



DISTRICT OF COLUMBIA
PUBLIC SCHOOLS

Elementary (K-5) Science Scope and Sequence for the



A Guide to Reading the DCPS Science Scope and Sequence

In response to the adoption of the Next Generation Science Standards (NGSS)¹ by the State Board of Education in December 2013, the District of Columbia Public Schools (DCPS) Office of Teaching and Learning convened a group of science teachers – the STEM Master Teacher Corps – to develop a new scope and sequence (SAS) for science for grades K-12. The inaugural STEM Master Teacher Corps consisted of the following dedicated educators:

- Gloria Allen – Hardy Middle School
- Erica Banks – Cardozo Education Campus
- Sydney Bergman – School Without Walls High School
- Jessica Buono – DCPS Office of Teaching and Learning
- Megan Fisk – Eastern High School
- Rabiah Harris – Kelly Miller Middle School
- Trilby Hillenbrand – Jefferson Middle School Academy
- Leslie Maddox – Wilson High School
- Amanda Oberski – Ludlow-Taylor Elementary School
- Lola Odukoya – Langdon Education Campus
- Ericka Senegar-Mitchell – McKinley Technology High School
- Stephen Sholtas – Brookland Education Campus
- Molly Smith – Cardozo Education Campus
- Angelique Sykes – Dunbar High School

The principal goal was to reorganize the complex NGSS architecture into instructional units that would make the most sense to teachers.

All scope and sequences begin with a **Grade Level/Course overview** that summarizes what students will learn for the year, followed by a **“School Year at a Glance”** that summarizes the order of the units and a suggested timeline for their implementation. All SAS assume a full year of science for a minimum of 225 minutes per week for all grade levels.

¹ A full copy of the NGSS can be downloaded from the NGSS website at <http://www.nextgenscience.org>.

Following the grade level/course overview and year at a glance, each unit is broken out into several sections beginning with the **Disciplinary Core Ideas (DCIs)** and **Crosscutting Concepts (“What to Teach”)** and the **Science and Engineering Practices (“What Students Do”)** for that unit. This was done to emphasize that the Science and Engineering Practices are the way that students experience the content so that they think, speak, act, and write the way scientists and engineers do. Teachers should also refer to Appendix F of the NGSS to learn more about how these practices are articulated across grade levels.

Student Performance Expectations follow the Disciplinary Core Ideas, Crosscutting Concepts, and Science and Engineering Practices section of the unit breakdown. Student performance expectations provide a brief explanation of what students who demonstrate understanding of the content are able to do.

Links to the **Common Core State Standards (CCSS) for ELA/Literacy and Mathematics** (including the Standards for Mathematical Practice) are included in every unit breakdown to emphasize the connections between CCSS and the NGSS so that teachers can more readily identify entry points for integration of science across subject areas. Teachers should also refer to the full NGSS document for additional connections to other DCIs and for information about articulation of DCIs across grade levels.

Finally, connections to the **former DC Science Standards** are included with every unit to serve as an unofficial crosswalk between the NGSS and the former standards. Teachers should be advised that inclusion of these standards does not imply that they are exactly parallel to the NGSS, but rather are related in some way to the Disciplinary Core Ideas, Crosscutting Concepts, and/or Science and Engineering Practices that make up the NGSS Performance Expectation(s) for that unit. More importantly, teachers should know that inclusion of the former standards is not intended for the purpose of continuing to teach with these standards, but rather so that teachers can more readily see how the content in the NGSS differs from that of the former standards.

A list of resources to help teachers plan to teach each unit of the scope and sequence are available in the **digital version** of this document, located on the **Elementary and Secondary Science Educators Pages of the DCPS Educator Portal**². Be sure to check the Educator Portal frequently for subsequent updates to this document.

For more information about the NGSS, please contact James Rountree, Science Curriculum Specialist (e-mail: james.rountree@dc.gov, phone: 202-442-4643).

² To access the Educator Portal, visit <http://www.educatorportalplus.com>.

Kindergarten

Overview and Scope and Sequence SY14-15

Grade Level Overview: Students begin their formal science education by formulating answers to questions such as: “What happens if you push or pull an object harder? Where do animals live and why do they live there? What is the weather like today and how is it different from yesterday?” Students will apply their understanding of the effects of different strengths or different directions of pushes and pulls on the motion of an object to analyze a design solution. Students will develop an understanding of what plants and animals (including humans) need to survive and the relationship between their needs and where they live. Students will develop an understanding of patterns and variations in local weather and the purpose of weather forecasting to prepare for, and respond to, severe weather. At the end of the year, students will explore local environmental issues and begin to propose how simple changes to human behavior can positively address these issues.

School Year At a Glance

Advisory	Units	Timeline
Advisory 1	Unit 1: Motion and Stability	9 weeks
Advisory 2	Unit 2: Animals and their Habitats	9 weeks
Advisory 3	Unit 3: That’s Some Weather We’re Having	9 weeks
Advisory 4	Unit 4: Taking Care of Our World	9 weeks

Advisory 1

Unit 1: Motion and Stability		
What to Teach		What Students Do
Disciplinary Core Ideas	Crosscutting Concepts	Science & Engineering Practices
<p>PS2.A: Forces and Motion</p> <ul style="list-style-type: none"> Pushes and pulls can have different strengths and directions. (K-PS2-1, K-PS2-2) Pushing or pulling on an object can change the speed or direction of its motion and can start or stop it. (K-PS2-1, K-PS2-2) <p>PS2.B: Types of Interactions</p> <ul style="list-style-type: none"> When objects touch or collide, they push on one another and can change motion. (K-PS2-1) <p>PS2.C: Relationship Between Energy and Forces</p> <ul style="list-style-type: none"> A bigger push or pull makes things speed up or slow down more quickly. (K-PS2-1) <p>ETS1.A: Defining Engineering Problems</p> <ul style="list-style-type: none"> A situation that people want to change or create can be approached as a problem to be solved through engineering. Such problems may have many acceptable solutions. (K-PS2-2) 	<p>Cause and Effect</p> <ul style="list-style-type: none"> Simple tests can be designed to gather evidence to support or refute student ideas about causes. (K-PS2-1, K-PS2-2) 	<p>Planning and Carrying Out Investigations</p> <ul style="list-style-type: none"> With guidance, plan and conduct an investigation in collaboration with peers. (K-PS2-1) <p>Analyzing and Interpreting Data</p> <ul style="list-style-type: none"> Analyze data from tests of an object or tool to determine if it works as intended. (K-PS2-2) <hr style="border-top: 1px dashed black;"/> <p>Connections to Nature of Science</p> <p>Scientific Investigations Use a Variety of Methods</p> <ul style="list-style-type: none"> Science uses different ways to study the world. (K-PS2-1)
What to Assess: <i>Student Performance Expectations</i>		
<p>Students who demonstrate understanding can:</p> <p>K-PS2-1. Plan and conduct an investigation to compare the effects of different strengths or different directions of pushes and pulls on the motion of an object. [Clarification Statement: Examples of pushes or pulls could include a string attached to an object being pulled, a person</p>		

Unit 1: Motion and Stability

pushing an object, a person stopping a rolling ball, and two objects colliding and pushing on each other.] [Assessment Boundary: Assessment is limited to different relative strengths or different directions, but not both at the same time. Assessment does not include non-contact pushes or pulls such as those produced by magnets.]

K-PS2-2. Analyze data to determine if a design solution works as intended to change the speed or direction of an object with a push or a pull. [Clarification Statement: Examples of problems requiring a solution could include having a marble or other object move a certain distance, follow a particular path, and knock down other objects. Examples of solutions could include tools such as a ramp to increase the speed of the object and a structure that would cause an object such as a marble or ball to turn.] [Assessment Boundary: Assessment does not include friction as a mechanism for change in speed.]

Integrated Common Core State Standards

For ELA/Literacy

- RI.K.1** – With prompting and support, ask and answer questions about key details in a text. (K-PS2-2)
- W.K.7** – Participate in shared research and writing projects (e.g., explore a number of books by a favorite author and express opinions about them). (K-PS2-1)
- SL.K.3** – Ask and answer questions in order to seek help, get information, or clarify something that is not understood. (K-PS2-2)

For Mathematics

- MP.2** – Reason abstractly and quantitatively. (K-PS2-1)
- K.MD.A.1** – Describe measurable attributes of objects, such as length or weight. Describe several attributes of a single object. (K-PS2-1)
- K.MD.A.2** – Directly compare two objects with a measurable attribute in common, to see which object has “more of”/”less of” the attribute, and describe the difference. (K-PS2-1)

Connections to Former DC Science Standards

Scientific Thinking and Inquiry: K.1.2-3
Physical Science: K.4.1-2, 1.3.1-2

Advisory 2

Unit 2: Animals and their Habitats		
What to Teach		What Students Do
Disciplinary Core Ideas	Crosscutting Concepts	Science & Engineering Practices
<p>LS1.C: Organization for Matter and Energy Flow in Organisms</p> <ul style="list-style-type: none"> All animals need food in order to live and grow. They obtain their food from plants or from other animals. Plants need water and light to live and grow. (K-LS1-1) <p>ESS2.E: Biogeology</p> <ul style="list-style-type: none"> Plants and animals can change their environment. (K-ESS2-2) <p>ESS3.A: Natural Resources</p> <ul style="list-style-type: none"> Living things need water, air, and resources from the land, and they live in places that have the things they need. Humans use natural resources for everything they do. (K-ESS3-1) <p>PS3.B: Conservation of Energy and Energy Transfer</p> <ul style="list-style-type: none"> Sunlight warms Earth’s surface. (K-PS3-1) 	<p>Cause and Effect</p> <ul style="list-style-type: none"> Events have causes that generate observable patterns. (K-PS3-1) <p>Patterns</p> <ul style="list-style-type: none"> Patterns in the natural and human designed world can be observed and used as evidence. (K-LS1-1) <p>Systems and System Models</p> <ul style="list-style-type: none"> Systems in the natural and designed world have parts that work together. (K-ESS2-2, K-ESS3-1) 	<p>Analyzing and Interpreting Data</p> <ul style="list-style-type: none"> Use observations (firsthand or from media) to describe patterns in the natural world in order to answer scientific questions. (K-LS1-1, K-ESS2-2, K-ESS3-1) <p>Developing and Using Models</p> <ul style="list-style-type: none"> Use a model to represent relationships in the natural world. (K-ESS3-1) <p>Engaging in Argument from Evidence</p> <ul style="list-style-type: none"> Construct an argument with evidence to support a claim. (K-ESS2-2) <p>Planning and Carrying Out Investigations</p> <ul style="list-style-type: none"> Make observations (firsthand or from media) to collect data that can be used to make comparisons. (K-PS3-1) <p>-----</p> <p>Connections to Nature of Science</p> <p>Scientific Knowledge is Based on Empirical Evidence</p> <ul style="list-style-type: none"> Scientists look for patterns and order when making observations about the world. (K-LS1-1, K-ESS2-2) <p>Scientific Investigations Use a Variety of Methods</p> <ul style="list-style-type: none"> Scientists use different ways to study the world. (K-PS3-1)

Unit 2: Animals and their Habitats

What to Assess

Student Performance Expectations

Students who demonstrate understanding can:

K-LS1-1. Use observations to describe patterns of what plants and animals (including humans) need to survive. [Clarification Statement: Examples of patterns could include that animals need to take in food but plants do not; the different kinds of food needed by different types of animals; the requirement of plants to have light; and, that all living things need water.]

K-ESS2-2. Construct an argument supported by evidence for how plants and animals (including humans) can change the environment to meet their needs. [Clarification Statement: Examples of plants and animals changing their environment could include a squirrel digs in the ground to hide its food and tree roots can break concrete.]

K-ESS3-1. Use a model to represent the relationship between the needs of different plants or animals (including humans) and the places they live. [Clarification Statement: Examples of relationships could include that deer eat buds and leaves, therefore, they usually live in forested areas; and, grasses need sunlight so they often grow in meadows. Plants, animals, and their surroundings make up a system.]

K-PS3-1. Make observations to determine the effect of sunlight on Earth’s surface. [Clarification Statement: Examples of Earth’s surface could include sand, soil, rocks, and water] [Assessment Boundary: Assessment of temperature is limited to relative measures such as warmer/cooler.]

Integrated Common Core State Standards

For ELA/Literacy

- RI.K.1** – With prompting and support, ask and answer questions about key details in a text. (K-ESS2-2)
- W.K.1** – Use a combination of drawing, dictating, and writing to compose opinion pieces in which they tell a reader the topic or the name of the book they are writing about and state an opinion or preference about the topic or book. (K-ESS2-2)
- W.K.2** – Use a combination of drawing, dictating, and writing to compose informative/explanatory texts in which they name what they are writing about and supply some information about the topic. (K-ESS2-2)
- W.K.7** – Participate in shared research and writing projects (e.g., explore a number of books by a favorite author and express opinions about them). (K-LS1-1, K-PS3-1)

For Mathematics

- K.MD.A.2** – Directly compare two objects with a measurable attribute in common, to see which object has “more of”/“less of” the attribute, and describe the difference. (K-LS1-1, K-PS3-1)

Connections to Former DC Science Standards

Scientific Thinking and Inquiry: K.1.2-3

Life Science: K.5.1.2, 1.4.5, 2.7.1, 2.7.3, 2.8.1, 2.8.4

Advisory 3

Unit 3: That’s Some Weather We’re Having		
What to Teach		What Students Do
Disciplinary Core Ideas	Crosscutting Concepts	Science & Engineering Practices
<p>PS3.B: Conservation of Energy and Energy Transfer</p> <ul style="list-style-type: none"> • Sunlight warms Earth’s surface. (K-PS3-1, K-PS3-2) <p>ESS3.B: Natural Hazards</p> <ul style="list-style-type: none"> • Some kinds of severe weather are more likely than others in a given region. Weather scientists forecast severe weather so that the communities can prepare for and respond to these events. (K-ESS3-2) <p>ETS1.A: Defining and Delimiting an Engineering Problem</p> <ul style="list-style-type: none"> • Asking questions, making observations, and gathering information are helpful in thinking about problems. (K-ESS3-2) 	<p>Cause and Effect</p> <ul style="list-style-type: none"> • Events have causes that generate observable patterns. (K-PS3-1, K-PS3-2, K-ESS3-2) <hr style="border-top: 1px dashed black;"/> <p>Connections to Engineering, Technology, and Applications of Science</p> <p>Interdependence of Science, Engineering, and Technology</p> <ul style="list-style-type: none"> • People encounter questions about the natural world every day. (K-ESS3-2) <p>Influence of Engineering, Technology, and Science on Society and the Natural World</p> <ul style="list-style-type: none"> • People depend on various technologies in their lives; human life would be very different without technology. (K-ESS3-2) 	<p>Planning and Carrying Out Investigations</p> <ul style="list-style-type: none"> • Make observations (firsthand or from media) to collect data that can be used to make comparisons. (K-PS3-1) <p>Constructing Explanations and Designing Solutions</p> <ul style="list-style-type: none"> • Use tools and materials provided to design and build a device that solves a specific problem or a solution to a specific problem. (K-PS3-2) <p>Asking Questions and Defining Problems</p> <ul style="list-style-type: none"> • Ask questions based on observations to find more information about the designed world. (K-ESS3-2) <p>Obtaining, Evaluating, and Communicating Information</p> <ul style="list-style-type: none"> • Read grade-appropriate texts and/or use media to obtain scientific information to describe patterns in the natural world. (K-ESS3-2) <hr style="border-top: 1px dashed black;"/> <p>Connections to Nature of Science</p> <p>Scientific Investigations Use a Variety of Methods</p> <ul style="list-style-type: none"> • Scientists use different ways to study the world. (K-PS3-1)
What to Assess:		

Unit 3: That’s Some Weather We’re Having

Student Performance Expectations

Students who demonstrate understanding can:

K-PS3-1. Make observations to determine the effect of sunlight on Earth’s surface. [Clarification Statement: Examples of Earth’s surface could include sand, soil, rocks, and water] [Assessment Boundary: Assessment of temperature is limited to relative measures such as warmer/cooler.]

