

Quinton Township School District
Science
Grade 5

Pacing Chart/Curriculum MAP

Key: Technology Careers Interdisciplinary Studies

Marking Period:	One & Two	Unit Title:	Physical Science	Pacing:	60 days
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Unit Summary: In this unit students will recognize that matter of any type can be subdivided into particles that are too small to see, but even then the matter still exists and can be detected by other means. A model showing that gases are made from matter particles that are too small to see and are moving freely around in space can explain many observations, including the inflation and shape of a balloon and the effects of air on larger particles or objects. (5-PS1-1)

The amount (weight) of matter is conserved when it changes form, even in transitions in which it seems to vanish. (5-PS1-2)

Measurements of a variety of properties can be used to identify materials. (Boundary: At this grade level, mass and weight are not distinguished, and no attempt is made to define the unseen particles or explain the atomic-scale mechanism of evaporation and condensation.) (5-PS1-3)

PS1.B: Chemical Reactions- When two or more different substances are mixed, a new substance with different properties may be formed. (5-PS1-4) No matter what reaction or change in properties occurs, the total weight of the substances does not change. (Boundary: Mass and weight are not distinguished at this grade level.) (5-PS1-2) Science and Engineering Practices Developing and Using Models Modeling in 3–5 builds on K–2 experiences and progresses to building and revising simple models and using models to represent events and design solutions.

Objectives:

- Define matter as having mass and taking up space.
- Describe matter as consisting of particles.
- Compare and contrast the properties of solids, liquids, and gases.

- Infer that a solution contains particles too small to see.
- Develop a model to describe that matter is made of particles too small to be seen.
- Construct and test a model.
- Evaluate the validity of a model.
- Use a model to successfully communicate a concept.
- Identify seven physical properties of matter.
- Describe hardness.
- Order the degrees of hardness of various materials.
- Determine the hardness order of minerals by performing scratch tests.
- Describe magnetism.
- Identify substances that are attracted to a magnet.
- Explain how the property of magnetism can be tested.
- Classify matter based on its ability to conduct or insulate electrical energy
- Identify materials that conduct and do not conduct electricity.
- Classify matter based on its ability to conduct or insulate thermal energy
- Determine the solubility in water of various materials
- Define the boiling and melting points of matter.
- Identify the boiling and melting points of water.
- Describe how boiling affects the state of water.
- Define condensation.
- Describe how the cooling of water can change its state.
- Determine whether matter is conserved during a change in state.
- Describe changes in the physical properties of matter that occur during changes in state.
- Determine whether matter is conserved when one material is mixed with another material.
- Find evidence that supports the Law of Conservation of Matter.
- Plan and conduct an investigation.
- Organize, analyze, and interpret data.
- Express a scientific generalization.
- Define and describe a chemical change.

- Compare and contrast chemical changes and physical changes.
- Distinguish between a chemical change and a chemical reaction.
- Identify the signs of a chemical change
- Demonstrate that matter is conserved though changed during a chemical reaction.
- Distinguish materials based on an analysis of their physical and chemical properties
- Identify the goal of research scientist Albert Yu-Min Lin and the tools he employs to reach that goal.

Essential Questions: What is matter?

What are and how can you identify the three physical states of matter?

How do your results provide evidence that matter is made of particles too small to see?

What are six physical properties that can be used to identify matter?

How can the property of hardness be tested?

How does boiling affect water's state of matter?

What is condensation?

Which properties of water stay the same after cooling and which properties change?

How can your findings demonstrate the conservation of matter?

How did the mass of the materials before the baking soda and water were mixed compared to the mass of the materials after they were mixed?

What is a chemical reaction?

How is a chemical change different from a physical change and how is it the same

Common Core State Standards/Learning Targets: 5-PS1-1., 5-PS1-2. , 5-PS1-3. , 5-PS1-4. , PS1.A: PS1.B:

Other standards covered: 8.1, 9.2,

English Language Arts:

- Draw on information from multiple print or digital sources, demonstrating the ability to locate an answer to a question quickly or

to solve a problem efficiently. (5-PS1-1) **RI.5.7**

- Conduct short research projects that use several sources to build knowledge through investigation of different aspects of a topic. (5-PS1-3) **W.5.7**
- Recall relevant information from experiences or gather relevant information from print and digital sources; summarize or paraphrase information in notes and finished work, and provide a list of sources. (5-PS1-3) **W.5.8**
- Draw evidence from literary or informational texts to support analysis, reflection, and research. (5-PS1-3) **W.5.9**

Mathematics:

- Reason abstractly and quantitatively. (5-PS1-1) (5-PS1-3) **MP.2**
- Model with mathematics. (5-PS1-1) **MP.4**
- Use appropriate tools strategically. (5-PS1-3) **MP.5**
- Explain patterns in the number of zeros of the product when multiplying a number by powers of 10, and explain patterns in the placement of the decimal point when a decimal is multiplied or divided by a power of 10. Use whole-number exponents to denote powers of 10. (5-PS1-1) **5.NBT.A.1**
- Apply and extend previous understandings of division to divide unit fractions by whole numbers and whole numbers by unit fractions. (5-PS1-1) **5.NF.B.7**
- Recognize volume as an attribute of solid figures and understand concepts of volume measurement. (5-PS1-1) **5.MD.C.3**
- Measure volumes by counting unit cubes, using cubic cm, cubic in, cubic ft., and improvised units. (5-PS1-1) **5.MD.C.4**

