Shrewsbury Borough School District
Science Curriculum Guide
Grade 5
2015

Mission Statement:

The mission of the Shrewsbury Borough School District, a system built on successful cooperation among family, school and community, is to prepare all students to achieve excellence and to become responsible citizens through rigorous educational programs consistent with New Jersey Core Content State Standards and which respect individual differences and diversity. Students will be prepared to meet the challenges presented in the regional high school and the world beyond.

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Approved by Shrewsbury Borough Board of Education:
September 2015

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Implementation: September 2015

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Course Philosophy

The performance expectations in fifth grade help students formulate answers to questions such as: "When matter changes, does its weight change? How much water can be found in different places on Earth? Can new substances be created by combining other substances? How does matter cycle through ecosystems? Where does the energy in food come from and what is it used for? How do lengths and directions of shadows or relative lengths of day and night change from day to day, and how does the appearance of some stars change in different seasons?" Fifth grade performance expectations include PS1, PS2, PS3, LS1, LS2, ESS1, ESS2, and ESS3 Disciplinary Core Ideas from the NRC Framework. Students are able to describe that matter is made of particles too small to be seen through the development of a model. Students develop an understanding of the idea that regardless of the type of change that matter undergoes, the total weight of matter is conserved. Students determine whether the mixing of two or more substances results in new substances. Through the development of a model using an example, students are able to describe ways the geosphere, biosphere, hydrosphere, and/or atmosphere interact. They describe and graph data to provide evidence about the distribution of water on Earth. Students develop an understanding of the idea that plants get the materials they need for growth chiefly from air and water. Using models, students can describe the movement of matter among plants, animals, decomposers, and the environment and that energy in animals' food was once energy from the sun. Students are expected to develop an understanding of patterns of daily changes in length and direction of shadows, day and night, and the seasonal appearance of some stars in the night sky. The crosscutting concepts of patterns; cause and effect; scale, proportion, and quantity; energy and matter; and systems and systems models are called out as organizing concepts for these disciplinary core ideas. In the fifth grade performance expectations, students are expected to demonstrate grade-appropriate proficiency in developing and using models, planning and carrying out investigations, analyzing and interpreting data, using mathematics and computational thinking, engaging in argument from evidence, and obtaining, and communicating information; and to use these practices to demonstrate understanding of the core ideas.

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Course Description

The grade five integrated science curriculum is driven by the Next Generation Science Standards. Each performance expectation has three dimensions: disciplinary core ideas, scientific and engineering practices, and crosscutting concepts. The disciplinary core ideas describe existing scientific knowledge. The science and engineering practices describe how to engage in scientific inquiry. The crosscutting concepts provide a framework for connecting scientific knowledge. The four units of study, which consist of *Living Things and Ecosystems, Earth Systems, Changes in Matter,* and *Earth, the Moon, and the Stars,* integrate three strands of Science: Earth Science, Life Science, and Physical Science. Students will be guided to develop an understanding of the role of decomposers, consumers, and producers in a healthy ecosystem. They study the geosphere, hydrosphere, atmosphere, and biosphere and learn how these systems interact. They develop models to examine patterns caused by the relative positions of Earth and the sun, and identify matter as particles of matter too small to be seen.

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Scope and Sequence	
Course Title: Bring Science Alive! Exploring Science Practices	Grade Level: 5

Units:

Unit 1: Living Things and Ecosystems	September - October
Unit 2: Earth Systems	November - January
Unit 3: Changes in Matter	February - April
Unit 4: Earth, the Moon, and the Stars	May - June

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Unit 1 Overview
Unit Title: **Living Things and Ecosystems**
Grade Level: **5**
Recommended Pacing: 2 months - block scheduling
Unit Summary: In a forest, you may see trees, birds, insects, ferns, moss, and mushrooms. Some things may be hidden from view like earthworms. All living things, or organisms, live in an ecosystem. An ecosystem includes all the plants and animals, as well as nonliving things, in one area. In this unit, you will read about ecosystems and how they function. You will learn how organisms interact with each other and with nonliving things to meet their needs.
Unit 1 NGSS: 5-PS3.Energy 5-PS3-1. Use models to describe that energy in animals' food (used for body repair, growth, motion, and to maintain body warmth) was once energy from the sun.

