Adaptations, Weather and Climate, Forces and Changes in Motion
- **Fourth Grade-** Structure and Function, Waves, and Information and Energy Transfer, Earth's Systems. Fossil Fuels, and Human Impact
- **Fifth Grade-** Interactions Between the Earth, Sun, and Moon, Properties and Changes of Matter, Ecosystems and Earth's Resources

Resources

Elementary

Kindergarten

Weather-SB District Unit
 Forces: Pushes and Pulls- SB District Unit
 Needs of Living Things-SB District Unit

First Grade

Patterns and Change in the Sky- SB District Unit
 Light and Sound- SB District Unit
 Structures Functions and Information Processing - SB District Unit

Second Grade

Earth's Land and Water -SB District Unit
 Characteristics of Living Things- SB District Unit
 Properties of Matter- SB District Unit

Third Grade

Life Cycles and Adaptations- SB District Unit
 Weather and Climate- SB District Unit
 Forces and Changes in Motion- SB District Unit

Fourth Grade

Structure and Function- SB District Unit
 Energy Transfer, Waves, and Information-SB District Unit
 Earth Systems, Fossil Fuels, and Human Impact- SB District Unit

Fifth Grade

Interactions Between the Earth, Sun, and Moon- SB District Unit
 Properties and Changes of Matter- SB District Unit
 Ecosystems and Earth's Resources- SB District Unit

Assessment

There are multiple and varied forms of assessment at each grade level. What follows is a list of the key assessment tools used at each level.

Assessments at the Elementary Level

- District End of Unit assessments, and pre-assessments
- Teacher made quizzes and projects

- Unit specific formative assessments
- Student Observation
- Class Discussion
- Science Notebook
- New Jersey Student Learning Assessment – Science (NJSLA-S)

Next Generation Standards for Science

The South Brunswick Science Curriculum is aligned to the Next Generation Science Standards. These standards are addressed at every grade level, and are supported by research findings about how students learn science. Our program is inquiry based, and learning is viewed as an active process in which students construct their understanding of the natural world by engaging in “hands-on” and “minds-on” experiences. Technology is embedded where meaningful, and connections to the 21st Century Life and Career Education standards, to the District’s core values, and to other areas of curriculum are purposely and explicitly noted.

Framework for K-12 Science Education

The National Research Council (NRC) of the National Academy of Sciences managed the first of two steps in the creation of the Next Generation Science Standards by developing the [Framework for K-12 Science Education](#), which was released July 2011.

The Framework provides a sound, evidence-based foundation for standards by drawing on current scientific research—including research on the ways students learn science effectively—and identifies the science all K–12 students should know.

The Framework outlines the three dimensions that are needed to provide students a high quality science education. The integration of these three dimensions provides students with a context for the content of science, how science knowledge is acquired and understood, and how the sciences are connected through concepts that have universal meaning across the disciplines. The following excerpt is quoted from the Framework.

THE THREE DIMENSIONS OF THE FRAMEWORK

1. Scientific and Engineering Practices

- o Asking questions (for science) and defining problems (for engineering)
- o Developing and using models
- o Planning and carrying out investigations
- o Analyzing and interpreting data
- o Using mathematics and computational thinking
- o Constructing explanations (for science) and designing solutions (for engineering)
- o Engaging in argument from evidence
- o Obtaining, evaluating, and communicating information

2. Crosscutting Concepts

- o Patterns
- o Cause and effect: Mechanism and explanation
- o Scale, proportion, and quantity

- o Systems and system models
- o Energy and matter: Flows, cycles, and conservation
- o Structure and function
- o Stability and change

2. **Disciplinary Core Ideas**

Physical Sciences

- o PS1: Matter and its interactions
- o PS2: Motion and stability: Forces and interactions
- o PS3: Energy
- o PS4: Waves and their applications in technologies for information transfer

Life Sciences

- o LS1: From molecules to organisms: Structures and processes
- o LS2: Ecosystems: Interactions, energy, and dynamics
- o LS3: Heredity: Inheritance and variation of traits
- o LS4: Biological evolution: Unity and diversity

Earth and Space Sciences

- o ESS1: Earth's place in the universe
- o ESS2: Earth's systems
- o ESS3: Earth and human activity

Engineering, Technology, and Applications of Science

- o ETS1: Engineering design
- o ETS2: Links among engineering, technology, science, and society

The curriculum is written in the Understanding by Design format and is based on enduring understandings (broad concepts) with essential questions and both formative and summative assessments.

Complete copies of the standards for science may be found at:

<https://www.nextgenscience.org/overview-topics>

SCIENCE



Science

CURRICULUM

**Elementary Matrix:
Next Generation Science Standards and Essential Questions**

Grade	Standards & Essential Questions by Grade Level
Kindergarten	<p>Kindergarten students earth, space, life, and physical sciences based on the NGSS K-ESS3-3, K-ESS2-1, K-ESS3-2, K-LS1-1, K-ESS3-1, K-ESS2-2, K-PS2-1, K-PS2-2.</p> <ul style="list-style-type: none"> ● <i>Weather (Earth and Space)</i> ~ What is the weather like today and how is it different than yesterday? How can someone predict what the weather will be tomorrow? How does weather forecasting help us to prepare for dangerous weather? ● <i>Forces: Pushes and Pulls (Physical)</i> ~ How can you change the speed or direction of an object? What happens when two objects come together? What happens with a big push or pull? ● <i>Needs of Living Things (Life)</i> ~ What do plants and animals need to live and grow? What is the relationship between what plants and animals need and where they live? How do living things affect or change their environment?
First Grade	<p>First Grade students study physical and earth & space sciences based on the NGSS 1-PS4-2, 1-PS4-3, 1-PS4-1, 1-PS4-4, 1-ESS1-1, 1-ESS1-2, K.PS3-1, K-PS3-2,</p> <ul style="list-style-type: none"> ● <i>Patterns and Change in the Sky (Earth and Space)</i> ~ How can patterns we observe in the sky help us make predictions? What is the relationship between the amount of daylight and the time of year? What are the effects of the sun on earth’s surfaces? ● <i>Light and Sound (Physical)</i> ~ What is the relationship between light and what we see around us? What happens to a beam of light when you put different kinds of things in front of it? How do sound and vibration work together? How can light and sound be used to communicate over a distance? ● <i>Structures, Functions, & Information Processing (Life)</i> - How do animals use their structures and senses to survive? What are some ways plants and animals meet their needs so that they can survive and grow? How can humans learn from plants and animals? How can we identify plant/animal parents and offspring? What types (patterns) of behavior can be observed among parents that help offspring survive? What traits do parents pass to their offspring? How are young plants and animals alike and different from their parents?
Second Grade	<p>Second grade students study physical, earth & space, and life sciences based on the NGSS 2-PS1-1, 2-PS1-2, 2-PS1-4, 2-PS1-3, 2-ESS2-3, 2-ESS2-2, 2-ESS1-1, 2-ESS2-1, 1-LS1-2, 2-LS4-1, 2-LS2-1, 2-LS2-2 1-LS3-1.</p> <ul style="list-style-type: none"> ● <i>Earth’s Land and Water (Earth)</i> ~ Where is water found on the Earth? What forms of water are found in the Earth? What are the different Earth events that can occur, and how are they similar or different?