K-PS3-2. Use tools and materials to design and build a structure that will reduce the warming effect of sunlight on an area. [Clarification Statement: Examples of structures could include umbrellas, canopies, and tents that minimize the warming effect of the sun.]

K-ESS3-2. Ask questions to obtain information about the purpose of weather forecasting to prepare for, and respond to, severe weather. [Clarification Statement: Emphasis is on local forms of severe weather.]

Integrated Common Core State Standards

For ELA/Literacy

RI.K.1 – With prompting and support, ask and answer questions about key details in a text. (K-ESS3-2)

SL.K.3 – Ask and answer questions in order to seek help, get information, or clarify something that is not understood. (K-ESS3-2)

W.K.7 – Participate in shared research and writing projects (e.g., explore a number of books by a favorite author and express opinions about them). (K-PS3-1, K-PS3-2)

For Mathematics

K.CC – Counting and Cardinality (K-ESS3-2)

K.MD.A.2 – Directly compare two objects with a measurable attribute in common, to see which object has “more of”/“less of” the attribute, and describe the difference. (K-PS3-1, K-PS3-2)

MP.4 – Model with mathematics. (K-ESS3-2)

Connections to Former DC Science Standards

Scientific Thinking and Inquiry: K.1.2-3, K.1.5

Earth Science: K.2.1-3, 2.3.1-7

Advisory 4

Unit 4: Taking Care of Our World		
What to Teach		What Students Do
Disciplinary Core Ideas	Crosscutting Concepts	Science & Engineering Practices
<p>ESS3.C: Human Impacts on Earth Systems</p> <ul style="list-style-type: none"> Things that people do to live comfortably can affect the world around them. But they can make choices that reduce their impacts on the land, water, air, and other living things. (K-ESS3-3) <p>ETS1.B: Developing Possible Solutions</p> <ul style="list-style-type: none"> Designs can be conveyed through sketches, drawings, or physical models. These representations are useful in communicating ideas for a problem’s solutions to other people. (K-ESS3-3) <p>PS3.B: Conservation of Energy and Energy Transfer</p> <ul style="list-style-type: none"> Sunlight warms Earth’s surface. (K-PS3-2). 	<p>Cause and Effect</p> <ul style="list-style-type: none"> Events have causes that generate observable patterns. (K-ESS3-3), (K-PS3-2) 	<p>Obtaining, Evaluating, and Communicating Information</p> <ul style="list-style-type: none"> Communicate solutions with others in oral and/or written forms using models and/or drawings that provide detail about scientific ideas. (K-ESS3-3) <p>Constructing Explanations and Designing Solutions</p> <ul style="list-style-type: none"> Use tools and materials provided to design and build a device that solves a specific problem or a solution to a specific problem. (K-PS3-2)
What to Assess: <i>Student Performance Expectations</i>		
<p>Students who demonstrate understanding can:</p> <p>K-ESS3-3. Communicate solutions that will reduce the impact of humans on the land, water, air, and/or other living things in the local environment. [Clarification Statement: Examples of human impact on the land could include cutting trees to produce paper and using resources to produce bottles. Examples of solutions could include reusing paper and recycling cans and bottles.]</p> <p>K-PS3-2. Use tools and materials to design and build a structure that will reduce the warming effect of sunlight on an area. [Clarification Statement: Examples of structures could include umbrellas, canopies, and tents that minimize the warming effect of the sun.]</p>		

Unit 4: Taking Care of Our World	
Integrated Common Core State Standards	
<p>For ELA/Literacy</p> <p>W.K.2 – Use a combination of drawing, dictating, and writing to compose informative/explanatory texts in which they name what they are writing about and supply some information about the topic. (K-ESS3-3)</p> <p>W.K.7 – Participate in shared research and writing projects (e.g., explore a number of books by a favorite author and express opinions about them). (K-PS3-2)</p>	<p>For Mathematics</p> <p>K.MD.A.2 – Directly compare two objects with a measurable attribute in common, to see which object has “more of”/”less of” the attribute, and describe the difference. (K-PS3-2)</p>
Connections to Former DC Science Standards	
<p>Scientific Thinking and Inquiry: K.1.2, K.1.5</p> <p>Earth Science: 2.4.1-2</p>	

First Grade Science

Overview and Scope and Sequence SY14-15

Grade Level Overview: In grade 1, students begin the year observing, describing, and predicting some patterns of the movement of objects in the sky. Students develop an understanding of the relationship between sound and vibration, as well as the availability of light and the ability to see. Students also develop an understanding of how plants and animals use their external parts to help them survive, grow, and meet their needs, as well as how behaviors of parents and offspring help the offspring survive. Students then end the year investigating how parents and their offspring are alike, yet different.

School Year At a Glance

Advisory	Units	Timeline
Advisory 1	Unit 1: Look Up! Is it a bird? Is it a plane?	9 weeks
Advisory 2	Unit 2: See No Evil, Hear No Evil	9 weeks
Advisory 3	Unit 3: Survival!	9 weeks
Advisory 4	Unit 4: Like Father, Like Son	9 weeks

Advisory 1

Unit 1: Look Up! Is it a bird? Is it a plane?		
What to Teach		What Students Do
Disciplinary Core Ideas	Crosscutting Concepts	Science & Engineering Practices
<p>ESS1.A: The Universe and its Stars</p> <ul style="list-style-type: none"> Patterns of the motion of the sun, moon, and stars in the sky can be observed, described, and predicted. (1-ESS1-1) <p>ESS1.B: Earth and the Solar System</p> <ul style="list-style-type: none"> Seasonal patterns of sunrise and sunset can be observed, described, and predicted. (1-ESS1-2) 	<p>Patterns</p> <ul style="list-style-type: none"> Patterns in the natural world can be observed, used to describe phenomena, and used as evidence. (1-ESS1-1), (1-ESS1-2) <p style="text-align: center;">-----</p> <p>Connections to Nature of Science</p> <p>Scientific Knowledge Assumes an Order and Consistency in Natural Systems</p> <ul style="list-style-type: none"> Science assumes natural events happen today as they happened in the past. (1-ESS1-1) Many events are repeated. (1-ESS1-1) 	<p>Planning and Carrying Out Investigations</p> <ul style="list-style-type: none"> Make observations (firsthand or from media) to collect data that can be used to make comparisons. (1-ESS1-2) <p>Analyzing and Interpreting Data</p> <ul style="list-style-type: none"> Use observations (firsthand or from media) to describe patterns in the natural world in order to answer scientific questions. (1-ESS1-1)
What to Assess: <i>Student Performance Expectations</i>		
<p>Students who demonstrate understanding can:</p> <p>1-ESS1-1. Use observations of the sun, moon, and stars to describe patterns that can be predicted. [Clarification Statement: Examples of patterns could include that the sun and moon appear to rise in one part of the sky, move across the sky, and set; and stars other than our sun are visible at night but not during the day.] [Assessment Boundary: Assessment of star patterns is limited to stars being seen at night and not during the day.]</p> <p>1-ESS1-2. Make observations at different times of year to relate the amount of daylight to the time of year. [Clarification Statement: Emphasis is on relative comparisons of the amount of daylight in the winter to the amount in the spring or fall.] [Assessment Boundary: Assessment is limited to relative amounts of daylight, not quantifying the hours or time of daylight.]</p>		
Integrated Common Core State Standards		
<p>For ELA/Literacy</p> <p>W.1.7 - Participate in shared research and writing projects (e.g., explore a number of “how-to” books on a given topic and use them to write a sequence of instructions). (1-ESS1-1), (1-ESS1-2)</p> <p>W.1.8 - With guidance and support from adults, recall information from experiences or gather information from provided sources to</p>	<p>For Mathematics</p> <p>MP.2 - Reason abstractly and quantitatively. (1-ESS1-2)</p> <p>MP.4 - Model with mathematics. (1-ESS1-2)</p> <p>MP.5 - Use appropriate tools strategically. (1-ESS1-2)</p> <p>1.OA.A.1 - Use addition and subtraction within 20 to solve word problems involving situations of adding to, taking from, putting</p>	

Unit 1: Look Up! Is it a bird? Is it a plane?

answer a question. (1-ESS1-1), (1-ESS1-2)

together, taking apart, and comparing, with unknowns in all positions, e.g., by using objects, drawings, and equations to represent the problem. (1-ESS1-2)

1.MD.C.4 - Organize, represent, and interpret data with up to three categories; ask and answer questions about the total number of data points, how many in each category, and how many more or less are in one category than in another. (1-ESS1-2)

Connections to Former DC Science Standards

Scientific Thinking and Inquiry: 1.1.1-2, 1.1.4, 1.1.8

Earth and Space Science: K.2.1-3, 1.2.3, 3.3.1-4

Advisory 2

Unit 2: See No Evil, Hear No Evil		
What to Teach		What Students Do
Disciplinary Core Ideas	Crosscutting Concepts	Science & Engineering Practices
<p>PS4.A: Wave Properties</p> <ul style="list-style-type: none"> Sound can make matter vibrate, and vibrating matter can make sound. (1-PS4-1) <p>PS4.B: Electromagnetic Radiation</p> <ul style="list-style-type: none"> Objects can be seen only when light is available to illuminate them. Some objects give off their own light. (1-PS4-2) 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. Mirrors can be used to redirect a light beam. (Boundary: The idea that light travels from place to place is developed through experiences with light sources, mirrors, and shadows, but no attempt is made to discuss the speed of light.) (1-PS4-3) <p>PS4.C: Information Technologies and Instrumentation</p> <ul style="list-style-type: none"> People also use a variety of devices to communicate (send and receive information) over long distances. (1-PS4-4) 	<p>Cause and Effect</p> <ul style="list-style-type: none"> Simple tests can be designed to gather evidence to support or refute student ideas about causes. (1-PS4-1), (1-PS4-2), (1-PS4-3) <p style="text-align: center;">-----</p> <p><i>Connections to Engineering, Technology, and Applications of Science</i></p> <p>Influence of Engineering, Technology, and Science, on Society and the Natural World</p> <ul style="list-style-type: none"> People depend on various technologies in their lives; human life would be very different without technology. (1-PS4-4) 	<p>Planning and Carrying Out Investigations</p> <ul style="list-style-type: none"> Plan and conduct investigations collaboratively to produce data to serve as the basis for evidence to answer a question. (1-PS4-1), (1-PS4-3) <p>Constructing Explanations and Designing Solutions</p> <ul style="list-style-type: none"> Make observations (firsthand or from media) to construct an evidence-based account for natural phenomena (1-PS4-2) Use tools and materials provided to design a device that solves a specific problem. (1-PS4-4) <p style="text-align: center;">-----</p> <p><i>Connections to Nature of Science</i></p> <p>Scientific Investigations Use a Variety of Methods</p> <ul style="list-style-type: none"> Science investigations begin with a question. (1-PS4-1) Science uses different ways to study the world. (1-PS4-1)
What to Assess:		

Unit 2: See No Evil, Hear No Evil

Student Performance Expectations

Students who demonstrate understanding can:

1-PS4-1. Plan and conduct investigations to provide evidence that vibrating materials can make sound and that sound can make materials vibrate. [Clarification Statement: Examples of vibrating materials that make sound could include tuning forks and plucking a stretched string. Examples of how sound can make matter vibrate could include holding a piece of paper near a speaker making sound and holding an object near a vibrating tuning fork.]

1-PS4-2. Make observations to construct an evidence-based account that objects can be seen only when illuminated. [Clarification Statement: Examples of observations could include those made in a completely dark room, a pinhole box, and a video of a cave explorer with a flashlight. Illumination could be from an external light source or by an object giving off its own light.]

1-PS4-3. Plan and conduct an investigation to determine the effect of placing objects made with different materials in the path of a beam of light. [Clarification Statement: Examples of materials could include those that are transparent (such as clear plastic), translucent (such as wax paper), opaque (such as cardboard), and reflective (such as a mirror).] [Assessment Boundary: Assessment does not include the speed of light.]

1-PS4-4. Use tools and materials to design and build a device that uses light or sound to solve the problem of communicating over a distance.* [Clarification Statement: Examples of devices could include a light source to send signals, paper cup and string “telephones,” and a pattern of drum beats.] [Assessment Boundary: Assessment does not include technological details for how communication devices work.]