Overview of Activities	Teacher's Guide/ Resources	Core Instructional Materials	Technology Infusion
Lesson 1- Matter Lesson 2- States of Matter- Science in a Snap Lesson 3- Investigate Matter Lesson 4- Think Like a Scientist: Develop a Model	myngconnect.com Teacher Edition myngconnect.com Teacher Resources	balloons string safety goggles salt plastic cup (approx. 9 oz.	<ul style="list-style-type: none"> ● Smart Board Applications ● Google Applications ● My NG Connect

<p>Lesson 5- Properties of Matter Lesson 6- Hardness: Science in a Snap Lesson 7- Investigate Hardness Lesson 8- Magnetism Science in a Snap Lesson 9- Electrical Conductivity Lesson 10- Investigate Electrical Conductivity Lesson 11- Thermal Conductivity Science in a Snap Lesson 12- Investigate Solubility Lesson 13- Heating Lesson 14- Cooling Lesson 15- Investigate: Changing States of Water Lesson 16- Investigate: Mixtures Lesson 17- Think Like a Scientist: Provide Evidence Lesson 18- Chemical Changes Lesson 19- Signs of a Chemical Change Lesson 20- Investigate Chemical Reactions Lesson 21- Think Like a Scientist: Identify Materials Lesson 22- Science Career: Research Scientist</p>		<p>size); water, plastic teaspoon (measuring spoon preferred); dropper; black construction paper; hand lens 2- and 3-dimensional materials from which students can choose, including: paper, poster board, foam, foil, clay, snap blocks, chenille stems, craft sticks, and any other selection of objects that can be repurposed for modeling plastic spoon, aluminum washer, copper penny, steel paper clip, rubber band, orange crayon</p>	<ul style="list-style-type: none"> ● Legends of Learning ● Personal Computers
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Formative Assessment Plan	Summative Assessment Plan
<p>Suggested activities to assess student progress: Exit tickets, Journal responses</p>	<p>Final Assessment/Benchmark: End of Unit Assessment Develop a model to describe phenomena. Develop a model to describe that matter is made of particles too small to be seen. (Assessment does not include the atomic-scale mechanism of evaporation and condensation or defining the unseen particles.) Examples of evidence could include: Adding air to expand a basketball Compressing air in a syringe Dissolving sugar in water Evaporating salt water Measure, describe, and record physical quantities such as weight, time, temperature, and volume. Make observations and record measurements to produce data that can serve as the basis for evidence for an explanation of a phenomenon. Make observations and record measurements to identify materials based on their properties.</p>

	<p>Examples of materials to be identified could include:</p> <p>Baking soda and other powders</p> <p>Metals</p> <p>Minerals</p> <p>Liquids</p> <p>Examples of properties could include:</p> <p>Color</p> <p>Hardness</p> <p>Reflectivity</p> <p>Electrical conductivity</p> <p>Thermal conductivity</p> <p>Response to magnetic forces</p> <p>Solubility</p>
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Differentiation

Special Education	ELL	At Risk	Gifted and Talented
<ul style="list-style-type: none"> • RTI • Modify and accommodate as listed in student's IEP or 504 plan • Utilize effective amount of wait time 	<ul style="list-style-type: none"> • RTI • Speech/Language Therapy • Rosetta Stone • Hold high expectations • Provide English/Spanish Dictionary for use 	<ul style="list-style-type: none"> • RTI Tiered Interventions following RTI framework • Support instruction with RTI intervention resources • Provide after school 	<ul style="list-style-type: none"> • Organize the curriculum to include more elaborate, complex, and in-depth study of major ideas and problems through Compacting. • Allow for the

<ul style="list-style-type: none"> ● Hold high expectations ● Communicate directions clearly and concisely and repeat, reword, modify as necessary. ● Utilize open-ended questioning techniques ● Utilize scaffolding to support instruction. ● Chunk tasks into smaller components ● Provide step by step instructions ● Model and use visuals as often as possible ● Utilize extended time and/or reduce amount of items given for homework, quizzes, and tests. ● Teach Tiers 1,2, and 3 words to assist students' understanding of instructional texts. ● Utilize a variety of formative assessments to drive next point of instruction/differentiated instructional practices. ● Create rubrics/allow students to assist with task, so that all are 	<ul style="list-style-type: none"> ● Place with Spanish speaking teacher/paraprofessional as available ● Learn/Utilize/Display some words in the students' native language ● Invite student to after school tutoring sessions ● Basic Skills Instruction ● Utilize formative assessments to drive instruction ● Translate printed communications for parents in native language ● Hold conferences with translator present ● Utilize additional NJDOE resources/recommendations ● Review Special Education listing for additional recommendations ● Establish a consistent and daily routine 	<p>tutoring services</p> <ul style="list-style-type: none"> ● Basic Skills Instruction ● Hold high expectations ● Utilize Go Math! RTI strategies ● Fountas and Pinnell Phonics ● Hold parent conferences fall and spring ● Make modifications to instructional plans based on I and RS Plan. ● Develop a record system to encourage good behavior and completion of work. ● Establish a consistent and daily routine. 	<p>development and application of productive thinking skills to enable students to re-conceptualize existing knowledge and/or generate new knowledge.</p> <ul style="list-style-type: none"> ● Enable students to explore continually changing knowledge and information and develop the attitude that knowledge is worth pursuing in an open world. ● Encourage exposure to, selection and use of appropriate and specialized resources. ● Promote self-initiated and self-directed learning and growth. ● Provide for the development of self-understanding of one's relationships with people, societal institutions, nature and culture. ● Student led lessons
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<p>aware of expectations.</p> <ul style="list-style-type: none">• Create modified assessments.• Allow students to utilize online books, when available, to listen to oral recorded reading.• Provide individualized assistance as necessary.• Allow for group work (strategically selected) and collaboration as necessary.• Utilize homework recorder within SIS.• Allow for copies of notes to be shared out.• Utilize assistive technology as appropriate.• Provide meaningful feedback and utilize teachable moments.• Utilize graphic organizers• Introduce/review study skills• Provide reading material at or slightly above students' reading levels.• Utilize manipulatives as necessary.			
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<ul style="list-style-type: none">• Utilize auditory reminders as deemed necessary.• Provide breaks to allow for refocusing as necessary.• Establish a consistent and daily routine.			
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Science
Grade 5