	<ul style="list-style-type: none"> ● Properties of Matter (Physical) ~ How can we sort objects into groups that have similar patterns? Can some materials be a solid or a liquid? How do the properties of matter determine their use? How can objects change? Are all changes reversible? ● Characteristics of Living Things (Life) ~ Why do we see different living things in different habitats? ~ How are young plants and animals alike and different from their parents? What types (patterns) of behavior can be observed among parents that help offspring survive? How does the diversity of plants and animals compare among different habitats? Why do some plants rely on animals for reproduction?
Third Grade	<p>Third Grade students study the life, earth and physical sciences based on the NGSS standards 3-PS2-1, 3-PS2-2, 3-PS2-3, 3-PS2-4, 3-ESS2-1, 3-ESS2-2, 3-ESS3-1, 3-LS1-1, 3-LS3-1, 3-LS3-2, 3-LS4-2, 3-LS2-1, 3-LS4-3, 3-LS4-4.</p> <ul style="list-style-type: none"> ● Life Cycles and Adaptations (Life) ~ How do organisms live, grow, respond to their environment, and reproduce? How are characteristics of one generation passed to the next? How can individuals of the same species and even siblings have different characteristics? Why do individuals of the same species vary in how they look, function, and behave? ● Weather and Climate (Earth) ~ Can we predict the kind of weather that we will see in the spring, summer, autumn, or winter? How can climates in different regions of the world be described? How can we protect people from natural hazards such as flooding, fast wind, or lightening? ● Forces and Changes in Motion (Physical) ~ How do equal and unequal forces on an object affect an object? How can we use observations to predict future motion of an object? What are some cause and effect relationships related to magnets and electricity?
Fourth Grade	<p>Fourth grade students study the life, earth and physical sciences based on the NGSS standards 4-PS3-1, 4-PS3-2, 4-PS3-3, 4-PS3-4, 4-PS4-1, 4-PS4-2, 4-PS4-3, 4-LS1-2, 4-ESS2-1, 4-ESS2-2, 4-ESS1-1, 4-ESS3-1, 4-ESS3-2, 3-LS4-1, 4-LS1-1, 1-LS1-1.</p> <ul style="list-style-type: none"> ● Structure and Function (Life) ~ How do internal and external structures of plants and animals help plants survive, grow, and thrive? How do animals receive and process different types of information from their environment? ● Waves, Information, and Energy Transfer (Physical) ~ What is energy, when is it present, and how does it move? In what ways does energy change when objects collide? How can we use waves to gather and transmit information? How can waves and objects interact? What patterns can be found in waves? ● Earth Systems, Fossil Fuels, and Human Impact (Earth) ~ Is it possible to engineer ways to protect humans from natural Earth? What do the shapes of landforms and rock formations tell us about our past? How can

	<p>evidence of the effects of weathering or erosion be observed or measured? From what natural resources are energy and fuels derived?</p> <ul style="list-style-type: none"> • In what ways does the human use of natural resources affect the environment? What do fossils tell us about the organisms and the environments in which they lived?
<p>Fifth Grade</p>	<p>Fifth grade students study physical, life, and earth & space sciences based on the NGSS standards 5-PS1-1, 5-PS1-3, 5-PS1-4, 5-PS1-2, 5-LS1-1, 5-PS3-1, 5-LS2-1, 5-ESS1-1, 5-ESS1-2, 5-PS2-1, 5-ESS2-2, 5-ESS2-1, 5-ESS3-1.</p> <ul style="list-style-type: none"> • <i>Interactions Between Earth, Sun, and Moon (Earth & Space)</i> ~ What patterns do we notice when observing the sky? What effect does Earth's gravitational force have on objects? What effect does the relative distance from Earth have on the apparent brightness of the sun and other stars? • <i>Properties and Changes of Matter (Physical)</i> ~ How can properties be used to identify materials? What kind of model can be created to describe matter? Can we create a new substance by mixing two substances? When matter undergoes change, how does this impact the total weight of the matter? • <i>Ecosystems and Earth's Resources (Life and Earth)</i> ~ How does matter and energy move among plants, animals, decomposers, and the environment? In what ways do the geosphere, biosphere, hydrosphere, and/or atmosphere interact? Where is water found on the Earth? How do individual communities use science ideas to protect Earth's resources and environment?



Content: Kindergarten Science

Course Description or Content Overview:

Kindergarten students study life, Earth & Space, Physical, and Engineering & Technology sciences based on the following standards, enduring understandings, and essential questions.

Next Generation Science Standards (NGSS):

1. Scientific and Engineering Practices

- o Asking questions (for science) and defining problems (for engineering)
- o Developing and using models
- o Planning and carrying out investigations
- o Analyzing and interpreting data
- o Using mathematics and computational thinking
- o Constructing explanations (for science) and designing solutions (for engineering)
- o Engaging in argument from evidence
- o Obtaining, evaluating, and communicating information

2. Crosscutting Concepts

- o Patterns
- o Cause and effect: Mechanism and explanation
- o Scale, proportion, and quantity
- o Systems and system models
- o Energy and matter: Flows, cycles, and conservation
- o Structure and function
- o Stability and change

3. Disciplinary Core Ideas

Physical Sciences

- o PS1: Matter and its interactions
- o PS2: Motion and stability: Forces and interactions
- o PS3: Energy
- o PS4: Waves and their applications in technologies for information transfer

Life Sciences

- o LS1: From molecules to organisms: Structures and processes
- o LS2: Ecosystems: Interactions, energy, and dynamics
- o LS3: Heredity: Inheritance and variation of traits

- o LS4: Biological evolution: Unity and diversity

Earth and Space Sciences

- o ESS1: Earth's place in the universe
- o ESS2: Earth's systems
- o ESS3: Earth and human activity

Engineering, Technology, and Applications of Science

- o ETS1: Engineering design
- o ETS2: Links among engineering, technology, science, and society

Enduring Understandings:

Weather:

- Weather is the combination of sunlight, wind, snow, or rain and temperature in a particular region at a particular time.
- People observe patterns in weather data to make predictions.
- Weather scientists forecast severe weather so that communities can prepare for and respond to these events.