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5-LS1. From Molecules to Organisms: Structures and Processes

5-LS1-1. Support an argument that plants get the materials they need for growth chiefly from air and water.

5-LS2. Ecosystems: Interactions, Energy, and Dynamics

5-LS2-1. Develop a model to describe the movement of matter among plants, animals, decomposers, and the environment.

5-ESS2. Earth's Systems

5-ESS2-1. Develop a model using an example to describe ways the geosphere, biosphere, hydrosphere, and/or atmosphere interact.

5-ESS3.Earth and Human Activity

5-ESS3-1. Obtain and combine information about ways individual communities use science ideas to protect the Earth's resources and environment.

3-5-ETS1. Engineering Design

3-5-ETS1-1. Define a simple design problem reflecting a need or a want that includes specified criteria for success and constraints on materials, time, or cost.

3-5-ETS1-2. Generate and compare multiple possible solutions to a problem based on how well each is likely to meet the criteria and constraints of the problem.

3-5-ETS1-3. Plan and carry out fair tests in which variables are controlled and failure points are considered to identify aspects of a model or prototype that can be improved.

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Unit 1 ISTE Standards:

1. a-d Creativity and Innovation- Students demonstrate creative thinking, construct knowledge, and develop innovative products and processes through technology.

2. a-d Communication and Collaboration- Students use digital media and environments to communicate and work collaboratively, including at a distance, to support individual learning and contribute to the learning of others.

3. a-d Research and Information Fluency- Students apply digital tools to gather, evaluate, and use information.

4. a-d Critical Thinking, Problem Solving, and Decision Making- Students use critical thinking skills to plan and conduct research, manage projects, solve problems, and make informed decisions using appropriate digital tools and resources.

Unit 1 Science and Engineering Practices:

- Developing and Using Models
- Develop a model to describe phenomena
- Asking Questions and Defining Problems
- Ask questions based on observations to find more information about the natural and/or designed world(s)

- Use models to describe phenomena
- Engaging In Argument from Evidence

- Support an argument with evidence, data, or a model
- Planning and Carrying Out Investigations
- Make observations and measurements to produce data to serve as the basis for evidence for an explanation of a phenomenon
- Respectfully provide and receive critiques from peers about a proposed procedure, explanation, or model by citing relevant evidence and posing specific questions
- Obtaining, Evaluating, and Communicating Information
- Communicate scientific and/or technical information orally and/or in written formats, including various forms of media as well as tables, diagrams, and charts
- Constructing Explanations and Designing Solutions
- Generate and compare multiple solutions to a problem based on how well they meet the criteria and constraints of the design problem

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Unit 1 Essential Questions:

What is an ecosystem?

What is the role of producers in an ecosystem?

What is the role of consumers in an ecosystem?

What is the role of decomposers in an ecosystem?

How do matter and energy move in an ecosystem?

What makes an ecosystem healthy or unhealthy?

How do ecosystems change?

How do humans change ecosystems?

Unit 1 Learning Targets ***Students will be able to…***	**Unit 1 Learning Targets** ***Students will do…***

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• use models to describe a phenomenon that includes the idea that energy in animals' food was once energy from the sun • identify and describe the relevant relationships between plants, animals, and energy • use the models to describe causal accounts of the relationships between energy from the sun and animals' needs for energy • identify a claim which include the idea that plants acquire the materials they need for growth chiefly from air and water • describe the given evidence, data, and/or models that support the claim and determine whether the evidence supports the claim • use reasoning to connect the evidence to support the claim with argumentation • develop a model to describe a phenomenon that includes the movement of matter within an ecosystem identifying relevant components, including: matter, plants, animals, decomposers, and the environment	• read for content mastery • develop and use content related vocabulary • analyze and interpret data to determine similarities and differences in findings • cite specific textual evidence to support analysis of science and technical texts • complete a variety of laboratory activities to support the content • write informative/explanatory texts to examine a topic and convey ideas, concepts, and information through the selection, organization, and analysis of relevant content • view various content related videos