Pacing Chart/Curriculum MAP

Key: **Technology** **Careers** **Interdisciplinary Studies**

Marking Period:	Two & Three	Unit Title:	Life Science	Pacing:	60 Days
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Unit Summary: In this unit students will recognize that the energy released [from] food was once energy from the sun that was captured by plants in the chemical process that forms plant matter (from air and water). (5-PS3-1)

LS1.C: Organization for Matter and Energy Flow in Organisms

Food provides animals with the materials they need for body repair and growth and the energy they need to maintain body warmth and for motion. (*secondary to 5-PS3-1*)

Plants acquire their material for growth chiefly from air and water. (5-LS1-1)

LS2.A: Interdependent Relationships in Ecosystems

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. A healthy ecosystem is one in which multiple species of different types are each able to meet their needs in a relatively stable web of life. Newly introduced species can damage the balance of an ecosystem. (5-LS2-1)

LS2.B: Cycles of Matter and Energy Transfer in Ecosystems

Matter cycles between the air and soil and among plants, animals, and microbes as these organisms live and die. Organisms obtain gases, and water, from the environment, and release waste matter (gas, liquid, or solid) back into the environment.

Objectives:

- List the three main things that plants need to live and grow.

- Identify the source of the energy that plants use to make the food they need to survive.
- Explain that the energy that plants use to live and grow was once energy from the sun.
- Describe the process of photosynthesis.
- Explain that plants get the materials they need for growth chiefly from air and water.
- Identify some of the conditions that make it difficult to grow enough food for all the people on Earth.
- Describe hydroponics and explain how its use can help increase the supply of food for humans.
- Conduct an investigation to determine if plants can grow without soil.
- Use evidence to support the argument that plants get the materials they need for growth chiefly from air and water.
- Explain that food provides animals with the materials they need for growth and body repair, and the energy they need for motion and to maintain body warmth.
- Use a food chain to describe the flow of energy from the sun through the plants and animals in an ecosystem.
- Use food chains to compare the pathway of energy from the sun through the organisms in two different environments.
- Use a model to describe that energy in animals' food was once energy from the sun.
- Describe the flow of energy from the sun through the organisms in a food web.
- Describe the role of decomposers in food webs and in cycles of matter.
- Describe how matter cycles through an ecosystem and among the plants, animals, and microbes that live and die in the environment.
- Explain that organisms can survive only in environments in which their particular needs are met.
- Describe the levels of organisms that make up an ecosystem
- Observe the way organisms live and survive in their ecosystem by interacting with other organisms and nonliving elements
- Describe the flow of energy derived from the sun through an ecosystem.
- Develop a model to describe the movement of matter among plants, animals, decomposers, and the environment.
- Describe how newly introduced species can damage the balance of an ecosystem.
- Describe how a newly introduced species is damaging the balance of an ecosystem
- Explain how scientists are using another species to control the population of an invasive species.
- Describe how a conservationist studies the natural world and works with other people to save natural resources

Essential Questions: What are the three main things that plants need to survive?

What source of energy do plants use to make food?

What happens during the process of photosynthesis?

What substance allows plants to capture the sun's energy?

What two materials are used in photosynthesis? Where does each of them come from?

Where does most of the material in a plant come from?

Where do plants get mineral nutrients?

What is hydroponics?

Can plants grow without soil?

Where do animals get the materials they need to grow larger?

What are some ways that animals use the energy in food?

What is a food chain?

How do producers and consumers each obtain the energy they need to live and grow?

What is the original source of energy for food chains?

How are the producers and consumers in the pond like those in the rainforest? How are they different?

How does energy flow through a food chain?

How is a food web different from a food chain?

What are two kinds of decomposers?

How do decomposers get energy in the nitrogen cycle?

Why is the carbon dioxide-oxygen cycle important to plants and animals?

What is an ecosystem?

How do the physical characteristics of an environment help support the organisms that live there?

What are the three levels of organisms that make up an ecosystem?

How is a population different from a community?

What is an invasive species?

What is a conservationist?