Integrated Common Core State Standards

For ELA/Literacy

W.1.2 - Write informative/explanatory texts in which they name a topic, supply some facts about the topic, and provide some sense of closure. (1-PS4-2)

W.1.7 - Participate in shared research and writing projects (e.g., explore a number of “how-to” books on a given topic and use them to write a sequence of instructions). (1-PS4-1), (1-PS4-2), (1-PS4-3), (1-PS4-4)

W.1.8 - With guidance and support from adults, recall information from experiences or gather information from provided sources to answer a question. (1-PS4-1), (1-PS4-2), (1-PS4-3)

SL.1.1 - Participate in collaborative conversations with diverse partners about grade 1 topics and texts with peers and adults in small and larger groups. (1-PS4-1), (1-PS4-2), (1-PS4-3)

For Mathematics

MP.5 - Use appropriate tools strategically. (1-PS4-4)

1.MD.A.1 - Order three objects by length; compare the lengths of two objects indirectly by using a third object. (1-PS4-4)

1.MD.A.2 - Express the length of an object as a whole number of length units, by layering multiple copies of a shorter object (the length unit) end to end; understand that the length measurement of an object is the number of same-size length units that span it with no gaps or overlaps. (1-PS4-4)

Connections to Former DC Science Standards

Unit 2: See No Evil, Hear No Evil

Scientific Thinking and Inquiry: 1.1.1-2, 1.1.4, 1.1.7-8

Physical Science: 3.4.6, 4.5.2-3

Advisory 3

Unit 3: Survival!

What to Teach		What Students Do
Disciplinary Core Ideas	Crosscutting Concepts	Science & Engineering Practices
<p>LS1.A: Structure and Function</p> <ul style="list-style-type: none"> All organisms have external parts. Different animals use their body parts in different ways to see, hear, grasp objects, protect themselves, move from place to place, and seek, find, and take in food, water and air. Plants also have different parts (roots, stems, leaves, flowers, fruits) that help them survive and grow. (1-LS1-1) <p>LS1.B: Growth and Development of Organisms</p> <ul style="list-style-type: none"> 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. (1-LS1-2) <p>LS1.D: Information Processing</p> <ul style="list-style-type: none"> Animals have body parts that capture and convey different kinds of information needed for growth and survival. Animals respond to these inputs with behaviors that help them survive. Plants also respond to some external inputs. (1-LS1-1) 	<p>Patterns</p> <ul style="list-style-type: none"> Patterns in the natural world can be observed, used to describe phenomena, and used as evidence. (1-LS1-2) <p>Structure and Function</p> <ul style="list-style-type: none"> The shape and stability of structures of natural and designed objects are related to their function(s). (1-LS1-1) <p>-----</p> <p>Connections to Engineering, Technology, and Applications of Science</p> <p>Influence of Engineering Technology, and Science on Society and the Natural World</p> <ul style="list-style-type: none"> Every human-made product is designed by applying some knowledge of the natural world and is built by using natural materials. (1-LS1-1) 	<p>Constructing Explanations and Designing Solutions</p> <ul style="list-style-type: none"> Make observations (firsthand or from media) to construct an evidence-based account for natural phenomena. (1-LS3-1) Use materials to design a device that solves a specific problem or a solution to a specific problem. (1-LS1-1) <p>Obtaining, Evaluating, and Communicating Information</p> <p>Obtaining, evaluating, and communicating information in K–2 builds on prior experiences and uses observations and texts to communicate new information.</p> <ul style="list-style-type: none"> Read grade-appropriate texts and use media to obtain scientific information to determine patterns in the natural world. (1-LS1-2) <p>-----</p> <p>Connections to Nature of Science</p> <p>Scientific Knowledge is Based on Empirical Evidence</p> <ul style="list-style-type: none"> Scientists look for patterns and order when making observations about the world. (1-LS1-2)
What to Assess:		

Unit 3: Survival!

Student Performance Expectations

Students who demonstrate understanding can:

1-LS1-1. Use materials to design a solution to a human problem by mimicking how plants and/or animals use their external parts to help them survive, grow, and meet their needs.* [Clarification Statement: Examples of human problems that can be solved by mimicking plant or animal solutions could include designing clothing or equipment to protect bicyclists by mimicking turtle shells, acorn shells, and animal scales; stabilizing structures by mimicking animal tails and roots on plants; keeping out intruders by mimicking thorns on branches and animal quills; and, detecting intruders by mimicking eyes and ears.]

1-LS1-2. Read texts and use media to determine patterns in behavior of parents and offspring that help offspring survive. [Clarification Statement: Examples of patterns of behaviors could include the signals that offspring make (such as crying, cheeping, and other vocalizations) and the responses of the parents (such as feeding, comforting, and protecting the offspring).]

Integrated Common Core State Standards

For ELA/Literacy

- RI.1.1** - Ask and answer questions about key details in a text. (1-LS1-2), (1-LS3-1)
- RI.1.2** - Identify the main topic and retell key details of a text. (1-LS1-2)
- RI.1.10** - With prompting and support, read informational texts appropriately complex for grade. (1-LS1-2)
- W.1.7** - Participate in shared research and writing projects (e.g., explore a number of “how-to” books on a given topic and use them to write a sequence of instructions). (1-LS1-1), (1-LS3-1)

For Mathematics

- 1.NBT.B.3** - Compare two two-digit numbers based on the meanings of the tens and one digits, recording the results of comparisons with the symbols $>$, $=$, and $<$. (1-LS1-2)
- 1.NBT.C.4** - Add within 100, including adding a two-digit number and a one-digit number, and adding a two-digit number and a multiple of 10, using concrete models or drawings and strategies based on place value, properties of operations, and/or the relationship between addition and subtraction; relate the strategy to a written method and explain the reasoning uses. Understand that in adding two-digit numbers, one adds tens and tens, ones and ones; and sometimes it is necessary to compose a ten. (1-LS1-2)
- 1.NBT.C.5** - Given a two-digit number, mentally find 10 more or 10 less than the number, without having to count; explain the reasoning used. (1-LS1-2)
- 1.NBT.C.6** - Subtract multiples of 10 in the range 10-90 from multiples of 10 in the range 10-90 (positive or zero differences), using concrete models or drawings and strategies based on place value, properties of operations, and/or the relationship between addition and subtraction; relate the strategy to a written method and explain the reasoning used. (1-LS1-2)

Connections to Former DC Science Standards

Unit 3: Survival!

Scientific Thinking and Inquiry: 1.1.2-3

Life Science: 1.4.1-5, 2.6.1, 4.7.5

Advisory 4

Unit 4: Like Father, Like Son		
What to Teach		What Students Do
Disciplinary Core Ideas	Crosscutting Concepts	Science & Engineering Practices
<p>LS3.A: Inheritance of Traits</p> <ul style="list-style-type: none"> Young animals are very much, but not exactly, like their parents. Plants also are very much, but not exactly, like their parents. (1-LS3-1) <p>LS3.B: Variation of Traits</p> <ul style="list-style-type: none"> Individuals of the same kind of plant or animal are recognizable as similar but can also vary in many ways. (1-LS3-1) 	<p>Patterns</p> <ul style="list-style-type: none"> Patterns in the natural world can be observed, used to describe phenomena, and used as evidence. (1-LS3-1) 	<p>Constructing Explanations and Designing Solutions</p> <ul style="list-style-type: none"> Make observations (firsthand or from media) to construct an evidence-based account for natural phenomena. (1-LS3-1)
What to Assess: <i>Student Performance Expectations</i>		
<p>Students who demonstrate understanding can:</p> <p>1-LS3-1. Make observations to construct an evidence-based account that young plants and animals are like, but not exactly like, their parents. [Clarification Statement: Examples of patterns could include features plants or animals share. Examples of observations could include leaves from the same kind of plant are the same shape but can differ in size; and, a particular breed of dog looks like its parents but is not exactly the same.] [Assessment Boundary: Assessment does not include inheritance or animals that undergo metamorphosis or hybrids.]</p>		
Integrated Common Core State Standards		
<p>For ELA/Literacy</p> <p>RI.1.1 - Ask and answer questions about key details in a text. (1-LS3-1)</p> <p>W.1.7 - Participate in shared research and writing projects (e.g., explore a number of “how-to” books on a given topic and use them to write a sequence of instructions). (1-LS3-1)</p> <p>W.1.8 - With guidance and support from adults, recall information from experiences or gather information from provided sources to answer a question. (1-LS3-1)</p>	<p>For Mathematics</p> <p>MP.2 - Reason abstractly and quantitatively. (1-LS3-1)</p> <p>MP.5 - Use appropriate tools strategically. (1-LS3-1)</p> <p>1.MD.A.1 - Order three objects by length; compare the lengths of two objects indirectly by using a third object. (1-LS3-1)</p>	
Connections to Former DC Science Standards		
<p>Scientific Thinking and Inquiry: 1.1.1-3</p> <p>Life Science: 1.4.2, 2.9.3</p>		

Second Grade Science

Overview and Scope and Sequence SY14-15

Grade Level Overview: Students will continue their formal science education by taking a closer look at the world around them. They will be able to formulate the answers to questions such as: How does the addition of heat affect each state of matter? What do plants need to grow? Why do specific organisms only live in certain areas? What is special about Planet Earth? Students will focus on making connections between the properties of objects around them and what the object is used for. They will explore why plants need animals to ensure their survival, and they will gain a deeper understanding of how the surface of Earth is slowly, but constantly, changing due to natural occurrences. Students will be able to create maps by using the different landforms on Earth and paying close attention to classifying the different types of water bodies. At the end of the year, students should be able to explain how Earth's systems shape the surface of the planet using clay models.

School Year At a Glance

Advisory	Units	Timeline
Advisory 1	Unit 1: What Makes this Object Special?	9 weeks
Advisory 2	Unit 2: Plants and Animals	9 weeks
Advisory 3	Unit 3: I Live on Planet Earth	9 weeks
Advisory 4	Unit 4: Earth's Constant Makeover	9 weeks

Advisory 1

Unit 1: What Makes this Object Special?		
What to Teach		What Students Do
Disciplinary Core Ideas	Crosscutting Concepts	Science & Engineering Practices
<p>PS1.A: Structure and Properties of Matter</p> <ul style="list-style-type: none"> 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. (2-PS1-1) Different properties are suited to different purposes. (2-PS1-2), (2-PS1-A) A great variety of objects can be built up from a small set of pieces. (2-PS1-3) <p>PS1.B: Chemical Reactions</p> <ul style="list-style-type: none"> Heating or cooling a substance may cause changes that can be observed. Sometimes these changes are reversible, and sometimes they are not. (2-PS1-4) 	<p>Patterns</p> <ul style="list-style-type: none"> Patterns in the natural and human designed world can be observed. (2-PS1-1) <p>Cause and Effect</p> <ul style="list-style-type: none"> Events have causes that generate observable patterns. (2-PS1-4) Simple tests can be designed to gather evidence to support or refute student ideas about causes. (2-PS1-2) <p>Energy and Matter</p> <ul style="list-style-type: none"> Objects may break into smaller pieces and be put together into larger pieces, or change shapes. (2-PS1-3) <p>-----</p> <p>Connections to Engineering, Technology, and Applications of Science</p> <p>-----</p> <p>Influence of Engineering, Technology, and Science, on Society and the Natural World</p> <ul style="list-style-type: none"> Every human-made product is designed by applying some knowledge of the natural world and is built by using natural materials. (2-PS1-2) 	<p>Planning and Carrying Out Investigations</p> <ul style="list-style-type: none"> Plan and conduct an investigation collaboratively to produce data to serve as the basis for evidence to answer a question. (2-PS1-1) <p>Analyzing and Interpreting Data</p> <ul style="list-style-type: none"> Analyze data from tests of an object or tool to determine if it works as intended. (2-S1-2) <p>Constructing Explanations and Designing Solutions</p> <ul style="list-style-type: none"> Make observations (firsthand or from media) to construct an evidence-based account for natural phenomena. (2-PS1-3) <p>Engaging in Argument from Evidence</p> <ul style="list-style-type: none"> Construct an argument with evidence to support a claim. (2-PS1-4) <p>-----</p> <p>Connections to Nature of Science</p> <p>-----</p> <p>Science Models, Laws, Mechanisms, and Theories Explain Natural Phenomena</p> <ul style="list-style-type: none"> Science searches for cause and effect relationships to explain natural events. (2-PS1-4)
What to Assess:		

Unit 1: What Makes this Object Special?

Student Performance Expectations

Students who demonstrate understanding can:

2-PS1-1. Plan and conduct an investigation to describe and classify different kinds of materials by their observable properties. [Clarification Statement: Observations could include color, texture, hardness, and flexibility. Patterns could include the similar properties that different materials share.]

2-PS1-2. Analyze data obtained from testing different materials to determine which materials have the properties that are best suited for an intended purpose.* [Clarification Statement: Examples of properties could include, strength, flexibility, hardness, texture, and absorbency.] [Assessment Boundary: Assessment of quantitative measurements is limited to length.]

2-PS1-3. Make observations to construct an evidence-based account of how an object made of a small set of pieces can be disassembled and made into a new object. [Clarification Statement: Examples of pieces could include blocks, building bricks, or other assorted small objects.]

2-PS1-4. Construct an argument with evidence that some changes caused by heating or cooling can be reversed and some cannot. [Clarification Statement: Examples of reversible changes could include materials such as water and butter at different temperatures. Examples of irreversible changes could include cooking an egg, freezing a plant leaf, and heating paper.]