• describe the relationships among those components • use the model to describe: the cycling of matter in the system, how interactions allow multiple species to meet their needs, how newly introduced species can affect the balance of interactions, and how changing an aspect will affect other aspects of the ecosystem • obtain information from books and other reliable media about: how a given human activity affects the Earth's resources and environments, and how a given community uses scientific ideas to protect a given natural resource and the environment in which the resource is found • combine information from two or more sources to provide and describe evidence	

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Unit 1 Evidence of Learning
Formative Assessments: • Bring Science Alive! Grade 5 - teacher created quizzes • Exit tickets • Lab work • Homework • BrainPOP quizzes • Reading Challenges • Participation • Interactive Science notebook

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Summative Assessments:

- Bring Science Alive! Grade 5 - Chapter tests
- PBL: develop a model of a food chain and a food web using pictures of plants and animals; describe how matter and energy move through these models
- Lab work

Lab Activities:

- Bring Science Alive! - Grade 5

→ owl pellet dissection
→ explore what happens when sugar and yeast are mixed together; investigate and make observations to provide evidence
→ act as engineers to design a soilless farming system; observe results and provide improvements

- Gizmos labs: Cell Energy Cycle; Plants & Snails; Energy Conversions; Food Chains; Forest Ecosystem; Prairie Ecosystem

Unit 1 Materials/Equipment:

Required Lab Materials: forceps, owl poster, owl pellets, toothpicks, balloons, paper cups, graduated cylinders (100 mL), plastic spoons, sugar, triple beam balance, yeast, paper clips (large), yarn, bags (plastic sandwich size), cloth (cotton), containers (plastic, 2 quarts), craft sticks, filters (coffee), plates (paper), seeds (lima beans), sponges, safety glasses, disposable gloves, disinfectant wipes, masking tape, paper towels, water bottles with caps (500 mL), yellow construction paper, clear tape

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Materials/Equipment/Resources: Gizmos subscription, Quizlet subscription, BrainPOP subscription, Teachers Domain video clips, Mr. Parr's science songs, TCI Bring Science Alive! Grade 5, Smart Board, student laptops

Unit 2 Overview
Unit Title: **Earth Systems**
Grade Level: **5**
Recommended Pacing: 3 months; block scheduling
Unit Summary: Suppose you live on an island. On a warm day, you and your family decide to go snorkeling. When you get to the beach, you breathe in the fresh ocean air. Underwater, you see fish swimming and crabs crawling across the sand. You also observe sea grass and coral reefs along the ocean floor. In this unit, you will learn how all of these things are part of systems that make up Earth, and how these systems interact in different ways.
Unit 2 NGSS: 5-LS2. Ecosystems: Interactions, Energy, and Dynamics 5-LS2-1. Develop a model to describe the movement of matter among plants, animals, decomposers, and the environment. 5-ESS2. Earth's Systems

5-ESS2-1. Develop a model using an example to describe ways the geosphere, biosphere, hydrosphere, and/or atmosphere interact.

5-ESS2-2. Describe and graph the amounts and percentages of water and fresh water in various reservoirs to provide evidence about the distribution of water on Earth.

5-ESS3. Earth and Human Activity

5-ESS3-1. Obtain and combine information about ways individual communities use science ideas to protect the Earth's resources and environment.

3-5-ETS1. Engineering Design

3-5-ETS1-1. Define a simple design problem reflecting a need or a want that includes specified criteria for success and constraints on materials, time, or cost.

3-5-ETS1-2. Generate and compare multiple possible solutions to a problem based on how well each is likely to meet the criteria and constraints of the problem.

3-5-ETS1-3. Plan and carry out fair tests in which variables are controlled and failure points are considered to identify aspects of a model or prototype that can be improved.

Unit 2 ISTE Standards:

1. a-d Creativity and Innovation- Students demonstrate creative thinking, construct knowledge, and develop innovative products and processes through technology.

2. a-d Communication and Collaboration- Students use digital media and environments to communicate and work collaboratively, including at a distance, to support individual learning and contribute to the learning of others.

3. a-d Research and Information Fluency- Students apply digital tools to gather, evaluate, and use information.

4. a-d Critical Thinking, Problem Solving, and Decision Making- Students use critical thinking skills to plan and conduct research, manage projects, solve problems, and make informed decisions using appropriate digital tools and resources.