Common Core State Standards/Learning Targets: 5-PS3-1, 5-LS1-1, 5-LS2-1, PS3.D, LS1.C, LS2.A, LS2.B

Other Standards Covered: 8.1, 9.2

English Language Arts: Quote accurately from a text when explaining what the text says explicitly and when drawing inferences from the text. (5-LS1-1) **RI.5.1**

Draw on information from multiple print or digital sources, demonstrating the ability to locate an answer to a question quickly or to solve a problem efficiently. (5-LS2-1), (5-PS3-1) **RI.5.7**

Integrate information from several texts on the same topic in order to write or speak about the subject knowledgeably. (5-LS1-1) **RI.5.9** Write opinion pieces on topics or texts, supporting a point of view with reasons and information. (5-LS1-1) **W.5.1**

Include multimedia components (e.g., graphics, sound) and visual displays in presentations when appropriate to enhance the development of main ideas or themes. (5-LS2-1), (5-PS3-1) **SL.5.5**

Mathematics: Reason abstractly and quantitatively. (5-LS1-1), (5-LS2-1) **MP.2**

Model with mathematics. (5-LS1-1), (5-LS2-1) **MP.4**

Use appropriate tools strategically. (5-LS1-1) **MP.5**

Convert among different-sized standard measurement units within a given measurement system (e.g., convert 5 cm to 0.05 m), and use these conversions in solving multi-step, real world problems. (5-LS1-1) **5.MD.A.1**

Overview of Activities	Teacher's Guide/ Resources	Core Instructional Materials	Technology Infusion
Lesson 1- What Plants Need Lesson 2- How Plants Get Energy Lesson 3- Materials for Plant Growth Lesson 4- Think Like an Engineer- Case Study: Growing Crops Lesson 5- Investigate: Hydroponics Lesson 6- Think Like a Scientist: Support an Argument Lesson 7- Why Animals Need Food	myngconnect.com Teacher Edition myngconnect.com Teacher Resources	clear plastic container (about 8 oz.) and lid with a hole in the center; young plant pitcher of water cotton balls (3) liquid houseplant fertilizer (5 drops)	<ul style="list-style-type: none"> ● Google Applications ● My NG Connect ● Legends of Learning ● Personal Computers ● SmartBoard

<p>Lesson 8- Desert Food Chain Lesson 9- Think Like a Scientist: Compare and Contrast Lesson 10- Think Like a Scientist: Use Models Lesson 11- Desert Food Web Lesson 12- Decomposers Lesson 13- Cycles of Matter Lesson 14- Tallgrass Prairie Ecosystem Lesson 15- Grassland Populations and Communities Lesson 16- Investigate: Interactions in a Model Pond Lesson 17- Think Like a Scientist: Develop a Model Lesson 18- Plants Invade Lesson 19- Think Like a Scientist: Case Study- Animals Invade Lesson 20- Science Career- Conservationist</p>		<p>clear plastic bottle sand small rocks in plastic cup elodea water pitcher plastic spoon 3 snails in plastic cup hand lens <i>For teacher use:</i> sharp scissor masking tape</p>	<p>Applications</p>
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Formative Assessment Plan	Summative Assessment Plan
Suggested activities to assess student progress:	Final Assessment/Benchmark: End of Unit Assessment

<p>- Exit tickets Journal Responses</p>	<p>1.) Gather information and evidence to support a claim about the materials that plants need to live and grow. Most students will conclude that plants require carbon dioxide, water, and nutrients but do not require soil.</p> <p>2.) Use print and digital sources to gather information about a producer and at least two consumers in a food chain. Students will then prepare a model of the food chain and present it to the class.</p> <p>Suggested skills to be assessed: <i>1.) plants get the materials they need for growth chiefly from air and water</i> <i>2.) A food chain is the path by which energy flows from one living thing to another</i></p>
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Differentiation

Special Education	ELL	At Risk	Gifted and Talented
	<ul style="list-style-type: none"> • RTI 	<ul style="list-style-type: none"> • RTI Tiered 	