Integrated Common Core State Standards

For ELA/Literacy

RI.2.1 - Ask and answer such questions as who, what, where, when, why, and how to demonstrate understanding of key details in a text. (2-PS1-4)

RI.2.3 - Describe the connection between a series of historical events, scientific ideas or concepts, or steps in technical procedures in a text. (2-PS1-4)

RI.2.8 - Describe how reasons support specific points the author makes in a text. (2-PS1-2), (2-PS1-4) Write opinion pieces in which they introduce the topic or book they are writing about, state an opinion, supply reasons that support the opinion, use linking words (e.g., because, and, also) to connect opinion and reasons, and provide a concluding statement or section. (2-PS1-4)

W.2.1 - Write opinion pieces in which they introduce the topic or book they are writing about, state an opinion, supply reasons that support the opinion, use linking words (e.g., because, and, also) to connect opinion and reasons, and provide a concluding statement or section. (2-PS1-4)

W.2.7 - Participate in shared research and writing projects (e.g., read

For Mathematics

MP.2 - Reason abstractly and quantitatively. (2-PS1-2)

MP.4 - Model with mathematics. (2-PS1-1), (2-PS1-2)

MP.5 - Use appropriate tools strategically. (2-PS1-2)

2.MD.D.10 - Draw a picture graph and a bar graph (with single-unit scale) to represent a data set with up to four categories. Solve simple put-together, take-apart, and compare problems using information presented in a bar graph. (2-PS1-1), (2-PS1-2)

Unit 1: What Makes this Object Special?

a number of books on a single topic to produce a report; record science observations). (2-PS1-1), (2-PS1-2), (2-PS1-3)

W.2.8 - Recall information from experiences or gather information from provided sources to answer a question. (2-PS1-1), (2-PS1-2), (2-PS1-3)

Connections to *Former* DC Science Standards

Physical Science: 2.5.1-4

Advisory 2

Unit 2: Plants and Animals		
What to Teach		What Students Do
Disciplinary Core Ideas	Crosscutting Concepts	Science & Engineering Practices
<p>LS2.A: Interdependent Relationships in Ecosystems</p> <ul style="list-style-type: none"> Plants depend on water and light to grow. (2-LS2-1) Plants depend on animals for pollination or to move their seeds around. (2-LS2-2) <p>ETS1.B: Developing Possible Solutions</p> <ul style="list-style-type: none"> Designs can be conveyed through sketches, drawings, or physical models. These representations are useful in communicating ideas for a problem’s solutions to other people. (Secondary to 2-LS2-2) <p>LS4.D: Biodiversity and Humans</p> <ul style="list-style-type: none"> There are many different kinds of living things in any area, and they exist in different places on land and in water. (2-LS4-1) 	<p>Cause and Effect</p> <ul style="list-style-type: none"> Events have causes that generate observable patterns. (2-LS2-1) <p>Structure and Function</p> <ul style="list-style-type: none"> The shape and stability of structures of natural and designed objects are related to their function(s). (2-LS2-2) 	<p>Developing and Using Models</p> <ul style="list-style-type: none"> Develop a simple model based on evidence to represent a proposed object or tool. (2-LS2-2) <p>Planning and Carrying Out Investigations</p> <ul style="list-style-type: none"> Plan and conduct an investigation collaboratively to produce data to serve as the basis for evidence to answer a question. (2-LS2-1) <p>-----</p> <p>Connections to Nature of Science</p> <p>Scientific Knowledge is Based on Empirical Evidence</p> <ul style="list-style-type: none"> Scientists look for patterns and order when making observations about the world. (2-LS4-1)
What to Assess: <i>Student Performance Expectations</i>		
<p>Students who demonstrate understanding can:</p> <p>2-LS2-1. Plan and conduct an investigation to determine if plants need sunlight and water to grow. [Assessment Boundary: Assessment is limited to testing one variable at a time.]</p> <p>2-LS2-2. Develop a simple model that mimics the function of an animal in dispersing seeds or pollinating plants.*</p> <p>2-LS4-1. Make observations of plants and animals to compare the diversity of life in different habitats [Clarification Statement: Emphasis is on the diversity of living things in each of a variety of different habitats.] [Assessment Boundary: Assessment does not include specific animal and plant names in specific habitats.]</p>		

Unit 2: Plants and Animals

Integrated Common Core State Standards

For ELA/Literacy

W.2.7 - Participate in shared research and writing projects (e.g., read a number of books on a single topic to produce a report; record science observations). (2-LS2-1)

W.2.8 - Recall information from experiences or gather information from provided sources to answer a question. (2-LS2-1)

SL.2.5 - Create audio recordings of stories or poems; add drawings or other visual displays to stories or recounts of experiences when appropriate to clarify ideas, thoughts, and feelings. (2-LS2-2)

For Mathematics

MP.2 - Reason abstractly and quantitatively. (2-LS2-1)

MP.4 - Model with mathematics. (2-LS2-1), (2-LS2-2)

MP.5 - Use appropriate tools strategically. (2-LS2-1)

2.MD.D.10 - Draw a picture graph and a bar graph (with single-unit scale) to represent a data set with up to four categories. Solve simple put-together, take-apart, and compare problems using information presented in a bar graph.(2-LS2-2)

Connections to *Former* DC Science Standards

Life Science: 2.7.5-8, 2.8.1, 2.8.4

Advisory 3

Unit 3: I Live on Planet Earth		
What to Teach		What Students Do
Disciplinary Core Ideas	Crosscutting Concepts	Science & Engineering Practices
<p>ESS2.B: Plate Tectonics and Large-Scale System Interactions</p> <ul style="list-style-type: none"> • Maps show where things are located. One can map the shapes and kinds of land and water in any area. (2-ESS2-2) <p>ESS2.C: The Roles of Water in Earth’s Surface Processes</p> <ul style="list-style-type: none"> • Water is found in the ocean, rivers, lakes, and ponds. Water exists as solid ice and in liquid form. (2-ESS2-3) 	<p>Patterns</p> <ul style="list-style-type: none"> • Patterns in the natural world can be observed. (2-ESS2-2), (2-ESS2-3) 	<p>Developing and Using Models</p> <ul style="list-style-type: none"> • Develop a model to represent patterns in the natural world. (2-ESS2-2) <p>Obtaining, Evaluating, and Communicating Information</p> <ul style="list-style-type: none"> • Obtain information using various texts, text features (e.g., headings, tables of contents, glossaries, electronic menus, icons), and other media that will be useful in answering a scientific question. (2-ESS2-3)
What to Assess: <i>Student Performance Expectations</i>		
<p>Students who demonstrate understanding can:</p> <p>2-ESS2-2. Develop a model to represent the shapes and kinds of land and bodies of water in an area. [Assessment Boundary: Assessment does not include quantitative scaling in models.]</p> <p>2-ESS2-3. Obtain information to identify where water is found on Earth and that it can be solid or liquid.</p>		
Integrated Common Core State Standards		
<p>For ELA/Literacy</p> <p>W.2.6 - With guidance and support from adults, use a variety of digital tools to produce and publish writing, including in collaboration with peers. (2-ESS2-3)</p> <p>W.2.8 - Recall information from experiences or gather information from provided sources to answer a question. (2-ESS2-3)</p> <p>SL.2.5 - Create audio recordings of stories or poems; add drawings or other visual displays to stories or recounts of experiences when appropriate to clarify ideas, thoughts, and feelings. (2-ESS2-2)</p>	<p>For Mathematics</p> <p>MP.2 - Reason abstractly and quantitatively. (2-ESS2-2)</p> <p>MP.4 - Model with mathematics. (2-ESS2-2)</p> <p>2.NBT.A.3 - Read and write numbers to 1000 using base-ten numerals, number names, and expanded form. (2-ESS2-2)</p>	

Unit 3: I Live on Planet Earth

Connections to *Former* DC Science Standards

Scientific Thinking and Inquiry: 2.1.1, 2.1.3, 2.1.4, 2.1.6

Earth Science: 4.3.2

Advisory 4

Unit 4: Earth’s Constant Makeover		
What to Teach		What Students Do
Disciplinary Core Ideas	Crosscutting Concepts	Science & Engineering Practices
<p>ESS1.C: The History of Planet Earth</p> <ul style="list-style-type: none"> Some events happen very quickly; others occur very slowly, over a time period much longer than one can observe. (2-ESS1-1) <p>ESS2.A: Earth Materials and Systems</p> <ul style="list-style-type: none"> Wind and water can change the shape of the land. (2-ESS2-1) <p>ETS1.C: Optimizing the Design Solution</p> <ul style="list-style-type: none"> Because there is always more than one possible solution to a problem, it is useful to compare and test designs. (Secondary to 2-ESS2-1) 	<p>Stability and Change</p> <ul style="list-style-type: none"> Things may change slowly or rapidly. (2-ESS1-1), (2-ESS2-1) <p>-----</p> <p>Connections to Engineering, Technology, and Applications of Science</p> <p>Influence of Engineering, Technology, and Science on Society and the Natural World</p> <ul style="list-style-type: none"> Developing and using technology has impacts on the natural world. (2-ESS2-1) <p>-----</p> <p>Connections to Nature of Science</p> <p>Science Addresses Questions About the Natural and Material World</p> <ul style="list-style-type: none"> Scientists study the natural and material world. (2-ESS2-1) 	<p>Constructing Explanations and Designing Solutions</p> <ul style="list-style-type: none"> Make observations (firsthand or from media) to construct an evidence-based account for natural phenomena. (2-ESS1-1) Compare multiple solutions to a problem. (2-ESS2-1)
What to Assess:		
Student Performance Expectations		
<p>Students who demonstrate understanding can:</p> <p>2-ESS1-1. Use information from several sources to provide evidence that Earth events can occur quickly or slowly. [Clarification Statement: Examples of events and timescales could include volcanic explosions and earthquakes, which happen quickly and erosion of rocks, which occurs slowly.] [Assessment Boundary: Assessment does not include quantitative measurements of timescales.]</p> <p>2-ESS2-1. Compare multiple solutions designed to slow or prevent wind or water from changing the shape of the land.* [Clarification Statement: Examples of solutions could include different designs of dikes and windbreaks to hold back wind and water, and different designs for using shrubs, grass, and trees to hold back the land.]</p>		

Unit 4: Earth's Constant Makeover

Integrated Common Core State Standards

For ELA/Literacy

- RI.2.1** - Ask and answer such questions as who, what, where, when, why, and how to demonstrate understanding of key details in a text. (2-ESS1-1)
- RI.2.3** - Describe the connection between a series of historical events, scientific ideas or concepts, or steps in technical procedures in a text. (2-ESS1-1)
- W.2.6** - With guidance and support from adults, use a variety of digital tools to produce and publish writing, including in collaboration with peers. (2-ESS1-1)
- W.2.7** - Participate in shared research and writing projects (e.g., read a number of books on a single topic to produce a report; record science observations). (2-ESS1-1)
- W.2.8** - Recall information from experiences or gather information from provided sources to answer a question. (2-ESS1-1)
- SL.2.2** - Recount or describe key ideas or details from a text read aloud or information presented orally or through other media. (2-ESS1-1)
- RI.2.9** - Compare and contrast the most important points presented by two texts on the same topic. (2-ESS2-1)

For Mathematics

- MP.2** - Reason abstractly and quantitatively. (2-ESS1-1)
- MP.4** - Model with mathematics. (2-ESS1-1)
- 2.NBT.A** - Understand place value. (2-ESS1-1)
- MP.5** - Use appropriate tools strategically. (2-ESS2-1)
- 2.MD.B.5** - Use addition and subtraction within 100 to solve word problems involving lengths that are given in the same units, e.g., by using drawings (such as drawings of rulers) and equations with a symbol for the unknown number to represent the problem. (2-ESS2-1)

Connections to Former DC Science Standards

Scientific Thinking and Inquiry: 2.1.1, 2.1.6, 2.1.7

Earth Science: 4.3.1

Third Grade Science

Overview and Scope and Sequence SY14-15

Grade Level Overview: Students will continue their formal science education by exploring the objects in the world around them. They will develop answers to such questions as: How do you make an object move? Why do some animals like to live together and others do not? Why do siblings have different personalities? What happened to the dinosaurs and how do we know they existed? They will explore how weather changes affect the quality of human life, and they will be able to give factual explanations on why some species become extinct. Students will dive into physical science and analyze the behavior of objects to predict their paths of motion. They will form connections with their prior knowledge to examine the life cycles of various plants and animals. At the end of the year, students will complete a study that explains why only the species that are able to adapt will survive when an ecosystem begins to transform.

School Year At a Glance

Advisory	Units	Timeline
Advisory 1	Unit 1: Forces: Why do things move?	9 weeks
Advisory 2	Unit 2: Weather and Climate	9 weeks
Advisory 3	Unit 3: The Ecosystem is Changing! Unit 4: Plant and Animal Life Cycles	9 weeks
Advisory 4	Unit 5: The Hunger Games: Who will survive?	9 weeks

Advisory 1

Unit 1: Forces: Why do things move?		
What to Teach		What Students Do
Disciplinary Core Ideas	Crosscutting Concepts	Science & Engineering Practices
<p>PS2.A: Forces and Motion</p> <ul style="list-style-type: none"> Each force acts on one particular object and has both strength and a direction. An object at rest typically has multiple forces acting on it, but they add to give zero net force on the object. Forces that do not sum to zero can cause changes in the object’s speed or direction of motion. (Boundary: Qualitative and conceptual, but not quantitative addition of forces are used at this level.) (3-PS2-1) The patterns of an object’s motion in various situations can be observed and measured; when that past motion exhibits a regular pattern, future motion can be predicted from it. (Boundary: Technical terms, such as magnitude, velocity, momentum, and vector quantity, are not introduced at this level, but the concept that some quantities need both size and direction to be described is developed.) (3-PS2-2) <p>PS2.B: Types of Interactions</p> <ul style="list-style-type: none"> Objects in contact exert forces on each other. (3-PS2-1) Electric and magnetic forces between a pair of objects do not require that 	<p>Patterns</p> <ul style="list-style-type: none"> Patterns of change can be used to make predictions. (3-PS2-2) <p>Cause and Effect</p> <ul style="list-style-type: none"> Cause and effect relationships are routinely identified. (3-PS2-1) Cause and effect relationships are routinely identified, tested, and used to explain change. (3-PS2-3) <p>-----</p> <p><i>Connections to Engineering, Technology, and Applications of Science</i></p> <p>Interdependence of Science, Engineering, and Technology</p> <ul style="list-style-type: none"> Scientific discoveries about the natural world can often lead to new and improved technologies, which are developed through the engineering design process. (3-PS2-4) 	<p>Asking Questions and Defining Problems</p> <ul style="list-style-type: none"> Ask questions that can be investigated based on patterns such as cause and effect relationships. (3-PS2-3) Define a simple problem that can be solved through the development of a new or improved object or tool. (3-PS2-4) <p>Planning and Carrying Out Investigations</p> <ul style="list-style-type: none"> Plan and conduct an investigation collaboratively to produce data to serve as the basis for evidence, using fair tests in which variables are controlled and the number of trials considered (3-PS2-1). Make observations and/or measurements to produce data to serve as the basis for evidence for an explanation of a phenomenon or test a design solution. (3-PS2-2) <p>Constructing Explanations and Designing Solutions</p> <ul style="list-style-type: none"> Apply scientific ideas to solve design problems. (3-PS2-4) <p>-----</p> <p><i>Connections to Nature of Science</i></p> <p>Science Knowledge is Based on Empirical Evidence</p>

Unit 1: Forces: Why do things move?

the objects be in contact. The sizes of the forces in each situation depend on the properties of the objects and their distances apart and, for forces between two magnets, on their orientation relative to each other. (3-PS2-3), (3-PS2-4)

- Science findings are based on recognizing patterns. (3-PS2-2)
- Scientific Investigations Use a Variety of Methods**
- Science investigations use a variety of methods, tools, and techniques. (3-PS2-1)

**What to Assess:
Student Performance Expectations**

Students who demonstrate understanding can:

3-PS2-1. Plan and conduct an investigation to provide evidence of the effects of balanced and unbalanced forces on the motion of an object. [Clarification Statement: Examples could include an unbalanced force on one side of a ball can make it start moving; and, balanced forces pushing on a box from both sides will not produce any motion at all.] [Assessment Boundary: Assessment is limited to one variable at a time: number, size, or direction of forces. Assessment does not include quantitative force size, only qualitative and relative. Assessment is limited to gravity being addressed as a force that pulls objects down.]