Science and Engineering Practices:

- Developing and Using Models
- Develop a model using an example to describe a scientific principle.
- Using Mathematics and Computational Thinking
- Describe and graph quantities such as area and volume to address scientific questions

- Obtaining, Evaluating, and Communicating Information
- Obtain and combine information from books and/or other reliable media to explain phenomena or solutions to a design problem.
- Use a model to test cause and effect relationships of interactions concerning the functioning of a natural or designed system.
- Asking Questions and Defining Problems
- Define a simple solution that can be solved through the development of an object, tool, process, or system and includes several criteria for success and constraints on materials, time, or cost.
- People's needs and wants change over time, as do their demands for new and improved technologies.

Unit 2 Essential Questions:

What are Earth's four systems?

How do Earth's systems produce weather and climate?

How do Earth's systems change Earth's surface?

How do farming and industry affect Earth's systems?

How do people's everyday lives affect Earth's systems?

What can people do to protect Earth's systems?

Unit 2 Learning Targets ***Students will be able to…***	**Unit 2 Learning Targets** ***Students will do…***
• develop a model to describe a phenomenon that includes the movement of matter within an ecosystem	• read for content mastery

• describe the relationships in the system between organisms that consume other organisms • describe the relationship between organisms and the exchange of matter from and back into the environment • use their models to describe the cycling of matter in the system, how interactions in the system allow multiple species to meet their needs, how newly introduced species can affect the balance of interactions in a system, and how changing an aspect of the ecosystem will affect other aspects of the ecosystem • develop a model, using a specific given example of a phenomenon, to describe ways that the geosphere, biosphere, hydrosphere, and/or atmosphere interact • identify and describe relationships within and between the parts of the Earth systems identified in the model that are relevant to the example • use their model to describe a variety of ways in which the parts of two major Earth systems in the specific given example interact to affect the Earth's surface materials and processes in that context	• develop and use content related vocabulary • analyze and interpret data to determine similarities and differences in findings • cite specific textual evidence to support analysis of science and technical texts • complete a variety of laboratory activities to support the content • write informative/explanatory texts to examine a topic and convey ideas, concepts, and information through the selection, organization, and analysis of relevant content • view various content related videos

• graph and analyze the given data about the amount of salt water and the amount of fresh water in various reservoirs • obtain information from books and other reliable media about human and community activities regarding their effects on the Earth's resources and environments • combine information from two or more sources to provide and describe evidence about positive and negative effects on the environment as a result of human activities; and how communities can protect a natural resource and the environment in which the resource is found	

Unit 2 Evidence of Learning
Formative Assessments: • Bring Science Alive! Grade 5 - teacher created quizzes • Exit tickets • Lab work • Reading Challenges • Interactive Student notebook • Homework • BrainPOP quizzes • Participation
Summative Assessments: • Bring Science Alive! Grade 5 - Chapter tests • Lab work • Create an *act-it-out* to model how Earth's systems interact to cause a change in Earth's surface - (textbook)

Unit 2 Lab Activities:

- Bring Science Alive! - Grade 5

➔ build a clay model of Earth showing each of it systems
➔ model the effects the mining industry has on the geosphere
➔ act as engineers to design and build a water filter/research

- Gizmos labs: Rock Cycle, Water Cycle, Greenhouse Effect, Coastal Winds & Clouds, Hurricane Motion, Water Pollution

Unit 2 Materials/Equipment:

Required Lab Materials:

bags (plastic sandwich size, beads, clay (modeling), cotton balls, Earth Model (inflatable), plates (paper), sand, cups (paper), forks (plastic), knives (plastic), spoons(plastic), paper clips(large), toothpicks, beakers(250mL), bins (plastic), filters (coffee), gravel, sand gravel, soil gravel, sponges, safety glasses, colored pencils, chocolate chip cookies, paper towels, small rocks, water bottles with plastic caps,

Materials/Equipment/Resources:

Gizmos subscription, Quizlet subscription, BrainPOP subscription, Teachers Domain video clips, Mr. Parr's science songs, TCI Bringing Science Alive Grade 5 series, Smart Board, student laptops