<ul style="list-style-type: none"> ● RTI ● Modify and accommodate as listed in student's IEP or 504 plan ● Utilize effective amount of wait time ● Hold high expectations ● Communicate directions clearly and concisely and repeat, reword, modify as necessary. ● Utilize open-ended questioning techniques ● Utilize scaffolding to support instruction. ● Chunk tasks into smaller components ● Provide step by step instructions ● Model and use visuals as often as 	<ul style="list-style-type: none"> ● Speech/Language Therapy ● Rosetta Stone ● Hold high expectations ● Provide English/Spanish Dictionary for use ● Place with Spanish speaking teacher/paraprofessional as available ● Learn/Utilize/Display some words in the students' native language ● Invite student to after school tutoring sessions ● Basic Skills Instruction ● Utilize formative assessments to drive instruction ● Translate printed communications for parents in native language ● Hold conferences 	<p>Interventions following RTI framework</p> <ul style="list-style-type: none"> ● Support instruction with RTI intervention resources ● Provide after school tutoring services ● Basic Skills Instruction ● Hold high expectations ● Utilize Go Math! RTI strategies ● Fountas and Pinnell Phonics ● Hold parent conferences fall and spring ● Make modifications to instructional plans based on I and RS Plan. ● Develop a record system to encourage good behavior and completion of work. 	<ul style="list-style-type: none"> ● Organize the curriculum to include more elaborate, complex, and in-depth study of major ideas and problems through Compacting. ● Allow for the development and application of productive thinking skills to enable students to re-conceptualize existing knowledge and/or generate new knowledge. ● Enable students to explore continually changing knowledge and information and develop the attitude that knowledge is worth pursuing in an open world. ● Encourage exposure to,
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<p>possible</p> <ul style="list-style-type: none"> ● Utilize extended time and/or reduce amount of items given for homework, quizzes, and tests. ● Teach Tiers 1,2, and 3 words to assist students' understanding of instructional texts. ● Utilize a variety of formative assessments to drive next point of instruction/differentiated instructional practices. ● Create rubrics/allow students to assist with task, so that all are aware of expectations. ● Create modified assessments. ● Allow students to utilize online 	<p>with translator present</p> <ul style="list-style-type: none"> ● Utilize additional NJDOE resources/recommendations ● Review Special Education listing for additional recommendations ● Establish a consistent and daily routine 	<ul style="list-style-type: none"> ● Establish a consistent and daily routine. 	<p>selection and use of appropriate and specialized resources.</p> <ul style="list-style-type: none"> ● Promote self-initiated and self-directed learning and growth. ● Provide for the development of self-understanding of one's relationships with people, societal institutions, nature and culture. ● Continue to offer Accelerated Mathematics 7 (7th grade) and Algebra 1 (8th grade).
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<p>books, when available, to listen to oral recorded reading.</p> <ul style="list-style-type: none">● Provide individualized assistance as necessary.● Allow for group work (strategically selected) and collaboration as necessary.● Utilize homework recorder within SIS.● Allow for copies of notes to be shared out.● Utilize assistive technology as appropriate.● Provide meaningful feedback and utilize teachable moments.● Utilize graphic organizers● Introduce/review study skills			
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| <ul style="list-style-type: none">● Provide reading material at or slightly above students' reading levels.● Utilize manipulatives as necessary.● Establish a consistent and daily routine | | | |
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**Quinton Township School District
Science
Grade 5**

**Pacing Chart/Curriculum MAP
Studies**

Key: Technology Careers Interdisciplinary

Marking Period:	Three & Four	Unit Title:	Earth Science	Pacing:	60 Days
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Unit Summary: In this unit, students will 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 freshwater in various reservoirs to provide evidence about the distribution of water on Earth. 5-ESS3-1. Obtain and combine information about ways individual communities use science ideas to protect the Earth’s resources and environment.

ESS2.A: Students will identify earth materials and systems; earth’s major systems are the geosphere (solid and molten rock, soil, and sediments), the hydrosphere (water and ice), the atmosphere (air), and the biosphere (living things, including humans). Students will learn that these systems interact in multiple ways to affect Earth’s surface materials and processes. Students will recognize that the ocean supports a variety of ecosystems and organisms, shapes landforms, and influences climate. Students will recognize that winds and clouds in the atmosphere interact with the landforms to determine patterns of weather. (5-ESS2-1) Nearly all of Earth’s available water is in the ocean. Most freshwater is in glaciers or underground; only a tiny fraction is in streams, lakes, wetlands, and the atmosphere. (5-ESS2-2)

ESS3.C: Human Impacts on Earth Systems Human activities in agriculture, industry, and everyday life have had major effects on

the land, vegetation, streams, ocean, air, and even outer space. But individuals and communities are doing things to help protect Earth's resources and environments. (5-ESS3-1) Develop a model using an example to describe a scientific principle. (5-ESS2-1 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 differences in the apparent brightness of the sun compared to other stars is due to their relative distances from 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. The gravitational force of Earth acting on an object near Earth's surface pulls that object toward the planet's center. (5-PS2-1) ESS1.A: The Universe and its Stars The sun is a star that appears larger and brighter than other stars because it is closer. Stars range greatly in their distance from Earth. (5-ESS1-1) ESS1.B: Earth and the Solar System The orbits of Earth around the sun and of the moon around Earth, together with the rotation of Earth about an axis between its North and South poles, cause observable patterns. These include day and night; daily changes in the length and direction of shadows; and different positions of the sun, moon, and stars at different times of the day, month, and year. (5-ESS1-2)

Objectives: •Identify Earth's major systems.

- Recognize that these systems interact and affect Earth's materials and processes
- Describe the geosphere, one of Earth's major systems.
- Explain how the geosphere interacts with other Earth systems to affect Earth's surface materials and processes
- Describe the hydrosphere, one of Earth's major systems.
- Explain how the hydrosphere interacts with other systems to affect Earth's surface materials and processes
- Describe the atmosphere, one of Earth's major systems.
- Explain how the atmosphere interacts with other Earth systems to affect Earth's surface materials and processes
- Describe the biosphere, one of Earth's major systems.
- Explain how the biosphere interacts with other Earth systems to affect Earth's surface materials and processes.
- Describe how interactions of Earth's systems result in weather patterns known as monsoons.
- Model the interactions of Earth's major systems.
- Describe how the geosphere, atmosphere, hydrosphere, and biosphere interact.
- Describe the variety of ecosystems and organisms in the ocean.