3-PS2-2. Make observations and/or measurements of an object’s motion to provide evidence that a pattern can be used to predict future motion. [Clarification Statement: Examples of motion with a predictable pattern could include a child swinging in a swing, a ball rolling back and forth in a bowl, and two children on a see-saw.] [Assessment Boundary: Assessment does not include technical terms such as period and frequency.]

3-PS2-3. Ask questions to determine cause and effect relationships of electric or magnetic interactions between two objects not in contact with each other. [Clarification Statement: Examples of an electric force could include the force on hair from an electrically charged balloon and the electrical forces between a charged rod and pieces of paper; examples of a magnetic force could include the force between two permanent magnets, the force between an electromagnet and steel paperclips, and the force exerted by one magnet versus the force exerted by two magnets. Examples of cause and effect relationships could include how the distance between objects affects strength of the force and how the orientation of magnets affects the direction of the magnetic force.] [Assessment Boundary: Assessment is limited to forces produced by objects that can be manipulated by students, and electrical interactions are limited to static electricity.]

3-PS2-4. Define a simple design problem that can be solved by applying scientific ideas about magnets. * [Clarification Statement: Examples of problems could include constructing a latch to keep a door shut and creating a device to keep two moving objects from touching each other.]

Integrated Common Core State Standards

For ELA/Literacy

RI.3.1 - Ask and answer questions to demonstrate understanding of a text, referring explicitly to the text as the basis for the answers. (3-

For Mathematics

MP.2 - Reason abstractly and quantitatively. (3-PS2-1)
MP.5 - Use appropriate tools strategically. (3-PS2-1)

Unit 1: Forces: Why do things move?

PS2-1), (3-PS2-3)

RI.3.3 - Describe the relationship between a series of historical events, scientific ideas or concepts, or steps in technical procedures in a text, using language that pertains to time, sequence, and cause/effect. (3-PS2-3)

RI.3.8 - Describe the logical connection between particular sentences and paragraphs in a text (e.g., comparison, cause/effect, first/second/third in a sequence). (3-PS2-3)

W.3.7 - Conduct short research projects that build knowledge about a topic. (3-PS2-1), (3-PS2-2)

W.3.8 - Recall information from experiences or gather information from print and digital sources; take brief notes on sources and sort evidence into provided categories. (3-PS2-1), (3-PS2-2)

SL.3.3 - Ask and answer questions about information from a speaker, offering appropriate elaboration and detail. (3-PS2-3)

3.MD.A.2 - Measure and estimate liquid volumes and masses of objects using standard units of grams (g), kilograms (kg), and liters (l). Add, subtract, multiply, or divide to solve one-step word problems involving masses or volumes that are given in the same units, e.g., by using drawings (such as a beaker with a measurement scale) to represent the problem. (3-PS2-1)

Connections to Former DC Science Standards

Physical Science: 4.6.2-3, 4.6.5, 4.6.7-8

Forces and Motion: 5.9.2-3

Advisory 2

Unit 2: Weather and Climate		
What to Teach		What Students Do
Disciplinary Core Ideas	Crosscutting Concepts	Science & Engineering Practices
<p>ESS2.D: Weather and Climate</p> <ul style="list-style-type: none"> Scientists record patterns of the weather across different times and areas so that they can make predictions about what kind of weather might happen next. (3-ESS2-1) Climate describes a range of an area's typical weather conditions and the extent to which those conditions vary over years. (3-ESS2-2) <p>ESS3.B: Natural Hazards</p> <ul style="list-style-type: none"> A variety of natural hazards result from natural processes. Humans cannot eliminate natural hazards but can take steps to reduce their impacts. (3-ESS3-1) (Note: This Disciplinary Core Idea is also addressed by 4-ESS3-2.) 	<p>Patterns</p> <ul style="list-style-type: none"> Patterns of change can be used to make predictions. (3-ESS2-1), (3-ESS2-2) <p>Cause and Effect</p> <ul style="list-style-type: none"> Cause and effect relationships are routinely identified, tested, and used to explain change. (3-ESS3-1) <p>-----</p> <p><i>Connections to Engineering, Technology, and Applications of Science</i></p> <p>Influence of Engineering, Technology, and Science on Society and the Natural World</p> <ul style="list-style-type: none"> Engineers improve existing technologies or develop new ones to increase their benefits (e.g., better artificial limbs), decrease known risks (e.g., seatbelts in cars), and meet societal demands (e.g., cell phones). (3-ESS3-1) <p>-----</p> <p><i>Connections to Nature of Science</i></p> <p>Science is a Human Endeavor</p> <ul style="list-style-type: none"> Science affects everyday life. (3-ESS3-1) 	<p>Analyzing and Interpreting Data</p> <ul style="list-style-type: none"> Represent data in tables and various graphical displays (bar graphs, pictographs and/or pie charts) to reveal patterns that indicate relationships. (3-ESS2-1) <p>Obtaining, Evaluating, and Communicating Information</p> <ul style="list-style-type: none"> Obtain and combine information from books and other reliable media to explain phenomena. (3-ESS2-2) <p>Engaging in Argument from Evidence</p> <ul style="list-style-type: none"> Make a claim about the merit of a solution to a problem by citing relevant evidence about how it meets the criteria and constraints of the problem. (3-ESS3-1)

Unit 2: Weather and Climate

What to Assess: *Student Performance Expectations*

Students who demonstrate understanding can:

3-ESS2-1. Represent data in tables and graphical displays to describe typical weather conditions expected during a particular season.

[Clarification Statement: Examples of data at this grade level could include average temperature, precipitation, and wind direction.]

[Assessment Boundary: Assessment of graphical displays is limited to pictographs and bar graphs. Assessment does not include climate change.]

3-ESS2-2. Obtain and combine information to describe climates in different regions of the world.

3-ESS3-1. Make a claim about the merit of a design solution that reduces the impacts of a weather-related hazard.* [Clarification Statement: Examples of design solutions to weather-related hazards could include barriers to prevent flooding, wind resistant roofs, and lightning rods.]

Integrated Common Core State Standards

For ELA/Literacy

RI.3.1 - Ask and answer questions to demonstrate understanding of a text, referring explicitly to the text as the basis for the answers. (3-ESS2-2)

RI.3.9 - Compare and contrast the most important points and key details presented in two texts on the same topic. (3-ESS2-2)

W.3.9 - Recall information from experiences or gather information from print and digital sources; take brief notes on sources and sort evidence into provided categories. (3-ESS2-2)

W.3.1 - Write opinion pieces on topics or texts, supporting a point of view with reasons. (3-ESS3-1)

W.3.7 - Conduct short research projects that build knowledge about a topic. (3-ESS3-1)

For Mathematics

MP.2 - Reason abstractly and quantitatively. (3-ESS2-1), (3-ESS2-2)

MP.4 - Model with mathematics. (3-ESS2-1), (3-ESS2-2)

MP.5 - Use appropriate tools strategically. (3-ESS2-1)

3.MD.A.2 - Measure and estimate liquid volumes and masses of objects using standard units of grams (g), kilograms (kg), and liters (l). Add, subtract, multiply, or divide to solve one-step word problems involving masses or volumes that are given in the same units, e.g., by using drawings (such as a beaker with a measurement scale) to represent the problem. (3-ESS2-1)

3.MD.B.3 - Draw a scaled picture graph and a scaled bar graph to represent a data set with several categories. Solve one- and two-step “how many more” and “how many less” problems using information presented in bar graphs. (3-ESS2-1)

Connections to Former DC Science Standards

Earth Science: 2.3.1, 2.3.3-7

Advisory 3

Unit 3: The Ecosystem is Changing

What to Teach		What Students Do
Disciplinary Core Ideas	Crosscutting Concepts	Science & Engineering Practices
<p>LS2.C: Ecosystem Dynamics, Functioning, and Resilience</p> <ul style="list-style-type: none"> When the environment changes in ways that affect a place’s physical characteristics, temperature, or availability of resources, some organisms survive and reproduce, others move to new locations, yet others move into the transformed environment, and some die. (Secondary to 3-LS4-4) <p>LS4.A: Evidence of Common Ancestry and Diversity</p> <ul style="list-style-type: none"> Some kinds of plants and animals that once lived on Earth are no longer found anywhere. (Note: moved from K-2) (3-LS4-1) Fossils provide evidence about the types of organisms that lived long ago and also about the nature of their environments. (3-LS4-1) <p>LS4.D: Biodiversity and Humans</p> <ul style="list-style-type: none"> Populations live in a variety of habitats, and change in those habitats affects the organisms living there. (3-LS4-4) 	<p>Scale, Proportion, and Quantity</p> <ul style="list-style-type: none"> Observable phenomena exist from very short to very long time periods. (3-LS4-1) <p>Systems and System Models</p> <ul style="list-style-type: none"> A system can be described in terms of its components and their interactions. (3-LS4-4) <hr/> <p><i>Connections to Nature of Science</i></p> <p>Scientific Knowledge Assumes an Order and Consistency in Natural Systems</p> <ul style="list-style-type: none"> Science assumes consistent patterns in natural systems. (3-LS4-1) 	<p>Analyzing and Interpreting Data</p> <ul style="list-style-type: none"> Analyze and interpret data to make sense of phenomena using logical reasoning. (3-LS4-1) <p>Engaging in Argument from Evidence</p> <ul style="list-style-type: none"> Make a claim about the merit of a solution to a problem by citing relevant evidence about how it meets the criteria and constraints of the problem. (3-LS4-4)

Unit 3: The Ecosystem is Changing

What to Assess:

Student Performance Expectations

Students who demonstrate understanding can:

3-LS4-1. Analyze and interpret data from fossils to provide evidence of the organisms and the environments in which they lived long ago.

[Clarification Statement: Examples of data could include type, size, and distributions of fossil organisms. Examples of fossils and environments could include marine fossils found on dry land, tropical plant fossils found in Arctic areas, and fossils of extinct organisms.]

[Assessment Boundary: Assessment does not include identification of specific fossils or present plants and animals. Assessment is limited to major fossil types and relative ages.]

3-LS4-4. Make a claim about the merit of a solution to a problem caused when the environment changes and the types of plants and animals that live there may change.* [Clarification Statement: Examples of environmental changes could include changes in land characteristics, water distribution, temperature, food, and other organisms.] [Assessment Boundary: Assessment is limited to a single environmental change. Assessment does not include the greenhouse effect or climate change.]

Integrated Common Core State Standards

For ELA/Literacy

RI.3.1 - Ask and answer questions to demonstrate understanding of a text, referring explicitly to the text as the basis for the answers. (3-LS4-1), (3-LS4-4)

RI.3.2 - Determine the main idea of a text; recount the key details and explain how they support the main idea. (3-LS4-1), (3-LS4-4)

RI.3.3 - Describe the relationship between a series of historical events, scientific ideas or concepts, or steps in technical procedures in a text, using language that pertains to time, sequence, and cause/effect. (3-LS4-1), (3-LS4-4)

W.3.1 - Write opinion pieces on topics or texts, supporting a point of view with reasons. (3-LS4-1), (3-LS4-4)

W.3.2 - Write informative/explanatory texts to examine a topic and convey ideas and information clearly. (3-LS4-1), (3-LS4-4)

W.3.9 - Recall information from experiences or gather information from print and digital sources; take brief notes on sources and sort evidence into provided categories. (3-LS4-1)

SL.3.4 - Report on a topic or text, tell a story, or recount an experience with appropriate facts and relevant, descriptive details, speaking clearly at an understandable pace. (3-LS4-4)

For Mathematics

MP.2 - Reason abstractly and quantitatively. (3-LS4-1), (3-LS4-4)

MP.4 - Model with mathematics. (3-LS4-1), (3-LS4-4)

MP.5 - Use appropriate tools strategically. (3-LS4-1)

3.MD.B.4 - Generate measurement data by measuring lengths using rulers marked with halves and fourths of an inch. Show the data by making a line plot, where the horizontal scale is marked off in appropriate units—whole numbers, halves, or quarters. (3-LS4-1)

Unit 3: The Ecosystem is Changing

Connections to *Former* DC Science Standards

Adaptation and Survival: 5.12.9-10

Advisory 3

Unit 4: Plant and Animal Life Cycles		
What to Teach		What Students Do
Disciplinary Core Ideas	Crosscutting Concepts	Science & Engineering Practices
<p>LS1.B: Growth and Development of Organisms</p> <ul style="list-style-type: none"> Reproduction is essential to the continued existence of every kind of organism. Plants and animals have unique and diverse life cycles. (3-LS1-1) <p>LS3.A: Inheritance of Traits</p> <ul style="list-style-type: none"> Many characteristics of organisms are inherited from their parents. (3-LS3-1) Other characteristics result from individuals' interactions with the environment, which can range from diet to learning. Many characteristics involve both inheritance and environment. (3-LS3-2) <p>LS3.B: Variation of Traits</p> <ul style="list-style-type: none"> Different organisms vary in how they look and function because they have different inherited information. (3-LS3-1) The environment also affects the traits that an organism develops. (3-LS3-2) 	<p>Patterns</p> <ul style="list-style-type: none"> Patterns of change can be used to make predictions. (3-LS1-1) Similarities and differences in patterns can be used to sort and classify natural phenomena. (3-LS3-1) <p>Cause and Effect</p> <ul style="list-style-type: none"> Cause and effect relationships are routinely identified and used to explain change. (3-LS3-2) 	<p>Developing and Using Models</p> <ul style="list-style-type: none"> Develop models to describe phenomena. (3-LS1-1) <p>Analyzing and Interpreting Data</p> <ul style="list-style-type: none"> Analyze and interpret data to make sense of phenomena using logical reasoning. (3-LS3-1) <p>Constructing Explanations and Designing Solutions</p> <ul style="list-style-type: none"> Use evidence (e.g., observations, patterns) to support an explanation. (3-LS3-2) <hr style="border-top: 1px dashed black;"/> <p>Connections to Nature of Science</p> <p>Scientific Knowledge is Based on Empirical Evidence</p> <ul style="list-style-type: none"> Science findings are based on recognizing patterns. (3-LS1-1)
What to Assess: <i>Student Performance Expectations</i>		
<p>Students who demonstrate understanding can:</p> <p>3-LS1-1. Develop models to describe that organisms have unique and diverse life cycles but all have in common birth, growth,</p>		

Unit 4: Plant and Animal Life Cycles

reproduction, and death. [Clarification Statement: Changes organisms go through during their life form a pattern.]