Needs of Living Things:

- Living things need water, air, food, and resources from the land.
- Plants and animals live in places that provide for their needs.
- Plants and animals can change their environments.
- Humans can make choices to reduce their impact on the environment.

Forces: Pushes and Pulls:

- Simple tests can be designed to gather evidence to support or refute student ideas about causes.
- Pushes and pulls can have different strengths and directions.
- Pushing or pulling on an object can change the speed or direction of its motion and can start or stop it.
- When objects touch or collide, they push on one another and can change motion.
- A bigger push or pull makes things speed up or slow down more quickly.

Essential Questions:

Weather:

- What is the weather like today and how is it different than yesterday?
- How can someone predict what the weather will be tomorrow?
- How does weather forecasting help us to prepare for dangerous weather?

Needs of Living Things:

- What do plants and animals need to live and grow?
- What is the relationship between what plants and animals need and where they live?
- How do living things affect or change their environment?

Forces: Pushes and Pulls:

- How can you plan a simple way to change the speed or direction of an object?
- What happens when two objects come together?
- What happens with a big push or pull?

Terminology:

Weather	Forces: Pushes and Pulls	Needs of Living Things
<ul style="list-style-type: none"> ● Weather ● Hazardous ● Thunderstorm ● Hurricane ● Temperature ● Degree ● Graph ● Patterns ● Sunny ● Cloudy ● Rainy ● Thermometer ● Season ● Hot ● Warm ● Cold ● Daily ● Storm ● Predict 	<ul style="list-style-type: none"> ● Push ● Pull ● Force ● Motion ● Strength ● Speed ● Direction ● Friction ● Gravity ● Distance ● Path ● Position ● Collide ● Detect ● Angle ● Shape ● Height ● Length ● Travel 	<ul style="list-style-type: none"> ● Nature ● Weather Environment ● Cycles ● Patterns ● Living ● Nonliving ● Observe ● Predict ● Hypothesis ● Magnifying Glass/Lens ● Senses ● Experiment ● Seed ● Plant ● Physical Characteristics ● Texture ● Describe ● Survive

Assessments:

- Unit specific formative assessments
- Student Observation
- Class Discussion
- Unit Summative Assessment

21st Century Connections:

8.1 Technology: All students will use digital tools to access, manage, evaluate, and synthesize, information in order to solve problems individually and collaboratively and to create and communicate knowledge.

8.2 Technology: All students will develop an understanding of the nature and impact of technology, engineering, technological design, and the design world, as they relate to the individual, global society, and the environment.

9.1 Life and Career Skills: All students will demonstrate the creative, critical thinking, collaboration, and problem-solving skills needed to function successfully as both global citizens and workers in diverse ethnic and organizational cultures.

9.3 Career Awareness, Exploration, and Preparation: All students will apply knowledge about and engage in the process of career awareness, exploration, and preparation in order to navigate the globally competitive work environment of the information age.

Character Education:

The elementary core values of cooperation, assertion, responsibility, empathy, and self-control are addressed and stressed throughout each unit of study.

Cross Curricular / Interdisciplinary:

Mathematics: Data collection, representation and analysis, problem solving

Language Arts: Journal writing, recording observations, and shared literature

Art: Scientific drawings and model creation

Course Resources:

Technologies:

Interactive websites to accompany units (MysteryScience.com)

[Interactive Read Alouds](#)

Units of Study:

1. Weather
2. Pushes and Pulls
3. Needs of Living Things

1 Science **FIRST GRADE SCIENCE**

Content: 1ST Grade Science

Course Description or Content Overview:

First grade students study Earth & Space, Physical, and Engineering & Technology sciences based on the following standards, enduring understandings, and essential questions.

1. Scientific and Engineering Practices

- o Asking questions (for science) and defining problems (for engineering)
- o Developing and using models
- o Planning and carrying out investigations
- o Analyzing and interpreting data
- o Using mathematics and computational thinking
- o Constructing explanations (for science) and designing solutions (for engineering)
- o Engaging in argument from evidence
- o Obtaining, evaluating, and communicating information

2. Crosscutting Concepts

- o Patterns
- o Cause and effect: Mechanism and explanation
- o Scale, proportion, and quantity
- o Systems and system models
- o Energy and matter: Flows, cycles, and conservation
- o Structure and function
- o Stability and change

3. Disciplinary Core Ideas

Physical Sciences

- o PS1: Matter and its interactions
- o PS2: Motion and stability: Forces and interactions
- o PS3: Energy
- o PS4: Waves and their applications in technologies for information transfer

Life Sciences

- o LS1: From molecules to organisms: Structures and processes
- o LS2: Ecosystems: Interactions, energy, and dynamics
- o LS3: Heredity: Inheritance and variation of traits

- o LS4: Biological evolution: Unity and diversity

Earth and Space Sciences

- o ESS1: Earth's place in the universe
- o ESS2: Earth's systems
- o ESS3: Earth and human activity

Engineering, Technology, and Applications of Science

- o ETS1: Engineering design
- o ETS2: Links among engineering, technology, science, and society

Enduring Understandings:

Light and Sound:

- Objects can be seen if light is available to illuminate them or if they give off their own light.
- Some materials allow light to pass through them, others allow only some light through, and others block all the light and create a dark shadow on any surface beyond them, where the light cannot reach.
- Sound can make matter vibrate, and vibrating matter can make sound.
- Simple tests can be designed to gather evidence to support or refute student ideas about causes.

Patterns and Change in the Sky:

- Patterns of the sun, moon, and stars in the sky can be predicted using observations.
- Seasonal patterns of sunrise and sunset can be observed and predicted.
- Sunlight warms the Earth's surface.

Structures, Functions, and Information Processing:

- Animal structures serve a purpose to help them survive and grow
- Not all structures function in the same way (eagles have good eyesight, bats do not)
- Humans mimic animals and plants to function in daily life
- Plants and animals can have young
- Offspring are dependent on their parents for a period of time in their early development.
- Offspring inherit traits from their parents
- Animal and plant offspring are very much, but not exactly, like their parents

Essential Questions:

Light and Sound:

- What is the relationship between light and what we see around us?
- What happens to a beam of light when you put different kinds of things in front of it?
- How do sound and vibration work together?
- How can light and sound be used to communicate over a distance?

Patterns and Change in the Sky (Earth and Space):

- How can patterns we observe in the sky help us make predictions?
- What is the relationship between the amount of daylight and the time of year?
- What are the effects of the sun on earth's surfaces?

Structures, Functions, and Information Processing:

- How do animals use their structures and senses to survive?
- What types (patterns) of behavior can be observed among parents that help offspring survive?
- How are young plants and animals alike and different from their parents?
- How can humans learn from plants and animals?