- Describe how the ocean shapes the land.
- Explain the processes of erosion and deposition
- Describe how the ocean influences climate.
- Explain the difference between weather and climate
- Describe how winds and clouds in the atmosphere interact with landforms to determine patterns of weather
- Explain how processes in Earth's atmosphere interact with and change the shape of landforms.
- Work with a group to develop a model that describes an interaction between two of Earth's systems, or spheres.
- Explain the interactions demonstrated in their model.
- Recognize that nearly all of Earth's available water is in the ocean.
- Identify sources of freshwater on Earth: glaciers, underground, streams, lakes, wetlands, and the atmosphere.
- Graph the amounts and percentages of saltwater and freshwater on Earth.
- Identify air, plants, water, animals, coal, oil, and natural gas as natural resources.
- Classify air, plants, water, and animals as renewable resources, and coal, oil, and natural gas as nonrenewable resources.
- Identify ways in which human activities affect the land
- Identify ways in which human activities affect vegetation.
- Model the impact of human activity on various ecosystems
- Describe how acidic chemicals affect the growth of plants.
- Identify ways that human activities impact water sources on Earth
- Identify ways that human activities impact air in Earth's atmosphere.
- Describe ways that people are working together to clean up the air.
- Identify ways in which human activities impact space.
- Explain the importance of conserving Earth's resources and how recycling can help conserve resources.
- Identify the benefits of trees in an urban environment.
- Describe methods that engineers have developed for growing trees in crowded cities.
- Describe the difference between nonrenewable and renewable energy resources.
- Explain why it is important for humans to conserve energy resources.
- Describe alternative energy resources, such as solar, wind, and hydroelectric energy.
- Investigate how solar energy can be used to make water cleaner
- Work with a group to obtain information about ways individual communities use science ideas to protect Earth's resources

and environment.

- Combine information from their investigation to communicate their results to others
- Describe the gravitational force of Earth acting on an object near Earth
- Gather data to support an argument that the gravitational force exerted by Earth on objects is directed down.
- Describe how the Earth, sun, and moon move in space and as a system.
- Relate gravitational force to the motions of Earth, the sun, and the moon in space
- Recognize that the sun is a star that appears larger and brighter than other stars because it is the star closest to Earth.
- Understand that stars range greatly in their distance from Earth
- Investigate to show that the apparent brightness of a light-emitting object varies with distance from the observer.
- Use data from the investigation to support an argument that differences in the apparent brightness of the sun compared to other stars is due to their relative distances from the Earth.
- Explain that Earth rotates on its axis once every 24 hours to cause the day/night cycle.
- Demonstrate that Earth rotates on its axis once every 24 hours to cause the day/night cycle.
- Explain what causes the apparent motion of the sun across the sky.
- Demonstrate the different positions of the sun at different times of day.
- Demonstrate that the rotation of Earth about an axis causes observable changes in patterns of shadows over time.
- Collect and record information using tools, including a meter stick and a clock
- Recognize that the orbit of Earth around the sun causes observable patterns such as the sequence of seasons over time.
- Represent data in a graph to reveal patterns of seasonal changes in the length of day and night
- Describe how Earth's orbit around the sun causes observable patterns in the positions of the stars at different times of the year
- Represent data in a graphical display that reveals the patterns of change in the seasonal appearance of some stars in the night sky.
- Use the graphical display to describe patterns of stars.
- Describe the moon's motions, including rotation, orbiting of Earth, and apparent movement across the sky.
- Explain why moon phases occur.
- Describe the pattern of the moon's phases
- Collect and analyze data to identify sequences and predict patterns of change in the observable appearance of the moon over time.

- Collect information about the moon's phases by making detailed observations.
- Connect the concepts of astronomy with the career of an astrobiologist and science educator

Essential Questions: What are Earth's four major systems?
What are two events or processes that take place in the geosphere?
How can water in the hydrosphere change the geosphere?
What is groundwater?
What process moves water from Earth's surface to the atmosphere?
How does water in the atmosphere return to Earth's surface?
Which gas makes up the largest portion of the atmosphere?
How does wind affect landforms?
What makes up the biosphere?
How do land animals interact with the atmosphere?
How do elements of the biosphere and the hydrosphere interact?
What is a monsoon?
How are the winter and summer monsoons alike and different?
What are three ocean ecosystems?
Why is the ocean able to support many different kinds of ecosystems?
What is the difference between erosion and deposition?
What is climate?
Why do clouds form near the top of a mountain range?
What are two factors in the atmosphere that can change the shape of landforms?
What is groundwater?
What is the difference between renewable and nonrenewable resources?
How can mining minerals to use in industry affect the land?
What is deforestation?
How does agriculture affect the vegetation of grasslands?
What is runoff?

What are three ways that burning fuels affects the quality of the air?
What is space junk?
What is recycling?
What is a vertical forest?
How could a vertical forest improve air quality?
What are three renewable sources of energy?
How does a hydroelectric power plant produce electricity?
What is gravity?
What is a revolution?
What is a star?
Why does the sun seem to be brighter and larger than other stars in the sky?
How does Earth's rotation on its axis cause day and night?
How are real and apparent motions different?
Why do the sun, other stars, and the moon appear to change positions in the sky?
What patterns in length and movement did you observe with the shadows?
What causes seasons?
Why are most stars visible only at night?
Why do some constellations seem to change during the year?
What are the eight phases of the moon?
What does an astrobiologist do?
What question do astrobiologists seek to answer?