3-LS3-1. Analyze and interpret data to provide evidence that plants and animals have traits inherited from parents and that variation of these traits exists in a group of similar organisms. [Clarification Statement: Patterns are the similarities and differences in traits shared between offspring and their parents, or among siblings. Emphasis is on organisms other than humans.] [Assessment Boundary: Assessment does not include genetic mechanisms of inheritance and prediction of traits. Assessment is limited to non-human examples.]

3-LS3-2. Use evidence to support the explanation that traits can be influenced by the environment. [Clarification Statement: Examples of the environment affecting a trait could include normally tall plants grown with insufficient water are stunted; and, a pet dog that is given too much food and little exercise may become overweight.]

Integrated Common Core State Standards

For ELA/Literacy

RI.3.1 Ask and answer questions to demonstrate understanding of a text, referring explicitly to the text as the basis for the answers. (3-LS3-1), (3-LS3-2)

RI.3.2 - Determine the main idea of a text; recount the key details and explain how they support the main idea. (3-LS3-1), (3-LS3-2)

RI.3.3 - Describe the relationship between a series of historical events, scientific ideas or concepts, or steps in technical procedures in a text, using language that pertains to time, sequence, and cause/effect. (3-LS3-1), (3-LS3-2)

W.3.2 - Write informative/explanatory texts to examine a topic and convey ideas and information clearly. (3-LS3-1), (3-LS3-2)

SL.3.4 - Report on a topic or text, tell a story, or recount an experience with appropriate facts and relevant, descriptive details, speaking clearly at an understandable pace. (3-LS3-1), (3-LS3-2)

SL.3.4 - Report on a topic or text, tell a story, or recount an experience with appropriate facts and relevant, descriptive details, speaking clearly at an understandable pace. (3-LS3-1), (3-LS3-2)

RI.3.7 - Use information gained from illustrations (e.g., maps, photographs) and the words in a text to demonstrate understanding of the text (e.g., where, when, why, and how key events occur). (3-LS1-1)

For Mathematics

MP.4 - Model with mathematics. (3-LS1-1)

3.NBT - Number and Operations in Base Ten (3-LS1-1)

3.NF - Number and Operations—Fractions (3-LS1-1)

MP.2 - Reason abstractly and quantitatively. (3-LS3-1), (3-LS3-2)

3.MD.B.4 - Generate measurement data by measuring lengths using rulers marked with halves and fourths of an inch. Show the data by making a line plot, where the horizontal scale is marked off in appropriate units—whole numbers, halves, or quarters. (3-LS3-1), (3-LS3-2)

Unit 4: Plant and Animal Life Cycles

SL.3.5 - Create engaging audio recordings of stories or poems that demonstrate fluid reading at an understandable pace; add visual displays when appropriate to emphasize or enhance certain facts or details. (3-LS1-1)

Connections to *Former* DC Science Standards

Life Science: 3.6.1-3, 3.5.1

Inheritance: 5.11.2

Advisory 4

Unit 5: The Hunger Games: Who will Survive?		
What to Teach		What Students Do
Disciplinary Core Ideas	Crosscutting Concepts	Science & Engineering Practices
<p>LS2.D: Social Interactions and Group Behavior</p> <ul style="list-style-type: none"> • Being part of a group helps animals obtain food, defend themselves, and cope with changes. Groups may serve different functions and vary dramatically in size (Note: Moved from K–2). (3-LS2-1) <p>LS4.B: Natural Selection</p> <ul style="list-style-type: none"> • Sometimes the differences in characteristics between individuals of the same species provide advantages in surviving, finding mates, and reproducing. (3-LS4-2) <p>LS4.C: Adaptation</p> <ul style="list-style-type: none"> • For any particular environment, some kinds of organisms survive well, some survive less well, and some cannot survive at all. (3-LS4-3) 	<p>Cause and Effect</p> <ul style="list-style-type: none"> • Cause and effect relationships are routinely identified and used to explain change. (3-LS2-1) (3-LS4-2), (3-LS4-3) <p style="text-align: center;">-----</p> <p>Connections to Engineering, Technology, and Applications of Science</p> <p>Interdependence of Science, Engineering, and Technology</p> <ul style="list-style-type: none"> • Knowledge of relevant scientific concepts and research findings is important in engineering. (3-LS4-3) 	<p>Engaging in Argument from Evidence</p> <ul style="list-style-type: none"> • Construct an argument with evidence, data, and/or a model. (3-LS2-1) <p>Constructing Explanations and Designing Solutions</p> <ul style="list-style-type: none"> • Use evidence (e.g., observations, patterns) to construct an explanation. (3-LS4-2) <p>Engaging in Argument from Evidence</p> <ul style="list-style-type: none"> • Construct an argument with evidence. (3-LS4-3)
What to Assess: <i>Student Performance Expectations</i>		
<p>Students who demonstrate understanding can:</p> <p>3-LS2-1. Construct an argument that some animals form groups that help members survive.</p> <p>3-LS4-2. Use evidence to construct an explanation for how the variations in characteristics among individuals of the same species may provide advantages in surviving, finding mates, and reproducing. [Clarification Statement: Examples of cause and effect relationships could be plants that have larger thorns than other plants may be less likely to be eaten by predators; and, animals that have better camouflage coloration than other animals may be more likely to survive and therefore more likely to leave offspring.]</p> <p>3-LS4-3. Construct an argument with evidence that in a particular habitat some organisms can survive well, some survive less well, and some cannot survive at all. [Clarification Statement: Examples of evidence could include needs and characteristics of the organisms and habitats</p>		

Unit 5: The Hunger Games: Who will Survive?

involved. The organisms and their habitat make up a system in which the parts depend on each other.]

Integrated Common Core State Standards

For ELA/Literacy

- SL.3.4** - Report on a topic or text, tell a story, or recount an experience with appropriate facts and relevant, descriptive details, speaking clearly at an understandable pace. (3-LS4-2), (3-LS4-3)
- RI.3.1** - Ask and answer questions to demonstrate understanding of a text, referring explicitly to the text as the basis for the answers. (3-LS2-1), (3-LS4-2), (3-LS4-3)
- RI.3.2** - Determine the main idea of a text; recount the key details and explain how they support the main idea. (3-LS4-2), (3-LS4-3)
- RI.3.3** - Describe the relationship between a series of historical events, scientific ideas or concepts, or steps in technical procedures in a text, using language that pertains to time, sequence, and cause/effect. (3-LS2-1), (3-LS4-2), (3-LS4-3)
- W.3.1** - Write opinion pieces on topics or texts, supporting a point of view with reasons. (3-LS2-1), (3-LS4-3)
- W.3.2** - Write informative/explanatory texts to examine a topic and convey ideas and information clearly. (3-LS4-2), (3-LS4-3)

For Mathematics

- MP.4** - Model with mathematics. (3-LS2-1)
- 3.NBT** - Number and Operations in Base Ten. (3-LS2-1)
- 3.MD.B.3** - Draw a scaled picture graph and a scaled bar graph to represent a data set with several categories. Solve one- and two-step “how many more” and “how many less” problems using information presented in scaled bar graphs. (3-LS4-2), (3-LS4-3)
- MP.2** - Reason abstractly and quantitatively. (3-LS4-1), (3-LS4-2), (3-LS4-3)

Connections to Former DC Science Standards

Adaptation and Survival: 5.12.1, 5.12.3-6

Life Science: 4.7.1, 2.7.1

Fourth Grade Science

Overview and Scope and Sequence SY14-15

Grade Level Overview: In fourth grade, students will explore the changes of the earth – how wind, water, weathering affect rocks and evolution of earth’s physical landscape. For physical science, they have their first exposure to different types of energy and how sound travels through waves. Though fairly abstract, students can use NGSS engineering strands to augment their energy learning. In earth science, students will explore systems of living things to see how plants and animals function as intricate instruments. In the last unit, students are exposed to the relationship between human population and their habitats; how we help and hurt the earth, how changes in the earth then impact us.

School Year At a Glance

Advisory	Units	Timeline
Advisory 1	Unit 1: Rocks and Weathering	9 weeks
Advisory 2	Unit 2: Energy and Waves	9 weeks
Advisory 3	Unit 3: Animal and Plant Structures	9 weeks
Advisory 4	Unit 4: Humans vs. Earth	9 weeks

Advisory 1

Unit 1: Rocks & Weathering

What to Teach		What Students Do
Disciplinary Core Ideas	Crosscutting Concepts	Science & Engineering Practices
<p>ESS1.C: The History of Planet Earth</p> <ul style="list-style-type: none"> 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. (4-ESS1-1) <p>ESS2.A: Earth Materials and Systems</p> <ul style="list-style-type: none"> Rainfall helps to shape the land and affects the types of living things found in a region. Water, ice, wind, living organisms, and gravity break rocks, soils, and sediments into smaller particles and move them around. (4-ESS2-1) <p>ESS2.B: Plate Tectonics and Large-Scale System Interactions</p> <ul style="list-style-type: none"> The locations of mountain ranges, deep ocean trenches, ocean floor structures, earthquakes, and volcanoes occur in patterns. Most earthquakes and volcanoes occur in bands that are often along the boundaries between continents and oceans. Major mountain chains form inside continents or near their edges. Maps can help locate the different land and water features areas of Earth. (4-ESS2-2) 	<p>Patterns</p> <ul style="list-style-type: none"> Patterns can be used as evidence to support an explanation. (4-ESS1-1), (4-ESS2-2) <p>Cause and Effect</p> <ul style="list-style-type: none"> Cause and effect relationships are routinely identified, tested, and used to explain change. (4-ESS2-1) <hr style="border-top: 1px dashed black;"/> <p>Connections to Nature of Science</p> <p>Scientific Knowledge Assumes an Order and Consistency in Natural Systems</p> <ul style="list-style-type: none"> Science assumes consistent patterns in natural systems. (4-ESS1-1) 	<p>Constructing Explanations and Designing Solutions</p> <ul style="list-style-type: none"> Identify the evidence that supports particular points in an explanation. (4-ESS1-1) <p>Planning and Carrying Out Investigations</p> <ul style="list-style-type: none"> Make observations and/or measurements to produce data to serve as the basis for evidence for an explanation of a phenomenon. (4-ESS2-1) <p>Analyzing and Interpreting Data</p> <ul style="list-style-type: none"> Analyze and interpret data to make sense of phenomena using logical reasoning. (4-ESS2-2)

Unit 1: Rocks & Weathering

ESS2.E: Biogeology

- Living things affect the physical characteristics of their regions. (4-ESS2-1)

What to Assess: *Student Performance Expectations*

Students who demonstrate understanding can:

4-ESS1-1. Identify evidence from patterns in rock formations and fossils in rock layers to support an explanation for changes in a landscape over time. [Clarification Statement: Examples of evidence from patterns could include rock layers with marine shell fossils above rock layers with plant fossils and no shells, indicating a change from land to water over time; and, a canyon with different rock layers in the walls and a river in the bottom, indicating that over time a river cut through the rock.] [Assessment Boundary: Assessment does not include specific knowledge of the mechanism of rock formation or memorization of specific rock formations and layers. Assessment is limited to relative time]

4-ESS2-1. Make observations and / or measurements to provide evidence of the effects of weathering or the rate of erosion by water, ice, wind, or vegetation. [Clarification Statement: Examples of variables to test could include angle of slope in the downhill movement of water, amount of vegetation, speed of wind, relative rate of deposition, cycles of freezing and thawing of water, cycles of heating and cooling, and volume of water flow.] [Assessment Boundary: Assessment is limited to a single form of weathering or erosion]

4-ESS2-2. Analyze and interpret data from maps to describe patterns of Earth’s features. [Clarification Statement: Maps can include topographic maps of Earth’s land and ocean floor, as well as maps of the locations of mountains, continental boundaries, volcanoes, and earthquakes.]