Terminology:

Patterns and Change in the Sky	Light and Sound	Structures, Functions, and Information Processing
<ul style="list-style-type: none"> ● Sun ● Moon ● Earth ● Stars ● Pattern ● Night ● Day ● Daylight ● Position ● Prediction ● Patterns ● Sundial ● Rotate ● West ● East ● Shadows ● Sunrise ● Sunset ● Globe ● Absorb ● Reflect ● Temperature ● Thermometer 	<ul style="list-style-type: none"> ● Light ● Sound ● Light source ● Translucent ● Transparent ● Opaque ● Reflect ● Mirror ● Illuminate ● Illumination ● Shadow ● Beam ● Ray ● Path ● Sound ● Vibrate ● Energy ● Absorb ● Travel ● Communicate ● Device ● Distance ● Darkness 	<ul style="list-style-type: none"> ● Structure ● Function ● Traits ● Inherit ● Offspring ● Plants ● Animals ● Behaviors ● Roots ● Stem ● Leaf ● Flower ● External parts ● Body covering

Assessments:

- Unit specific formative assessments
- Student Observation
- Class Discussion
- Unit Summative Assessment

21st Century Connections:

8.1 Technology: All students will use digital tools to access, manage, evaluate, and synthesize, information in order to solve problems individually and collaboratively and to create and communicate knowledge.

8.2 Technology: All students will develop an understanding of the nature and impact of technology, engineering, technological design, and the design world, as they relate to the individual, global society, and the environment.

9.1 Life and Career Skills: All students will demonstrate the creative, critical thinking, collaboration, and problem-solving skills needed to function successfully as both global citizens and workers in diverse ethnic and organizational cultures.

9.3 Career Awareness, Exploration, and Preparation: All students will apply knowledge about and engage in the process of career awareness, exploration, and preparation in order to navigate the globally competitive work environment of the information age.

Character Education:

The elementary core values of cooperation, assertion, responsibility, empathy, and self-control are addressed and stressed throughout each unit of study.

Cross Curricular / Interdisciplinary:

LA- Journal writing, recording observations, and shared literature

Math – Problem solving, data collection, sorting and classifying, measurement.

Art – Scientific drawings and model creation

SS – Communication, Impact Patterns of the Sky on the World

Tech – Viewing and reading online videos and texts

Course Resources:

Technologies:

Interactive websites to accompany units (MysteryScience.com)

Text: Light (Teacher’s guide and kit), Science Companion

[Interactive Read Alouds](#)

Units of Study:

1. Patterns and Change in the Sky
2. Light and Sound
3. Structures Functions and Information Processing

2



SECOND GRADE SCIENCE

Content: 2nd Grade Science

Course Description or Content Overview:

Second Grade students study life, Earth, and physical sciences based on the following standards, enduring understandings, and essential questions.

New Jersey Student Learning Standards (NJSLS):

Second grade students study the Earth & Space, Physical, and Engineering & Technology sciences based on the following standards, enduring understandings, and essential questions.

1. Scientific and Engineering Practices

- o Asking questions (for science) and defining problems (for engineering)
- o Developing and using models
- o Planning and carrying out investigations
- o Analyzing and interpreting data
- o Using mathematics and computational thinking
- o Constructing explanations (for science) and designing solutions (for engineering)
- o Engaging in argument from evidence
- o Obtaining, evaluating, and communicating information

2. Crosscutting Concepts

- o Patterns
- o Cause and effect: Mechanism and explanation
- o Scale, proportion, and quantity
- o Systems and system models
- o Energy and matter: Flows, cycles, and conservation
- o Structure and function
- o Stability and change

3. Disciplinary Core Ideas

Physical Sciences

- o PS1: Matter and its interactions
- o PS2: Motion and stability: Forces and interactions
- o PS3: Energy
- o PS4: Waves and their applications in technologies for information transfer

Life Sciences

- o LS1: From molecules to organisms: Structures and processes
- o LS2: Ecosystems: Interactions, energy, and dynamics
- o LS3: Heredity: Inheritance and variation of traits
- o LS4: Biological evolution: Unity and diversity

Earth and Space Sciences

- o ESS1: Earth's place in the universe
- o ESS2: Earth's systems
- o ESS3: Earth and human activity

Engineering, Technology, and Applications of Science

- o ETS1: Engineering design
- o ETS2: Links among engineering, technology, science, and society

Enduring Understandings:

Earth's Land and Water

- Maps show where things are located. One can map the shapes and kinds of land and water in any area.
- Water is found in the ocean, rivers, lakes, and ponds. Water exists as solid ice and in liquid form.
- Wind and water can change the shape of the land.
- The shape and stability of structures of natural and designed objects are related to their function(s).

Properties of Matter

- Different kinds of matter exist and many of them can be either solid or liquid, depending on temperature.
- Matter can be described and classified by its observable properties.
- Different properties are suited to different purposes.
- Heating or cooling a substance may cause changes that can be observed. Sometimes these changes are reversible, and sometimes they are not.

Characteristics of Living Things and Habitats

- Most living things need water, food, air, and space to grow and survive.
- Plants and animals have an interdependent relationship.
- Offspring are dependent on their parents for a period of time in their early development.
- Diversity of plants and animals is the result of adaptations that aid survival and developed over time through inheritance of beneficial traits.

Essential Questions:

Earth’s Land and Water

- Where is water found on the Earth?
- What forms of water are found in the Earth?
- What are the different Earth events that can occur, and how are they similar or different?
- In what ways do humans slow or prevent wind or water from changing the shape of the land?
- What evidence can we find to prove that Earth events can occur quickly or slowly?

Properties of Matter

- How can we sort objects into groups that have similar patterns? Can some materials be a solid or a liquid?
- How do the properties of matter determine their use?
- How can objects change?
- Are all changes reversible?

Characteristics of Living Things

- Why do we see different living things in different habitats?
- How are young plants and animals alike and different from their parents?
- What types (patterns) of behavior can be observed among parents that help offspring survive?
- How does the diversity of plants and animals compare among different habitats?
- What do plants need to live and grow?
- Why do some plants rely on animals for reproduction?