Common Core State Standards/Learning Targets: ESS2.A: Earth Materials and Systems Earth's major systems are the geosphere (solid and molten rock, soil, and sediments) the hydrosphere (water and ice), the atmosphere (air) and the biosphere (living things, including humans). These systems interact in multiple ways to affect Earth's surface materials and processes. (5-ESS2-1)
5-ESS2-1. Develop a model using an example to describe ways the geosphere, biosphere, hydrosphere, and/or atmosphere

interact. ESS2.C: The Roles of Water in Earth's Surface Processes Nearly all of Earth's available water is in the ocean. Most freshwater is in glaciers or underground; only a tiny fraction is in streams, lakes, wetlands, and the atmosphere. (5-ESS2-2) 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.

PS2.B: Types of Interactions The gravitational force of Earth acting on an object near Earth's surface pulls that object towards the planet's center. (5-PS2-1)

5-PS2-1. Support an argument that the gravitational force exerted by Earth on objects is directed down.

Other Standards Covered: [8.1](#), [9.2](#)

English Language Arts: Quote accurately from a text when explaining what the text says explicitly and when drawing inferences from the text. (5-ESS3-1) [RI.5.1](#)

Draw on information from multiple print or digital sources, demonstrating the ability to locate an answer to a question quickly or to solve a problem efficiently. (5-ESS2-1),(5-ESS3-1) [RI.5.7](#)

Recall relevant information from experiences or gather relevant information from print and digital sources; summarize or paraphrase information in notes and finished work, and provide a list of sources. (5-ESS3-1) [W.5.8](#)

Integrate information from several texts on the same topic in order to write or speak about the subject knowledgeably. (5-ESS3-1) [RI.5.9](#)

Draw evidence from literary or informational texts to support analysis, reflection, and research. (5-ESS3-1) [W.5.9](#)

Include multimedia components (e.g., graphics, sound) and visual displays in presentations when appropriate to enhance the development of main ideas or themes. (5-ESS2-2),(5-ESS2-1) [SL.5.5](#)

Mathematics: Reason abstractly and quantitatively. (5-ESS2-1),(5-ESS3-1) [MP.2](#)

Model with mathematics. (5-ESS2-1),(5-ESS3-1) [MP.4](#)

Represent real world and mathematical problems by graphing points in the first quadrant of the coordinate plane, and interpret coordinate values of points in the context of the situation. (5-ESS2-1) [5.G.A.2](#)

Overview of Activities	Teacher's Guide/ Resources	Core Instructional Materials	Technology Infusion
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<p>Lesson 1: Earth’s Major Systems Lesson 2: The Geosphere Lesson 3: The Hydrosphere Lesson 4: The Atmosphere Lesson 5: The Biosphere Lesson 6: Earth’s Systems Interact Lesson 7: Investigate: Interactions of Earth’s Systems Lesson 8: Ocean Ecosystems Lesson 9: The Ocean Shapes the Land Lesson 10: The Ocean Influences Climate Lesson 11: Landforms and Weather Patterns Lesson 12: The Atmosphere and Landforms Lesson 13: Think Like a Scientist: Develop a Model Lesson 14: Water on Earth Lesson 15: Investigate: Graphing Water Date Lesson 16: Earth’s Resources Lesson 17: Humans Impact the Land Lesson 18: Humans Impact Vegetation Lesson 19: Investigate: Plants and Pollution Lesson 20: Humans Impact Water Lesson 21: Humans Impact Air Lesson 22: Humans Impact Space</p>	<p>myngconnect.com Teacher Edition myngconnect.com Teacher Resources</p>	<p>clear 2-L plastic bottle with top cut off; gravel (enough to fill the bottom of the bottle to a depth of about 2.5 cm); potting soil (about 500 mL to fill bottom half of bottle); plastic spoon; small plants; water; masking tape</p> <p>For Models- poster board; colored markers, pencils, or crayons; modeling clay; construction paper; craft sticks; aluminum foil; rulers; tape; glue; heavy cardboard (for model bases); plastic shoe boxes; soil;</p>	<ul style="list-style-type: none"> ● Smart Board Applications ● Google Applications ● myngconnect.com ● Personal Computers
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<p>Lesson 23: Protecting Land, Air, and Water: Science in a Snap</p> <p>Lesson 24: Think Like an Engineer: Case Study: Tower of Trees</p> <p>Lesson 25: Renewable Energy Resources</p> <p>Lesson 26: Investigate Using Solar Energy</p> <p>Lesson 27: Think Like a Scientist: Obtain and Combine Information</p> <p>Lesson 28: Gravity on Earth</p> <p>Lesson 29: Investigate Gravity</p> <p>Lesson 30: Earth, Sun, and Moon</p> <p>Lesson 31: Our Star; The Sun: Science in a Snap</p> <p>Lesson 32: Investigate Apparent Brightness</p> <p>Lesson 33: Day and Night: Science in a Snap</p> <p>Lesson 34: Apparent Motion: Science in a Snap</p> <p>Lesson 35: Investigate: Sunlight and Shadows</p> <p>Lesson 36: Revolution and the Seasons</p> <p>Lesson 37: Investigate: Graph Hours of Daylight</p> <p>Lesson 38: Earth's Orbit and the Night Sky</p>		<p>sand;</p> <p>small plants;</p> <p>gravel;</p> <p>2-L bottles;</p> <p>plastic wrap;</p> <p>rubber bands;</p> <p>plastic cups;</p> <p>spray bottles.</p> <p>graph paper;</p> <p>9-oz. plastic cups;</p> <p>tape;</p> <p>75 mL water;</p> <p>25 mL vinegar;</p> <p>graduated cylinder; 2 containers of rye grass;</p> <p>hand lens;</p> <p>ruler;</p> <p>spoon</p> <p>plastic container (such as a plastic shoe box);</p> <p>small ball of clay;</p> <p>9-oz. plastic cup;</p> <p>measuring cup;</p> <p>water;</p> <p>sandy soil;</p>	
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<p>Lesson 39: Think Like a Scientist: Represent Data</p> <p>Lesson 40: Moon Motions</p> <p>Lesson 41: Moon Phases</p> <p>Lesson 42: Investigate Moon Phases</p> <p>Lesson 43: Science Career: Astrobiologist and Science Educator</p>		<p>spoon; plastic wrap; rubber band; rock</p> <p>unsharpened pencil; eraser; coin; crumpled paper; rubber ball</p> <p>3 penlights; tape; tissue paper; meter stick</p> <p>lump of clay (about the size of a large marble); sheet of poster board; unsharpened pencil; colored pencil; masking tape or rocks; meter stick</p> <p>craft stick or pencil;</p>	
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		foam ball; lamp with 60-watt bulb (to be shared by groups); meter stick <i>For teacher use:</i> masking tape	
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Formative Assessment Plan	Summative Assessment Plan
Suggested activities to assess student progress: -Exit Tickets -Journal Responses	Final Assessment/Benchmark: -End of Unit Assessment Describe a system in terms of its components and interactions. <ul style="list-style-type: none"> • Develop a model using an example to describe a scientific