Unit 3 Overview
Unit Title: Changes in Matter
Grade Level: 5
Recommended Pacing: 3 months – block scheduling
Unit Summary: Look around you. Perhaps you are sitting on a plastic chair in front of a wooden desk. You may have pencils and paper in front of you, or even a book. All of this is made of matter. Matter is all around you. The ground you walk on, the water you drink, and the air you breathe are all matter. In this unit you will read about what matter is made of. You will learn how different materials can be identified, and how different materials can change to become new materials. Look around you. Perhaps you are sitting on a plastic chair in front of a wooden desk. You may have pencils and paper in front of you, or even a book. All of this is made of matter. Matter is all around you. The ground you walk on, the water you drink, and the air you breathe are all matter. In this unit you will read about what matter is made of. You will learn how different materials can be identified, and how different materials can change to become new materials.

NGSS:

5-ESS2-1. Develop a model using an example to describe ways the geosphere, biosphere, hydrosphere, and/or atmosphere interact.

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

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

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

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

5-LS2-1. Develop a model to describe the movement of matter among plants, animals, decomposers, and the environment.

3-5-ETS1-1. Define a simple design problem reflecting a need or a want that includes specified criteria for success and constraints on materials, time, or cost.

3-5-ETS1-2. Generate and compare multiple possible solutions to a problem based on how well each is likely to meet the criteria and constraints of the problem.

3-5-ETS1-3. Plan and carry out fair tests in which variables are controlled and failure points are considered to identify aspects of a model or prototype that can be improved.

Unit 3 ISTE Standards:

1. a-d Creativity and Innovation- Students demonstrate creative thinking, construct knowledge, and develop innovative products and processes through technology.

2. a-d Communication and Collaboration- Students use digital media and environments to communicate and work collaboratively, including at a distance, to support individual learning and contribute to the learning of others.

3. a-d Research and Information Fluency- Students apply digital tools to gather, evaluate, and use information.

4. a-d Critical Thinking, Problem Solving, and Decision Making- Students use critical thinking skills to plan and conduct research, manage projects, solve problems, and make informed decisions using appropriate digital tools and resources.

Unit 3 Essential Questions:

What is matter made of?

Why are materials different?

How can substances be identified?

How do scientists know when substances change?

What causes substances to change?

How do changes to substances affect their weights?

How do engineers improve materials?

Unit 3 Learning Targets ***Students will be able to…***	**Unit 3 Learning Targets** ***Students will do…***
• develop a model to describe a phenomenon that includes the idea that matter is made of particles too small to be seen. In the model, students identify the relevant	• read for content mastery

components for the phenomenon, including: bulk matter and particles of matter that are too small to be seen • use the model to identify and describe relevant relationships between those components • use the model to describe how matter composed of tiny particles too small to be seen can account for observable phenomena (e.g., air inflating a basketball, ice melting into water) • measure and graph the given quantities using standard units, including: the weight of substances before they are heated, cooled, or mixed and the weight of substances, including any new substances produced by a reaction, after they are heated, cooled, or mixed • measure and/or calculate the difference between the total weight of the substances (using standard units) before and after they are heated, cooled, and/or mixed • describe the changes in properties observed during and/or after heating, cooling, or mixing substances • use measurements and calculations to describe that the total weights of the substances did not change, regardless	• develop and use content related vocabulary • cite specific textual evidence to support analysis of science and technical texts • complete a variety of laboratory activities to support the content • write informative/explanatory texts to examine a topic and convey ideas, concepts, and information through the selection, organization, and analysis of relevant content • view various content related videos

of the reaction or changes in properties that were observed • use measurements and descriptions of weight, as well as the assumption of consistent patterns in natural systems, to describe evidence to address scientific questions about the conservation of the amount of matter • from the given investigation plan, students identify the phenomenon under investigation, and identify the purpose of the investigation, which includes collecting data to serve as the basis for evidence • from the given investigation plan, students describe the evidence from data that will be collected, including: properties of materials that can be used to identify those materials and describe how the observations and measurements will provide the data necessary to address the purpose of the investigation • from the given investigation plan, students describe how the data will be collected • collect and record data according to the given investigation plan	