Terminology:

Earth’s Land and Water	Properties of Matter	Characteristics of Living Things and Habitats
<ul style="list-style-type: none"> • Land • Bodies of Water • Solid • Liquid • Snow cap • Glaciers • Landforms • Streams • Lakes • Ocean • Wind 	<ul style="list-style-type: none"> • Property • Matter • Mass • Observe • Classify • Observable properties • Flexibility • Absorbent • Strength • Solid • Liquid 	<ul style="list-style-type: none"> • Living • Non-living • Need • Structure • Attribute • Properties • Plants • Water • Grow • Dispersal • Pollination • Pollinator

<ul style="list-style-type: none"> ● Rain ● Flood ● Drought ● Groundwater ● Aquifer ● Ice cap ● Glacier ● Iceberg ● River ● Marsh ● Swamp ● Brook ● Volcano ● Earthquake ● Tsunami ● Erosions 	<ul style="list-style-type: none"> ● Gas ● Temperature ● Heating ● Cooling ● Substance ● Material ● Changes ● Reversed ● Reversible change ● Irreversible change ● Physical change ● Rearrange ● Structure 	<ul style="list-style-type: none"> ● Pollen ● Mimic ● Habitat ● Organism ● Offspring ● Characteristic ● Trait ● Feature ● Inherit ● Adaptation ● Behavior ● Survive ● Dependent ● Diversity
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Assessments:

- Unit specific formative assessments
- Science Journals
- Science Notebook pages
- Unit summative assessment

21st Century Connections:

8.1 Technology: All students will use digital tools to access, manage, evaluate, and synthesize, information in order to solve problems individually and collaboratively and to create and communicate knowledge.

8.2 Technology: All students will develop an understanding of the nature and impact of technology, engineering, technological design, and the design world, as they relate to the individual, global society, and the environment.

9.1 Life and Career Skills: All students will demonstrate the creative, critical thinking, collaboration, and problem-solving skills needed to function successfully as both global citizens and workers in diverse ethnic and organizational cultures.

9.3 Career Awareness, Exploration, and Preparation: All students will apply knowledge about and engage in the process of career awareness, exploration, and preparation in order to navigate the globally competitive work environment of the information age.

Character Education:

The elementary core values of cooperation, assertion, responsibility, empathy, and self-control are addressed and stressed throughout each unit of study.

Cross Curricular / Interdisciplinary:

- Language Arts: Journal writing, recording observations, and shared literature
- Writing: science journals
- Math: through data collection, representation and analysis, problem solving.

- Art: Scientific drawings and model creation

Course Resources:

Technologies:

Interactive websites to accompany units (MysteryScience.com)

[Interactive Read Alouds](#)

Pacing Charts:

Units of Study:

1. Earth's Land and Water
2. Properties of Matter
3. Characteristics of Living Things and Habitats

3 Science **THIRD GRADE SCIENCE**

Content: 3rd Grade Science

Course Description or Content Overview:

Third Grade students study the life, Earth, and physical sciences based on the following standards, enduring understandings, and essential questions.

New Jersey Student Learning Standards (NJSLS):

Third grade students study the Physical, Life, and Engineering & Technology sciences based on the following standards, enduring understandings, and essential questions.

1. Scientific and Engineering Practices

- o Asking questions (for science) and defining problems (for engineering)
- o Developing and using models
- o Planning and carrying out investigations
- o Analyzing and interpreting data
- o Using mathematics and computational thinking
- o Constructing explanations (for science) and designing solutions (for engineering)
- o Engaging in argument from evidence
- o Obtaining, evaluating, and communicating information

2. Crosscutting Concepts

- o Patterns
- o Cause and effect: Mechanism and explanation
- o Scale, proportion, and quantity
- o Systems and system models
- o Energy and matter: Flows, cycles, and conservation
- o Structure and function
- o Stability and change

3. Disciplinary Core Ideas

Physical Sciences

- o PS1: Matter and its interactions
- o PS2: Motion and stability: Forces and interactions
- o PS3: Energy
- o PS4: Waves and their applications in technologies for information transfer

Life Sciences

- o LS1: From molecules to organisms: Structures and processes
- o LS2: Ecosystems: Interactions, energy, and dynamics
- o LS3: Heredity: Inheritance and variation of traits
- o LS4: Biological evolution: Unity and diversity

Earth and Space Sciences

- o ESS1: Earth's place in the universe
- o ESS2: Earth's systems
- o ESS3: Earth and human activity

Engineering, Technology, and Applications of Science

- o ETS1: Engineering design
- o ETS2: Links among engineering, technology, science, and society

Enduring Understandings:

Life Cycles and Adaptations

- Differences in characteristics among individuals of the same species sometimes provide advantages in survival, finding mates, and reproducing.
- Plants and animals have predictable characteristics at different stages of development. Plants and animals grow and change.
- Adult plants and animals can have young. In many kinds of animals, parents and the offspring themselves engage in behaviors that help the offspring to survive.
- Offspring acquire a mix of traits from their parents. Different organisms vary in how they look and function because they have different inherited information. The environment also affects the traits that an organism develops.
- Differences in where they grow or in the food they consume may cause organisms that are related to end up looking or behaving differently.

Weather and Climate

- Patterns of change can be used to make predictions.
- People record patterns of the weather across different times and areas so that they can make predictions about what kind of weather might happen next.
- Climate describes the range of an area's typical weather conditions and the extent to which those conditions vary over years.
- A variety of natural hazards result from natural processes (e.g., flooding, fast wind, or lightning).
- Humans cannot eliminate natural hazards but can take steps to reduce their impacts.

Forces and Changes in Motion:

- Objects in contact exert forces on one another. These have both strength and direction.
- When forces are balanced, there is no change in the motion or position of an object.
- When forces are unbalanced, there is a change in the motion and/or position of the object the forces are acting on.

Essential Questions:

Life Cycles and Adaptations

- How do organisms live, grow, respond to their environment, and reproduce?
- How are characteristics of one generation passed to the next?
- How can individuals of the same species and even siblings have different characteristics?
- Why do individuals of the same species vary in how they look, function, and behave?

Weather and Climate

- Can we predict the kind of weather that we will see in the spring, summer, autumn, or winter?
- How can climates in different regions of the world be described?
- How can we protect people from natural hazards such as flooding, fast wind, or lightning?

Forces and Changes in Motion

- How do equal and unequal forces on an object affect an object?
- How can we use observations to predict future motion of an object?
- What are some cause and effect relationships related to magnets and electricity?
- How can I use magnets and/or electricity to design a solution to a problem?