Integrated Common Core State Standards

For ELA/Literacy

W.4.7 - Conduct short research projects that build knowledge through investigation of different aspects of a topic. (4-ESS1-1), (4-ESS2-2)

W.4.8 - Recall relevant information from experiences or gather relevant information from print and digital sources; take notes and categorize information, and provide a list of sources. (4-ESS1-1), (4-ESS2-1)

W.4.9 - Draw evidence from literary or informational texts to support analysis, reflection, and research. (4-ESS1-1)

RI.4.7 - Interpret information presented visually, orally, or quantitatively (e.g., in charts, graphs, diagrams, time lines, animations, or interactive elements on Web pages) and explain

For Mathematics

MP.2 - Reason abstractly and quantitatively. (4-ESS2-1)

MP.4 - Model with mathematics. (4-ESS2-1)

MP.5 - Use appropriate tools strategically. (4-ESS2-1)

4.MD.A.1 - Know relative sizes of measurement units within one system of units including km, m, cm; kg, g; lb, oz.; l, ml; hr, min, sec. Within a single system of measurement, express measurements in a larger unit in terms of a smaller unit. Record measurement equivalents in a two-column table. (4-ESS2-1)

4.MD.A.2. Use the four operations to solve word problems involving distances, intervals of time, liquid volumes, masses of objects, and money, including problems involving simple fractions or decimals, and problems that require expressing measurements

Unit 1: Rocks & Weathering

how the information contributes to an understanding of the text in which it appears. (4-ESS2-2)

given in a larger unit in terms of a smaller unit. Represent measurement quantities using diagrams such as number line diagrams that feature a measurement scale. (4-ESS2-1), (4-ESS2-2)

Connections to Former DC Science Standards

Earth Science: 4.3.1-2, 4.4.1-8

Advisory 2

Unit 2: Energy & Waves

What to Teach		What Students Do
Disciplinary Core Ideas	Crosscutting Concepts	Science & Engineering Practices
<p>PS3.A: Definitions of Energy</p> <ul style="list-style-type: none"> The faster a given object is moving, the more energy it possesses. (4-PS3-1) Energy can be moved from place to place by moving objects or through sound, light, or electric currents. (4-PS3-2), (4-PS3-3) <p>PS3.B: Conservation of Energy and Energy Transfer</p> <ul style="list-style-type: none"> Energy is present whenever there are moving objects, sound, light, or heat. When objects collide, energy can be transferred from one object to another, thereby changing their motion. In such collisions, some energy is typically also transferred to the surrounding air; as a result, the air gets heated and sound is produced. (4-PS3-2), (4-PS3-3) Light also transfers energy from place to place. (4-PS3-2) Energy can also be transferred from place to place by electric currents, which can then be used locally to produce motion, sound, heat, or light. The currents may have been produced to begin with by transforming the energy of motion into electrical energy. (4-PS3-2), (4- 	<p>Energy and Matter</p> <ul style="list-style-type: none"> Energy can be transferred in various ways and between objects. (4-PS3-1), (4-PS3-2), (4-PS3-3), (4-PS3-4) <p>Patterns</p> <ul style="list-style-type: none"> Similarities and differences in patterns can be used to sort, classify, and analyze simple rates of change for natural phenomena. (4-PS4-1) Similarities and differences in patterns can be used to sort and classify designed products. (4-PS4-3) <p>Cause and Effect</p> <ul style="list-style-type: none"> Cause and effect relationships are routinely identified. (4-PS4-2) <p style="text-align: center;">-----</p> <p><i>Connections to Engineering, Technology, and Applications of Science</i></p> <p>Influence of Science, Engineering and Technology on Society and the Natural World</p> <ul style="list-style-type: none"> Engineers improve existing technologies or develop new ones. (4-PS3-4) <p>Interdependence of Science, Engineering, and Technology</p> <ul style="list-style-type: none"> Knowledge of relevant scientific concepts and research findings is important in engineering. (4-PS4-3) 	<p>Asking Questions and Defining Problems</p> <ul style="list-style-type: none"> Ask questions that can be investigated and predict reasonable outcomes based on patterns such as cause and effect relationships. (4-PS3-3) <p>Constructing Explanations and Designing Solutions</p> <ul style="list-style-type: none"> Use evidence (e.g., measurements, observations, patterns) to construct an explanation. (4-PS3-1) Apply scientific ideas to solve design problems. (4-PS3-4) Generate and compare multiple solutions to a problem based on how well they meet the criteria and constraints of the design solution. (4-PS4-3) <p>Planning and Carrying Out Investigations</p> <ul style="list-style-type: none"> Make observations and/or measurements to produce data to serve as the basis for evidence for an explanation of a phenomenon. (4-PS3-2) <p>Developing and Using Models</p> <ul style="list-style-type: none"> Develop a model using an analogy, example, or abstract representation to describe a scientific principle. (4-PS4-1) Develop a model to describe

Unit 2: Energy & Waves

<p>PS3-4)</p> <p>PS3.C: Relationship Between Energy and Forces</p> <ul style="list-style-type: none"> When objects collide, the contact forces transfer energy so as to change the objects' motions. (4-PS3-3) <p>PS3.D: Energy in Chemical Processes and Everyday Life</p> <ul style="list-style-type: none"> The expression "produce energy" typically refers to the conversion of stored energy into a desired form for practical use. (4-PS3-4) <p>ETS1.A: Defining Engineering Problems</p> <ul style="list-style-type: none"> Possible solutions to a problem are limited by available materials and resources (constraints). The success of a designed solution is determined by considering the desired features of a solution (criteria). Different proposals for solutions can be compared on the basis of how well each one meets the specified criteria for success or how well each takes the constraints into account. (Secondary to 4-PS3-4) <p>PS4.A: Wave Properties</p> <ul style="list-style-type: none"> Waves, which are regular patterns of motion, can be made in water by disturbing the surface. When waves move across the surface of deep water, the water goes up and down in place; there is no net motion in the 	<p align="center"><i>Connections to Nature of Science</i></p> <p>Science is a Human Endeavor</p> <ul style="list-style-type: none"> Most scientists and engineers work in teams. (4-PS3-4) Science affects everyday life. (4-PS3-4) 	<p align="center">phenomena. (4-PS4-2)</p> <p align="center"><i>Connections to Nature of Science</i></p> <p>Scientific Knowledge is Based on Empirical Evidence</p> <ul style="list-style-type: none"> Science findings are based on recognizing patterns. (4-PS4-1)
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Unit 2: Energy & Waves

direction of the wave except when the water meets a beach. (Note: This grade band endpoint was moved from K–2.) (4-PS4-1)

- Waves of the same type can differ in amplitude (height of the wave) and wavelength (spacing between wave peaks). (4-PS4-1)

PS4.B: Electromagnetic Radiation

- An object can be seen when light reflected from its surface enters the eyes. (4-PS4-2)

PS4.C: Information Technologies and Instrumentation

- Digitized information can be transmitted over long distances without significant degradation. High-tech devices, such as computers or cell phones, can receive and decode information—convert it from digitized form to voice—and vice versa. (4-PS4-3)

ETS1.C: Optimizing The Design Solution

- Different solutions need to be tested in order to determine which of them best solves the problem, given the criteria and the constraints. (Secondary to 4-PS4-3)

What to Assess: Student Performance Expectations

Students who demonstrate understanding can:

4-PS3-1. Use evidence to construct an explanation relating the speed of an object to the energy of that object. [Assessment Boundary: Assessment does not include quantitative measures of changes in the speed of an object or on any precise or quantitative definition of

Unit 2: Energy & Waves

energy.]

4-PS3-2. Make observations to provide evidence that energy can be transferred from place to place by sound, light, heat, and electric currents. [Assessment Boundary: Assessment does not include quantitative measurements of energy.]

4-PS3-3. Ask questions and predict outcomes about the changes in energy that occur when objects collide. [Clarification Statement: Emphasis is on the change in the energy due to the change in speed, not on the forces, as objects interact.] [Assessment Boundary: Assessment does not include quantitative measurements of energy.]

4-PS3-4. Apply scientific ideas to design, test, and refine a device that converts energy from one form to another.

[Clarification Statement: Examples of devices could include electric circuits that convert electrical energy into motion energy of a vehicle, light, or sound; and, a passive solar heater that converts light into heat. Examples of constraints could include the materials, cost, or time to design the device.] [Assessment Boundary: Devices should be limited to those that convert motion energy to electric energy or use stored energy to cause motion or produce light or sound.]

4-PS4-1. Develop a model of waves to describe patterns in terms of amplitude and wavelength and that waves can cause objects to move.

[Clarification Statement: Examples of models could include diagrams, analogies, and physical models using wire to illustrate wavelength and amplitude of waves.] [Assessment Boundary: Assessment does not include interference effects, electromagnetic waves, non-periodic waves, or quantitative models of amplitude and wavelength.]

4-PS4-2. Develop a model to describe that light reflecting from objects and entering the eye allows objects to be seen. [Assessment Boundary: Assessment does not include knowledge of specific colors reflected and seen, the cellular mechanisms of vision, or how the retina works].

4-PS4-3. Generate and compare multiple solutions that use patterns to transfer information. [Clarification Statement: Examples of solutions could include drums sending coded information through sound waves, using a grid of 1's and 0's representing black and white to send information about a picture, and using Morse code to send text.]

Integrated Common Core State Standards

For ELA/Literacy

RI.4.1 - Write opinion pieces on topics or texts, supporting a point of view with reasons and information. (4-PS3-1)

RI.4.3 - Explain events, procedures, ideas, or concepts in a historical, scientific, or technical text, including what happened and why, based on specific information in the text. (4-PS3-1)

RI.4.9 - Integrate information from two texts on the same topic in order to write or speak about the subject knowledgeably. (4-PS3-1; 4-PS4-3)

SL.4.5 - Add audio recordings and visual displays to presentations when appropriate to enhance the development of main ideas or

For Mathematics

MP.4 - Model with mathematics. (4-PS4-1), (4-PS4-2)

4.G.A.1 - Draw points, lines, line segments, rays, angles (right, acute, obtuse), and perpendicular and parallel lines. Identify these in two-dimensional figures. (4-PS4-1), (4-PS4-2)

4.OA.A.3 - Solve multistep word problems posed with whole numbers and having whole-number answers using the four operations, including problems in which remainders must be interpreted. Represent these problems using equations with a letter standing for the unknown quantity. Assess the reasonableness of answers using mental computation and estimation strategies including

Unit 2: Energy & Waves

themes. (4-PS4-1), (4-PS4-2)

W.4.2 - Write informative/explanatory texts to examine a topic and convey ideas and information clearly. (4-PS3-1)

W.4.7 - Conduct short research projects that build knowledge through investigation of different aspects of a topic. (4-PS3-2), (4-PS3-3), (4-PS3-4)

W.4.8 - Recall relevant information from experiences or gather relevant information from print and digital sources; take notes and categorize information, and provide a list of sources. (4-PS3-1), (4-PS3-2), (4-PS3-3), (4-PS3-4)

W.4.9 - Draw evidence from literary or informational texts to support analysis, reflection, and research. (4-PS3-1)

rounding. (4-PS3-4)

Connections to Former DC Science Standards

Physical Science: 3.4.1-3, 4.6.1-10

Advisory 3

Unit 3: Animal & Plant Structures		
What to Teach		What Students Do
Disciplinary Core Ideas	Crosscutting Concepts	Science & Engineering Practices
<p>LS1.A: Structure and Function</p> <ul style="list-style-type: none"> Plants and animals have both internal and external structures that serve various functions in growth, survival, behavior, and reproduction. (4-LS1-1) <p>LS1.D: Information Processing</p> <ul style="list-style-type: none"> Different sense receptors are specialized for particular kinds of information, which may be then processed by the animal’s brain. Animals are able to use their perceptions and memories to guide their actions. (4-LS1-2) 	<p>Systems and System Models</p> <ul style="list-style-type: none"> A system can be described in terms of its components and their interactions. (4-LS1-1), (4-LS1-2) 	<p>Developing and Using Models</p> <ul style="list-style-type: none"> Use a model to test interactions concerning the functioning of a natural system. (4-LS1-2) <p>Engaging in Argument from Evidence</p> <ul style="list-style-type: none"> Construct an argument with evidence, data, and/or a model. (4-LS1-1)
What to Assess: <i>Student Performance Expectations</i>		
<p>Students who demonstrate understanding can:</p> <p>4-LS1-1. Construct an argument that plants and animals have internal and external structures that function to support survival, growth, behavior, and reproduction. [Clarification Statement: Examples: of structures could include thorns, stems, roots, colored petals, heart, stomach, lung, brain, and skin.] [Assessment Boundary: Assessment is limited to macroscopic structures within plant and animal systems.]</p> <p>4-LS1-2. Use a model to describe that animals receive different types of information through their senses, process the information in their brain, and respond to the information in different ways. [Clarification Statement: Emphasis is on systems of information transfer.] [Assessment Boundary: Assessment does not include the mechanisms by which the brain stores and recalls information or the mechanisms of how sensory receptors function.]</p>		
Integrated Common Core State Standards		
<p>For ELA/Literacy</p> <p>W.4.1- Write opinion pieces on topics or texts, supporting a point of view with reasons and information. (4-LS1-1)</p> <p>SL.4.5 - Add audio recordings and visual displays to presentations when appropriate to enhance the development of main ideas or</p>	<p>For Mathematics</p> <p>4.G.A.3 - Recognize a line of symmetry for a two-dimensional figure as a line across the figure such that the figure can be folded across the line into matching parts. Identify line-symmetric figures and draw lines of symmetry. (4-LS1-1)</p>	

Unit 3: Animal & Plant Structures	
themes. (4-LS1-2)	
Connections to <i>Former</i> DC Science Standards	
Life Science: 4.7.1-10, 4.8.1-9	

Advisory 4

Unit 4: Humans Vs. Earth		
What to Teach		What Students Do
Disciplinary Core Ideas	Crosscutting Concepts	Science & Engineering Practices
<p>ESS3.A: Natural Resources</p> <ul style="list-style-type: none"> Energy and fuels that humans use are derived from natural sources, and their use affects the environment in multiple ways. Some resources are renewable over time, and others are not. (4-ESS3-1) <p>ESS3.B: Natural Hazards</p> <ul style="list-style-type: none"> A variety of hazards result from natural processes (e.g., earthquakes, tsunamis, volcanic eruptions). Humans cannot eliminate the hazards but can take steps to reduce their impacts. (4-ESS3-2) (Note: This Disciplinary Core Idea can also be found in 3.WC.) <p>ETS1.B: Designing Solutions to Engineering Problems</p> <ul style="list-style-type: none"> Testing a solution involves investigating how well it performs under a range of likely conditions. (Secondary to 4-ESS3-2) 	<p>Cause and Effect</p> <ul style="list-style-type: none"> Cause and effect relationships are routinely identified and used to explain change. (4-ESS3-1) Cause and effect relationships are routinely identified, tested, and used to explain change. (4-ESS3-2) <hr style="border-top: 1px dashed black;"/> <p><i>Connections to Engineering, Technology, and Applications of Science</i></p> <p>Interdependence of Science, Engineering, and Technology</p> <ul style="list-style-type: none"> Knowledge of relevant scientific concepts and research findings is important in engineering. (4-ESS3-1) <p>Influence of Engineering, Technology, and Science on Society and the Natural World</p> <ul style="list-style-type: none"> Over time, people’s needs and wants change, as do their demands for new and improved technologies. (4-ESS3-1) Engineers improve existing technologies or develop new ones to increase their benefits, to decrease known risks, and to meet societal demands. (4-ESS3-2) 	<p>Constructing Explanations and Designing Solutions</p> <ul style="list-style-type: none"> Generate and compare multiple solutions to a problem based on how well they meet the criteria and constraints of the design solution. (4-ESS3-2) <p>Obtaining, Evaluating, and Communicating Information</p> <ul style="list-style-type: none"> Obtain and combine information from books and other reliable media to explain phenomena. (4-ESS3-1)

Unit 4: Humans Vs. Earth

What to Assess: *Student Performance Expectations*

Students who demonstrate understanding can:

4-ESS3-1. Obtain and combine information to describe that energy and fuels are derived from natural resources and their uses affect the environment. [Clarification Statement: Examples of renewable energy resources could include wind energy, water behind dams, and sunlight; non-renewable energy resources are fossil fuels and fissile materials. Examples of environmental effects could include loss of habitat due to dams, loss of habitat due to surface mining, and air pollution from burning of fossil fuels.]