• develop a model to identify the relevant components, including: matter. plants. animals. and decomposers, such as fungi and bacteria • describe the relationships in the system between organisms that consume other organisms, including: 1. animals that consume other animals, 2. animals that consume plants, 3. organisms that consume dead plants and animals, and 4.the movement of matter between organisms during consumption • make connections to describe: i. The cycling of matter in the system between plants, animals, decomposers, and the environment. ii. How interactions in the system of plants, animals, decomposers, and the environment allow multiple species to meet their needs: that newly introduced species can affect the balance of interactions in a system, changing an aspect of the ecosystem will affect other aspects of the ecosystem • develop a model to describe ways that the geosphere, biosphere, hydrosphere, and/or atmosphere interact • identify the relevant components of their example, including features of two of the following systems that are	

relevant for the given example: geosphere, hydrosphere, atmosphere, and biosphere • identify and describe relationships (interactions) within and between the parts of the Earth systems identified in the model that are relevant to the example	

Unit 3 Evidence of Learning
Formative Assessments: • Bring Science Alive! Grade 5 - teacher created quizzes • Exit tickets • Student Interactive notebook • Reading Challenges • Lab work • Homework • BrainPOP quizzes • Participation
Summative Assessments: • Bring Science Alive! Grade 5 - Chapter tests • Lab work

Lab Activities:

- Bring Science Alive! - Grade 5

➔ After observing and explaining a series of demonstrations, students will develop a model that describes matter as consisting of particles that are too small to be seen
➔ Model a solid, liquid, gas, and mixture
➔ Plan and carry out an investigation and mix together a variety of different substances; use their plan to identify which substances react together to form new substances
➔ Measure and graph the weight of substances before and after a change to discover what happens to the weight of substances during different kinds of changes
➔ Make glue from flour and water; use the engineering design process to identify what makes "good" glue

- Gizmos Labs: Phase Changes, Phases of Water, Solubility and Temperature, Density, Mineral ID, Mystery Powder Analysis,

Unit 3 Materials/Equipment:
Required Lab Materials: balloons, balsa wood, bowls (paper), rulers, salt, spoons(plastic), yarn, baking powder, baking soda, beakers(250 mL), plastic bins, plastic medicine cups, droppers, flour, graduated cylinders(100 mL), hand lenses, iodine solution, plastic jars with lids, talc powder, vinegar, sandwich size plastic bags, calcium chloride, antacid tablets, balance, craft sticks, washers, safety glasses, white and blue construction paper, masking tape, paper towels, clear tape, whipping cream
Materials/Equipment/Resources: Gizmos subscription, Quizlet subscription, Brainpop subscription, Teachers Domain video clips, Mr. Parr's science songs, TCI Bring Science Alive - Grade 5, Smart Board, student laptops

Unit 4 Overview	
Unit Title: **Earth, the Moon, and the Stars**	
Grade Level: **5**	
Recommended Pacing: 2 months – block scheduling	
Unit 4 Summary: It is a clear summer night. You gaze at the shining stars. You see the Big Dipper and even Orion's belt. You wonder, what are the other star patterns in the night sky? Later, you go back outside to show your parents the Big Dipper. But it has moved! If you watched the stars throughout the night, they and the moon would all appear to move. In this unit, you will discover how the moon and stars change and move in patterns. These patterns can be explained. And you will read about the tools scientists use to discover these objects.	
Unit 4 NGSS: 5-PS2-1. Support an argument that the gravitational force exerted by Earth on objects is directed down. 5-ESS1-1. Support an argument that the apparent brightness of the sun and stars is due to their relative distances from the Earth. 5.ESS1-2. Represent data in graphical displays to reveal patterns of daily changes in length and direction of shadows, day and night, and the seasonal appearance of some stars in the night sky. 3-5-ETS1-1. Define a simple design problem reflecting a need or a want that includes specified criteria for success and constraints on materials, time, or cost.	