Terminology:

Life Cycles and Adaptations	Weather	Forces and Changes in Motion
<ul style="list-style-type: none"> • Life Cycle • Larvae • Grow • Frass • Plant • Chrysalis • Migrate • Metamorphosis • Animal • Pupae • Milkweed • Seed • Adult • Antennae • Camouflage • Egg • Head • Abdomen • Thorax • Proboscis • Nectar • Transparent • Mexico 	<ul style="list-style-type: none"> • Weather • Condition • Seasonal • Hazard • Weather data • Climate • Region • Tornadoes • Hurricanes • Drought • Severe Weather • Precipitation • Cloud cover • Barometer • Hurricane • Temperature • Room temperature • Expand • Thermometer • Wind direction • Wind speed • Evaporation • Condensation 	<ul style="list-style-type: none"> • Push • Pull • Force • Object • Motion • Acceleration • Net force • Balanced force • Unbalanced force • Equal force • Unequal force • Strength • Speed • Direction • Friction • Gravity • Distance • Path • Position • Collide • Detect • Angle • Shape

<ul style="list-style-type: none"> ● Seedling ● Deforestation ● Mature plant ● Defense ● Mimicry ● Behavioral adaptation ● Physical adaptation ● Traits ● Organism ● Reproduce 	<ul style="list-style-type: none"> ● Transpiration ● Atmosphere ● Droplets ● Water Vapor ● Rain Gauge ● Humidity ● Air Pressure ● Meteorologist ● Low Pressure ● High Pressure ● Cold Fronts ● Warm Fronts ● Jet Streams 	<ul style="list-style-type: none"> ● Height ● Length ● Travel ● Rest ● Pattern ● Contact ● Exert ● Magnetic ● Electric
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Assessments:

- Unit specific formative assessments
- Student data and observations
- Science journals
- Summative Assessments

21st Century Connections:

8.1 Technology: All students will use digital tools to access, manage, evaluate, and synthesize, information in order to solve problems individually and collaboratively and to create and communicate knowledge.

8.2 Technology: All students will develop an understanding of the nature and impact of technology, engineering, technological design, and the design world, as they relate to the individual, global society, and the environment.

9.1 Life and Career Skills: All students will demonstrate the creative, critical thinking, collaboration, and problem-solving skills needed to function successfully as both global citizens and workers in diverse ethnic and organizational cultures.

9.3 Career Awareness, Exploration, and Preparation: All students will apply knowledge about and engage in the process of career awareness, exploration, and preparation in order to navigate the globally competitive work environment of the information age.

Character Education:

The elementary core values of cooperation, assertion, responsibility, empathy, and self-control are addressed and stressed throughout each unit of study.

Cross Curricular / Interdisciplinary:

- Math: measurement, classification, estimation, graphing
- Language Arts: journal writing, recording observations, and shared literature
- Social Studies: migration of the Monarch butterfly
- Art: Scientific drawings and model creation

Course Resources:

Technologies:

Information on Butterfly Rearing: <http://www.monarchwatch.org>

www.mysteryscience.com

FOSS Online Teacher Resources, “Magnetism and Electricity” module: www.fossweb.com

[Interactive Read Alouds](#)

Units of Study:

1. Life Cycles and Adaptations
2. Weather and Climate
3. Forces and Changes in Motion



4 FOURTH GRADE SCIENCE

Content: 4th Grade Science

Course Description or Content Overview:

Fourth Grade students study the life, Earth, and physical sciences based on the following standards, enduring understandings, and essential questions.

New Jersey Student Learning Standards (NJSLS):

Third grade students study the Physical, Life, and Engineering & Technology sciences based on the following standards, enduring understandings, and essential questions.

1. Scientific and Engineering Practices

- o Asking questions (for science) and defining problems (for engineering)
- o Developing and using models
- o Planning and carrying out investigations
- o Analyzing and interpreting data
- o Using mathematics and computational thinking
- o Constructing explanations (for science) and designing solutions (for engineering)
- o Engaging in argument from evidence
- o Obtaining, evaluating, and communicating information

2. Crosscutting Concepts

- o Patterns
- o Cause and effect: Mechanism and explanation
- o Scale, proportion, and quantity
- o Systems and system models
- o Energy and matter: Flows, cycles, and conservation
- o Structure and function
- o Stability and change

3. Disciplinary Core Ideas

Physical Sciences

- o PS1: Matter and its interactions
- o PS2: Motion and stability: Forces and interactions
- o PS3: Energy
- o PS4: Waves and their applications in technologies for information transfer

Life Sciences

- o LS1: From molecules to organisms: Structures and processes
- o LS2: Ecosystems: Interactions, energy, and dynamics
- o LS3: Heredity: Inheritance and variation of traits
- o LS4: Biological evolution: Unity and diversity

Earth and Space Sciences

- o ESS1: Earth's place in the universe
- o ESS2: Earth's systems
- o ESS3: Earth and human activity

Engineering, Technology, and Applications of Science

- o ETS1: Engineering design
- o ETS2: Links among engineering, technology, science, and society

Enduring Understandings:

Structure and Function

- A system can be described in terms of its components and their interactions.
- Plants and animals have both internal and external structures that serve various functions in growth, survival, behavior, and reproduction.

Waves, Information, and Energy Transfer

- Energy is the ability to do work. Energy is present whenever there is sound, light, or heat.
- Energy can be moved from place to place through sound, light, or electric currents.
- Energy can be transferred in various ways and between objects.
- Energy can be transferred from object to object through collisions
- Light also transfers energy from place to place. (Light transfers energy- light travels in the form of an electromagnetic wave and carries with it heat which is thermal energy).
- Energy can also be transferred from place to place by electric currents; the currents may have been produced to begin with by transforming the energy of motion into electrical energy.

Earth's Systems and Human Impact

- Water, ice, wind, living organisms, and gravity break rocks, soils, and sediments into smaller particles and move them around.
- Rainfall helps to shape the land and affects the types of living things found in a region.
- Living things affect the physical characteristics of their regions.
- Local, regional, and global patterns of rock formations reveal changes over time due to earth forces, such as earthquakes.
- The presence and location of certain fossil types indicate the order in which rock layers were formed.

Essential Questions:

Structure and Function

- How do internal structures of plants and animals help plants survive, grow, and thrive?
- How do external structures of plants and animals help plants survive, grow, and thrive?

Waves, Information, and Energy Transfer

- What is energy, when is it present, and how does it move?
- In what ways does energy change when objects collide?
- How can we use waves to gather and transmit information?
- How can waves and objects interact?
- What patterns can be found in waves?

Earth's Systems, Fossil Fuels, and Human Impact

- Is it possible to engineer ways to protect humans from natural Earth?
- What can maps tell us about features of the world?
- In what ways can the impact of natural Earth processes on humans be reduced?
- What do the shapes of landforms and rock formations tell us about our past?
- How can evidence of the effects of weathering or erosion be observed or measured?
- From what natural resources are energy and fuels derived?
- In what ways does the human use of natural resources affect the environment?
- What do fossils tell us about the organisms and the environments in which they lived?