	<p>principle.</p> <ul style="list-style-type: none"> • Develop a model using an example to describe ways the geosphere, biosphere, hydrosphere, and/or atmosphere interact. (The geosphere, hydrosphere, atmosphere, and biosphere are each a system. Assessment is limited to the interactions of two systems at a time.) • Obtain and combine information from books and/or other reliable media to explain phenomena or solutions to a design problem. • Obtain and combine information about ways individual communities use science ideas to protect the Earth’s resources and the environment
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Differentiation

Special Education	ELL	At Risk	Gifted and Talented
<ul style="list-style-type: none"> • RTI • Modify and accommodate as listed in student’s IEP or 504 plan • Utilize effective amount of wait time • Hold high expectations 	<ul style="list-style-type: none"> • RTI • Speech/Language Therapy • Rosetta Stone • Hold high expectations • Provide English/Spanish Dictionary for use • Place with Spanish 	<ul style="list-style-type: none"> • RTI Tiered Interventions following RTI framework • Support instruction with RTI intervention resources • Provide after school tutoring services 	<ul style="list-style-type: none"> • Organize the curriculum to include more elaborate, complex, and in-depth study of major ideas and problems through Compacting. • Allow for the

<ul style="list-style-type: none"> • Communicate directions clearly and concisely and repeat, reword, modify as necessary. • Utilize open-ended questioning techniques • Utilize scaffolding to support instruction. • Chunk tasks into smaller components • Provide step by step instructions • Model and use visuals as often as possible • Utilize extended time and/or reduce amount of items given for homework, quizzes, and tests. • Teach Tiers 1,2, and 3 words to assist students' 	<p>speaking teacher/paraprofessional as available</p> <ul style="list-style-type: none"> • Learn/Utilize/Display some words in the students' native language • Invite student to after school tutoring sessions • Basic Skills Instruction • Utilize formative assessments to drive instruction • Translate printed communications for parents in native language • Hold conferences with translator present • Utilize additional NJDOE resources/recommendations • Review Special Education listing for additional 	<ul style="list-style-type: none"> • Basic Skills Instruction • Hold high expectations • Utilize Go Math! RTI strategies • Fountas and Pinnell Phonics • Hold parent conferences fall and spring • Make modifications to instructional plans based on I and RS Plan. • Develop a record system to encourage good behavior and completion of work. • Establish a consistent and daily routine. 	<p>development and application of productive thinking skills to enable students to re-conceptualize existing knowledge and/or generate new knowledge.</p> <ul style="list-style-type: none"> • Enable students to explore continually changing knowledge and information and develop the attitude that knowledge is worth pursuing in an open world. • Encourage exposure to, selection and use of appropriate and specialized resources. • Promote self-initiated and self-directed learning and growth.
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<p>understanding of instructional texts.</p> <ul style="list-style-type: none">● Utilize a variety of formative assessments to drive next point of instruction/differentiated instructional practices.● Create rubrics/allow students to assist with task, so that all are aware of expectations.● Create modified assessments.● Allow students to utilize online books, when available, to listen to oral recorded reading.● Provide individualized assistance as necessary.● Allow for group work (strategically	<p>recommendations</p> <ul style="list-style-type: none">● Establish a consistent and daily routine		<ul style="list-style-type: none">● Provide for the development of self-understanding of one's relationships with people, societal institutions, nature and culture.● Continue to offer Accelerated Mathematics 7 (7th grade) and Algebra 1 (8th grade).
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<p>selected) and collaboration as necessary.</p> <ul style="list-style-type: none">● Utilize homework recorder within SIS.● Allow for copies of notes to be shared out.● Utilize assistive technology as appropriate.● Provide meaningful feedback and utilize teachable moments.● Utilize graphic organizers● Introduce/review study skills● Provide reading material at or slightly above students' reading levels.● Utilize manipulatives as necessary.● Establish a consistent and			
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daily routine			
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