3-5-ETS1-2. Generate and compare multiple possible solutions to a problem based on how well each is likely to meet the criteria and constraints of the problem. 3-5-ETS1-3. Plan and carry out fair tests in which variables are controlled and failure points are considered to identify aspects of a model or prototype that can be improved.	
Unit 4 ISTE Standards: 1 .a-d Creativity and Innovation- Students demonstrate creative thinking, construct knowledge, and develop innovative products and processes through technology. 2. a-d Communication and Collaboration- Students use digital media and environments to communicate and work collaboratively, including at a distance, to support individual learning and contribute to the learning of others. 3. a-d Research and Information Fluency- Students apply digital tools to gather, evaluate, and use information. 4. a-d Critical Thinking, Problem Solving, and Decision Making- Students use critical thinking skills to plan and conduct research, manage projects, solve problems, and make informed decisions using appropriate digital tools and resources.	

Unit 4 Essential Questions:

What does gravity do?

Why is the sun brighter than other stars?

Why is there day and night?

How do shadows change during the day and year?

How does the moon seem to move and change shape?

What tools do scientists use to observe space?

Unit 4 Learning Targets ***Students will be able to…***	**Unit 4 Learning Targets** ***Students will do…***
• identify a claim that includes the idea that the gravitational force exerted by Earth on objects is directed down toward the center of Earth • identify and describe the given evidence, data, and/or models that support the claim that indicate the Earth's	• read for content mastery • develop and use content related vocabulary

shape is spherical, that objects dropped appear to fall straight down, and that people live all around the spherical Earth, and they observe that objects appear to fall straight down • evaluate the evidence to determine whether it is sufficient and relevant to supporting the claim and determine whether any additional evidence is needed • use reasoning to connect the relevant and appropriate evidence to support the claim with argumentation • identify and support a claim that includes the idea that the apparent brightness of the sun and stars is due to their relative distances from Earth • describe the evidence, data, and/or models that support the claim, including: the sun and other stars are natural bodies in the sky that give off their own light, the apparent brightness of a variety of stars, including the sun, a luminous object close to a person appears much brighter and larger than a similar object that is very far away from a person, and the relative distance of the sun and stars from Earth • use reasoning to connect the relevant and appropriate evidence to support the claim with argumentation	• cite specific textual evidence to support analysis of science and technical texts • complete a variety of laboratory activities to support the content • write informative/explanatory texts to examine a topic and convey ideas, concepts, and information through the selection, organization, and analysis of relevant content • view various content related videos

• identify and support a claim that includes the idea that the apparent brightness of the sun and stars is due to their relative distances from Earth • use graphical displays to organize data pertaining to daily and seasonal changes caused by the Earth's rotation and orbit around the sun • use the organized data to find and describe relationships within the datasets, including: the apparent motion of the sun from east to west results in patterns of changes in length and directions of shadows throughout a day as Earth rotates on its axis; the length of the day gradually changes throughout the year as Earth orbits the sun, with longer days in the summer and shorter days in the winter; some stars and/or groups of stars can be seen in the sky all year, while others appear only at certain times of the year • use the organized data to find and describe relationships among the datasets, including: similarities and differences in the timing of observable changes in shadows, daylight, and the appearance of stars show that events occur at different rates	

Unit 4 Evidence of Learning
Formative Assessments: • Bringing Science Alive series - teacher created quizzes • Exit tickets • Reading Challenges • Student Interactive notebook • Lab work • Homework • BrainPOP quizzes • Participation

Unit 4 Summative Assessments:

- Bringing Science Alive series - Chapter tests
- Lab work
- PBL -after observing a model to see how Earth's rotation causes shadows to change length and direction, students will build and use a sundial
- Design and build a telescope to practice the engineering design process

Unit 4 Materials/Equipment:

Required Lab Materials:

inflatable model of the Earth, flashlights with size D batteries, light bulb, light socket, paper bowls, chalk, large paper clips, lenses (double concave, 10cm focal length), lenses (double convex, 15 cm focal length), cardboard tubes, stickers, sticky notes, clear tape, markers, pencils, yellow poster board, colored pencils, masking tape, construction paper, safety glasses

Materials/Equipment/Resources:

Gizmos subscription, Quizlet subscription, BrainPOP subscription, Teachers Domain video clips, Mr. Parr's science songs, TCI Bringing Science Alive! Grade 5 series, Smart Board, student laptops