Terminology:

Structure and Function	Waves, Information, and Energy Transfer	Earth's Systems, Fossil Fuels, and Human Impact
<ul style="list-style-type: none"> • Internal • External • Structure • Survive • Thrive • Growth • Behavior • Reproduction • Senses • Mimic • Function • Body system • Antennae • Behavior • Bristles • Carapace • Crustaceans • Elodea • Habitat • Pincers • Structures • Swimmerets 	<ul style="list-style-type: none"> • Wave • Motion • Amplitude • Wavelength • Reflection • Transmit • Transfer • Energy • Electrical Energy • Decode • Patterns • Converted • Thermal • Heat • Absorb • Reflection • Potential energy • Kinetic energy • Stored Energy • Elastic Energy • D-Cell • Bulb 	<ul style="list-style-type: none"> • Maps • Map features • Landforms • Rock formations • Weathering • Erosion • Energy • Fuels • Natural resource • Derived • Organisms • Fossil • Rock layers • Renewable • Coal • Oil • Natural gas • Soil • Topographic • Elevation • Contour • Contour lines

<ul style="list-style-type: none"> ● Territory ● Tail flap 	<ul style="list-style-type: none"> ● Negative ● Positive ● Circuit ● Momentum ● Inertia ● Gravity ● Catapult 	<ul style="list-style-type: none"> ● Contour interval ● Oceanic plates ● Landforms ● Acid Rain ● Deposition ● Glacier ● Limestone
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Assessments:

- Unit-specific formative assessments
- Prior Knowledge chart
- Written Science Notebook Assessments
- Performance Assessments
- End of Unit Test

21st Century Connections:

8.1 Technology: All students will use digital tools to access, manage, evaluate, and synthesize, information in order to solve problems individually and collaboratively and to create and communicate knowledge.

8.2 Technology: All students will develop an understanding of the nature and impact of technology, engineering, technological design, and the design world, as they relate to the individual, global society, and the environment.

9.1 Life and Career Skills: All students will demonstrate the creative, critical thinking, collaboration, and problem-solving skills needed to function successfully as both global citizens and workers in diverse ethnic and organizational cultures.

9.3 Career Awareness, Exploration, and Preparation: All students will apply knowledge about and engage in the process of career awareness, exploration, and preparation in order to navigate the globally competitive work environment of the information age.

Character Education:

The elementary core values of cooperation, assertion, responsibility, empathy, and self-control are addressed and stressed throughout each unit of study.

Cross Curricular / Interdisciplinary:

- Math: measurement, data collection and analysis, graphing
- LA: FOSS Matter and Energy text, FOSS science stories, suggested literature list;
- Technology: www.fossweb.com interactive Web site and other suggested interactive sites
- Art: Scientific drawings and model creation

Course Resources:

Technologies:

FOSS Online Teacher Resources, “Magnetism and Electricity” and “Structures of Life” modules.

www.fossweb.com

[Interactive Read Alouds](#)

Units of Study:

1. Structure and Function
2. Waves, Information, and Energy Transfer
3. Earth's Systems, Fossil Fuels, and Human Impact



5 FIFTH GRADE SCIENCE

Content: 5TH Grade Science

Course Description or Content Overview:

Fifth Grade students study the life, Earth, and physical sciences based on the following standards, enduring understandings, and essential questions.

New Jersey Student Learning Standards (NJSLS):

1. Scientific and Engineering Practices

- o Asking questions (for science) and defining problems (for engineering)
- o Developing and using models
- o Planning and carrying out investigations
- o Analyzing and interpreting data
- o Using mathematics and computational thinking
- o Constructing explanations (for science) and designing solutions (for engineering)
- o Engaging in argument from evidence
- o Obtaining, evaluating, and communicating information

2. Crosscutting Concepts

- o Patterns
- o Cause and effect: Mechanism and explanation
- o Scale, proportion, and quantity
- o Systems and system models
- o Energy and matter: Flows, cycles, and conservation
- o Structure and function
- o Stability and change

3. Disciplinary Core Ideas

Physical Sciences

- o PS1: Matter and its interactions
- o PS2: Motion and stability: Forces and interactions
- o PS3: Energy
- o PS4: Waves and their applications in technologies for information transfer

Life Sciences

- o LS1: From molecules to organisms: Structures and processes
- o LS2: Ecosystems: Interactions, energy, and dynamics
- o LS3: Heredity: Inheritance and variation of traits
- o LS4: Biological evolution: Unity and diversity

Earth and Space Sciences

- o ESS1: Earth's place in the universe
- o ESS2: Earth's systems
- o ESS3: Earth and human activity

Engineering, Technology, and Applications of Science

- o ETS1: Engineering design
- o ETS2: Links among engineering, technology, science, and society

Enduring Understandings:

Interactions Between the Earth, Sun, and Moon

- The Sun is our closest star, and is the central and largest body in our solar system.
- Regular and predictable patterns of motion of Earth and the moon, relative to the sun, can be described as a result of the force of gravity. These movements are responsible for the natural phenomena that occur on our planet (e.g. day, night, shadows, moon phases, seasons, etc.).

Properties of Matter:

- Physical properties can be used to describe matter, including , color, hardness, reflectivity, electrical conductivity, thermal conductivity, and response to magnetic forces and solubility .
- When two substances are mixed, a chemical change can take place which results in a new substance.
- Matter is made up of particles too small to be seen.
- Regardless of the type of change that matter undergoes, the total weight of matter is conserved.

Ecosystems and Earth's Resources

- Matter is transported into, out of, and within systems.
- Plants acquire their material for growth chiefly from air and water.
- The food of almost any kind of animal can be traced back to plants.
- Organisms are related in food webs in which some animals eat plants for food and other animals eat the animals that eat plants.
- Some organisms, such as fungi and bacteria, break down dead organisms (both plants or plants parts and animals) and therefore operate as decomposers.
- Decomposition eventually restores (recycles) some materials back to the soil.
- Organisms can survive only in environments in which their particular needs are met.
- Energy can be transferred in various ways and between objects.
- The energy released from food was once energy from the sun, which was captured by plants in the chemical process that forms plant matter (from air and water).

- Food provides animals with the materials they need for body repair and growth and the energy they need for motion and to maintain body warmth.

Essential Questions:

Interactions Between the Earth, Sun, and Moon

- What patterns do we notice when observing the sky?
- What effect does Earth’s gravitational force have on objects?
- What effect does the relative distance from Earth have on the apparent brightness of the sun and other stars?

Properties and Changes of Matter:

- How can properties be used to identify materials?
- What kind of model can be created to describe matter?
- Can we create a new substance by mixing two substances?
- When matter undergoes change, how does this impact the total weight of the matter?

Ecosystems and Earth’s Resources

- In what ways do the geosphere, biosphere, hydrosphere, and/or atmosphere interact?
- How do individual communities use science ideas to protect Earth’s resources and environment?
- Where is water found on the Earth? What percentage of the Earth is freshwater?

Terminology:

Interactions Between the Earth, Sun, and Moon	Properties and Changes of Matter	Ecosystems and Earth’s Resources
<ul style="list-style-type: none"> • Earth • Sun • Moon • Gravity • Gravitational Force • Force • Planet • Moon Phases • Cardinal Directions • Compass • Day • Night • East • West • North • South • Predictable • Season • Shadow 	<ul style="list-style-type: none"> • Matter • Mass • Weight • Substance • Physical Change • Chemical Change • Conservation • Solid • Liquid • Gas • Particles • Properties • Observe • Measure • Identify • Materials • Model • Mixture • Hardness 	<ul style="list-style-type: none"> • Decomposers • Environment • Energy • Ecosystem • Habitat • Organism • Geosphere • Hydrosphere • Biosphere • Terrarium • Nutrients • Food Chain • Producer • Consumer • Omnivore • Herbivore • Carnivore • Atmosphere • Interact • Molten • Sediments

<ul style="list-style-type: none"> ● Sun ● Constellation ● Earth ● Gravity ● Stars ● Moon Phase ● Waxing ● Waning ● Crescent ● Gibbous ● First Quarter ● Third Quarter ● Lunar ● Gnomon ● Cycle ● Satellite ● New Moon ● Full Moon ● Astronomer ● Rotate ● Revolve ● Telescope ● Magnify 	<ul style="list-style-type: none"> ● Reflectivity ● Electrical conductivity ● Magnetic forces ● Solubility ● Time ● Temperature ● Volume 	<ul style="list-style-type: none"> ● Petroleum
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Assessments:

- Unit specific formative assessments
- Student data and observations
- Science journals
- Unit Summative Assessment

21st Century Connections:

8.1 Technology: All students will use digital tools to access, manage, evaluate, and synthesize, information in order to solve problems individually and collaboratively and to create and communicate knowledge.

8.2 Technology: All students will develop an understanding of the nature and impact of technology, engineering, technological design, and the design world, as they relate to the individual, global society, and the environment.

9.1 Life and Career Skills: All students will demonstrate the creative, critical thinking, collaboration, and problem-solving skills needed to function successfully as both global citizens and workers in diverse ethnic and organizational cultures.

9.3 Career Awareness, Exploration, and Preparation: All students will apply knowledge about and engage in the process of career awareness, exploration, and preparation in order to navigate the globally competitive work environment of the information age.

Character Education:

The elementary core values of cooperation, assertion, responsibility, empathy, and self-control are addressed and stressed throughout each unit of study.

Cross Curricular / Interdisciplinary:

- Math – measurement (line graphs)
- Language Arts- Journal writing, recording observations, and shared literature
- Art – Scientific drawings and model creation
- SS-Ancient history of the constellations

Course Resources:

Technologies: Interactive websites – MysteryScience.com
[Interactive Read Alouds](#)

Units of Study:

1. Interactions Between the Earth, Sun, and Moon
2. Properties and Changes of Matter
3. Ecosystems and Earth's Resources

South Brunswick School District



DISTRICT APPENDIX

There are the various strands that cross content.

They have relevance to every curricular area and all grade levels.

The strands are interwoven into content and integrated into instruction.

They do not stand-alone.

A synopsis of each strand is included in this document.

The full SBSB K-12 District Appendix, with detailed information about each strand, can be found as a separate document.

Topics

Teaching for the 21st Century

Educational Technology Standards

21st Century Life and Career Education Skills

Character Education

Differentiation

Understanding by Design (UbD): “Reader’s Digest” Version

Topic

**Teaching for the 21st Century:
What does this mean and how do you do it?**

Students need to gain skills that will enable them to learn on their own, think critically and creatively, and apply knowledge to new situations. An emphasis needs to be placed on problem solving, teamwork skills, global awareness, and proficiency in using technology. Students need to learn to collaborate and work on authentic problems that they will likely encounter in their future careers. This section will outline what this means and how you “teach” for the 21st century: Elementary, Middle and High.

**Tools for the 21st Century:
Life, Careers, and Digital Environments**

21st Century Life and Career Education Skills and Educational Technology Skills outline the NJ Core Curriculum Content Standards for these areas that align with PK-12 learning.

These standards are written into the curriculum documents for all areas of content—English Language Arts, Mathematics, Science, Social Studies, PE/Health Education, Visual Art, Music, World Language and Library-Media. They are integrated into curriculum and instruction in places where it is relevant and meaningful to do so, and in ways that enhance learning. You will see these integrations explicitly noted in the curriculum guides: Elementary, Middle and High.

**Character Education:
Safe and Caring Learning Communities**

South Brunswick takes an “approach” to character education that fosters the social, emotional and academic growth of each child. The intent is to create a safe and caring community while building life skills based on the five core values (CARES):

- C Cooperation
- A Assertion
- R Responsibility (and Respect)
- E Empathy
- S Self-Control

For over ten years, the K-5 teachers have been trained in and have followed the *Responsive Classroom (RC)* approach.

The middle school teachers have studied and/or been trained in the *Developmental Designs (DD)* approach to character education.

The high school approach has been named “Strive for Five” and includes an annual theme with related activities to bring Character Education to the forefront. There is always a service-learning project connected to the theme. In addition, the high school also follows the *Institute of Excellence and Ethics* (IEE) approach. The IEE approach allows for explicit teaching of Character Education through a series of multimedia lessons that are embedded into the students’ schedules.

Differentiation

Differentiation of instruction is a deliberate and conscious method of planning and teaching that provides multiple avenues of learning. It means different challenges to different students. It is characterized by strategies that use an assessment of each individual student for readiness, interest and learning style to modify instruction in three ways: by content, process and product.

In this document, there is a brief description of several approaches and methods that have long been utilized in South Brunswick to meet the differentiated needs of students within the classroom.

- Bloom’s Taxonomy
- Gardner’s Multiple Intelligences
- Learning Styles
- Inclusion Classrooms
- Kagan Cooperative Learning
- Principles of Differentiation

It is expected that classroom instruction will be differentiated. This expectation is predicated upon the belief or disposition that “all students can learn.”

Understanding by Design

For nearly two decades, the South Brunswick School District has held much value in the Understanding by Design (UbD) or Backward Design model of curriculum writing by Grant Wiggins. This model and the process of curriculum development, has been used in the district for many years. The curriculum template—which was recommended by the State of NJ and adopted/adapted by the District, includes elements of the UbD approach.)

You will note that in every curricular area, we begin with the end in mind (that is, the big idea). Enduring understandings, essential questions and performance assessments—all based on standards--are used in the process of curriculum development.

With this being said, it is not only important to understand the process of UbD, but also how to implement curriculum designed in such a way.

A brief overview of how to use Understanding by Design in delivering curriculum is included in the Appendix.