4-ESS3-2. Generate and compare multiple solutions to reduce the impacts of natural Earth processes on humans. [Clarification Statement: Examples of solutions could include designing an earthquake resistant building and improving monitoring of volcanic activity.] [Assessment Boundary: Assessment is limited to earthquakes, floods, tsunamis, and volcanic eruptions.]

Integrated Common Core State Standards

For ELA/Literacy

RI.4.1 - Refer to details and examples in a text when explaining what the text says explicitly and when drawing inferences from the text. (4-ESS3-2)

RI.4.9 - Integrate information from two texts on the same topic in order to write or speak about the subject knowledgeably. (4-ESS3-2)

W.4.7 - Conduct short research projects that build knowledge through investigation of different aspects of a topic. (4-ESS3-1)

W.4.8 - Recall relevant information from experiences or gather relevant information from print and digital sources; take notes and categorize information, and provide a list of sources. (4-ESS3-1)

W.4.9 - Draw evidence from literary or informational texts to support analysis, reflection, and research. (4-ESS3-1)

For Mathematics

MP.2 - Reason abstractly and quantitatively. (4-ESS3-1), (4-ESS3-2)

MP.4 - Model with mathematics. (4-ESS3-1), (4-ESS3-2)

4.OA.A.1 - Interpret a multiplication equation as a comparison, e.g., interpret $35 = 5 \times 7$ as a statement that 35 is 5 times as many as 7 and 7 times as many as 5. Represent verbal statements of multiplicative comparisons as multiplication equations. (4-ESS3-1), (4-ESS3-2)

Connections to Former DC Science Standards

Science and Technology: 4.2.1-4

Fifth Grade Science

Overview and Scope and Sequence SY14-15

Grade Level Overview: In grade 5, students will deepen their understanding of Earth’s systems. The year begins with an in-depth look at our home as a planet: features of different objects in space, our place in the solar system, and characteristics of our home planet. From the large-scale, fifth graders will move into their survey of the very small. Focusing on matter and its interactions, breaking down into small particles and what “things” are made of, the fifth grade advisory two engages introductory levels of physical science. Advisory three encompasses the transfer of energy in life sciences, including movement of matter throughout an ecosystem, food chains and webs, and an overview of cells and their roles. The year ends with an emphasis on human and earth interaction, specifically focusing on ways to protect the environment.

School Year At a Glance

Advisory	Units	Timeline
Advisory 1	Our Sky: Earth and Space Systems	9 weeks
Advisory 2	Matter Matters	9 weeks
Advisory 3	Ecosystems and Webs	9 weeks
Advisory 4	Humans v. Earth: Conservation	9 weeks

Advisory 1

Unit 1: Our Sky: Earth and Space Systems		
What to Teach		What Students Do
Disciplinary Core Ideas	Crosscutting Concepts	Science & Engineering Practices
<p>ESS1.A: The Universe and its Stars</p> <ul style="list-style-type: none"> 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) <p>ESS1.B: Earth and the Solar System</p> <ul style="list-style-type: none"> 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) <p>ESS2.A: Earth Materials and Systems</p> <ul style="list-style-type: none"> 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. The ocean supports a variety of ecosystems and organisms, shapes landforms, and influences climate. Winds and clouds in the 	<p>Patterns</p> <ul style="list-style-type: none"> Similarities and differences in patterns can be used to sort, classify, communicate and analyze simple rates of change for natural phenomena. (5-ESS1-2) <p>Scale, Proportion, and Quantity</p> <ul style="list-style-type: none"> Natural objects exist from the very small to the immensely large. (5-ESS1-1) <p>Scale, Proportion, and Quantity</p> <ul style="list-style-type: none"> Standard units are used to measure and describe physical quantities such as weight and volume. (5-ESS2-2) <p>Systems and System Models</p> <ul style="list-style-type: none"> A system can be described in terms of its components and their interactions. (5-ESS2-1) <p>Cause and Effect</p> <ul style="list-style-type: none"> Cause and effect relationships are routinely identified and used to explain change. (5-PS2-1) 	<p>Analyzing and Interpreting Data</p> <ul style="list-style-type: none"> Represent data in graphical displays (bar graphs, pictographs and/or pie charts) to reveal patterns that indicate relationships. (5-ESS1-2) <p>Engaging in Argument from Evidence</p> <ul style="list-style-type: none"> Support an argument with evidence, data, or a model. (5-ESS1-1) <p>Developing and Using Models</p> <ul style="list-style-type: none"> Develop a model using an example to describe a scientific principle. (5-ESS2-1) <p>Using Mathematics and Computational Thinking</p> <ul style="list-style-type: none"> Describe and graph quantities such as area and volume to address scientific questions. (5-ESS2-2)

Unit 1: Our Sky: Earth and Space Systems

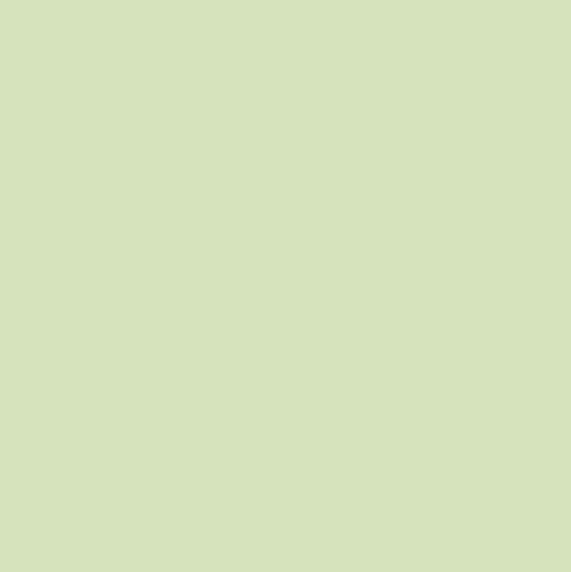
atmosphere interact with the landforms to determine patterns of weather. (5-ESS2-1)

ESS2.C: The Roles of Water in Earth’s Surface Processes

- Nearly all of Earth’s available water is in the ocean. Most fresh water is in glaciers or underground; only a tiny fraction is in streams, lakes, wetlands, and the atmosphere. (5-ESS2-2)

PS2.B: Types of Interactions

- The gravitational force of Earth acting on an object near Earth’s surface pulls that object toward the planet’s center. (5-PS2-1)



**What to Assess:
Student Performance Expectations**

Students who demonstrate understanding can:

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 the Earth. [Assessment Boundary: Assessment is limited to relative distances, not sizes, of stars. Assessment does not include other factors that affect apparent brightness (such as stellar masses, age, and stage).]

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. [Clarification Statement: Examples of patterns could include the position and motion of Earth with respect to the sun and selected stars that are visible only in particular months.] [Assessment Boundary: Assessment does not include causes of seasons.]

5-ESS2-1. Develop a model using an example to describe ways the geosphere, biosphere, hydrosphere, and/or atmosphere interact. [Clarification Statement: Examples could include the influence of the ocean on ecosystems, landform shape, and climate; the influence of the atmosphere on landforms and ecosystems through weather and climate; and the influence of mountain ranges on winds and clouds in the atmosphere. The geosphere, hydrosphere, atmosphere, and biosphere are each a system.] [Assessment Boundary: Assessment is limited to the interactions of two systems at a time.]

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. [Assessment Boundary: Assessment is limited to oceans, lakes, rivers, glaciers, ground water, and polar ice

Unit 1: Our Sky: Earth and Space Systems

caps, and does not include the atmosphere.]

5-PS2-1. Support an argument that the gravitational force exerted by Earth on objects is directed down. [Clarification Statement: “Down” is a local description of the direction that points toward the center of the spherical Earth.] [Assessment Boundary: Assessment does not include mathematical representation of gravitational force.]

Integrated Common Core State Standards

For ELA/Literacy

- RI.5.1** - Quote accurately from a text when explaining what the text says explicitly and when drawing inferences from the text. (5-ESS1-1)
- RI.5.7** - 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-ESS1-1) (5-ESS2-1), (5-ESS2-2)
- RI.5.8** - Explain how an author uses reasons and evidence to support particular points in a text, identifying which reasons and evidence support which point(s). (5-ESS1-1)
- RI.5.9** - Integrate information from several texts on the same topic in order to write or speak about the subject knowledgeably. (5-ESS1-1)
- W.5.1** - Write opinion pieces on topics or texts, supporting a point of view with reasons and information. (5-ESS1-1)
- SL.5.5** - Include multimedia components (e.g., graphics, sound) and visual displays in presentations when appropriate to enhance the development of main ideas or themes. (5-ESS1-2) (5-ESS2-1), (5-ESS2-2)
- W.5.8** - 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-ESS2-2)
- W.5.1** - Write opinion pieces on topics or texts, supporting a point of view with reasons and information. (5-PS2-1)

For Mathematics

- MP.2** - Reason abstractly and quantitatively. (5-ESS1-1), (5-ESS1-2) (5-ESS2-1), (5-ESS2-2)
- MP.4** - Model with mathematics. (5-ESS1-1), (5-ESS1-2) (5-ESS2-1), (5-ESS2-2)
- 5.NBT.A.2** - 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-ESS1-1)
- 5.G.A.2** - 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-ESS1-2)
- 5.G.A.2** - 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)

Unit 1: Our Sky: Earth and Space Systems

Connections to *Former DC Science Standards*

Space Science: 5.4.1-3

Earth Science: 5.5.1-7

Water Cycle: 5.6.1-5

Advisory 2

Unit 2: Matter Matters

Unit 2: Matter Matters		
What to Teach		What Students Do
Disciplinary Core Ideas	Crosscutting Concepts	Science & Engineering Practices
<p>PS1.A: Structure and Properties of Matter</p> <ul style="list-style-type: none"> • 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) <p>PS1.B: Chemical Reactions</p> <ul style="list-style-type: none"> • When two or more different substances are mixed, a new substance with different properties 	<p>Cause and Effect</p> <ul style="list-style-type: none"> • Cause and effect relationships are routinely identified and used to explain change. (5-PS1-4) <p>Scale, Proportion, and Quantity</p> <ul style="list-style-type: none"> • Natural objects exist from the very small to the immensely large. (5-PS1-1) • Standard units are used to measure and describe physical quantities such as weight, time, temperature, and volume. (5-PS1-2), (5-PS1-3) <p style="text-align: center;">-----</p> <p>Connections to Nature of Science</p> <p>Scientific Knowledge Assumes an Order and Consistency in Natural Systems Science assumes consistent patterns in natural systems. (5-PS1-2)</p>	<p>Developing and Using Models</p> <ul style="list-style-type: none"> • Use models to describe phenomena. (5-PS1-1) <p>Planning and Carrying Out Investigations</p> <ul style="list-style-type: none"> • Conduct an investigation collaboratively to produce data to serve as the basis for evidence, using fair tests in which variables are controlled and the number of trials considered. (5-PS1-4) • Make observations and measurements to produce data to serve as the basis for evidence for an explanation of a phenomenon. (5-PS1-3) <p>Using Mathematics and Computational Thinking</p> <ul style="list-style-type: none"> • Measure and graph quantities such as weight to address scientific and engineering questions and problems. (5-PS1-2) design solutions. • Describe and graph quantities such as area and volume to address scientific questions. (5-ESS2-2)

Unit 2: Matter Matters

- 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)

What to Assess: *Student Performance Expectations*

Students who demonstrate understanding can:

5-PS1-1. Develop a model to describe that matter is made of particles too small to be seen. [Clarification Statement: Examples of evidence supporting a model could include adding air to expand a basketball, compressing air in a syringe, dissolving sugar in water, and evaporating salt water.] [Assessment Boundary: Assessment does not include the atomic-scale mechanism of evaporation and condensation or defining the unseen particles.]

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. [Clarification Statement: Examples of reactions or changes could include phase changes, dissolving, and mixing that form new substances.] [Assessment Boundary: Assessment does not include distinguishing mass and weight.]

5-PS1-3. Make observations and measurements to identify materials based on their properties. [Clarification Statement: Examples of materials to be identified could include baking soda and other powders, metals, minerals, and liquids. Examples of properties could include color, hardness, reflectivity, electrical conductivity, thermal conductivity, response to magnetic forces, and solubility; density is not intended as an identifiable property.] [Assessment Boundary: Assessment does not include density or distinguishing mass and weight.]

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

Integrated Common Core State Standards

For ELA/Literacy

RI.5.7 - 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)

W.5.7 - Conduct short research projects that use several sources to build knowledge through investigation of different aspects of a topic. (5-PS1-2), (5-PS1-3), (5-PS1-4)

W.5.8 - 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

For Mathematics

MP.2 - Reason abstractly and quantitatively. (5-PS1-1), (5-PS1-2), (5-PS1-3)

MP.4 - Model with mathematics. (5-PS1-1), (5-PS1-2), (5-PS1-3)

MP.5 - Use appropriate tools strategically. (5-PS1-2), (5-PS1-3)

5.NBT.A.1 - 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)

Unit 2: Matter Matters

list of sources. (5-PS1-2), (5-PS1-3), (5-PS1-4)

W.5.9 - Draw evidence from literary or informational texts to support analysis, reflection, and research. (5-PS1-2), (5-PS1-3), (5-PS1-4)

5.NF.B.7 - Apply and extend previous understandings of division to divide unit fractions by whole numbers and whole numbers by unit fractions. (5-PS1-1)

5.MD.A.1 - 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-PS1-2)

5.MD.C.3 - Recognize volume as an attribute of solid figures and understand concepts of volume measurement. (5-PS1-1)

5.MD.C.4 - Measure volumes by counting unit cubes, using cubic cm, cubic in, cubic ft., and improvised units. (5-PS1-1)

Connections to *Former* DC Science Standards

Matter: 5.7.1-3

Heat and Energy: 5.8.1-3

Forces and Motion: 5.9.1-6

Advisory 3

Unit 3: Ecosystems and Webs		
What to Teach		What Students Do
Disciplinary Core Ideas	Crosscutting Concepts	Science & Engineering Practices
<p>PS3.D: Energy in Chemical Processes and Everyday Life</p> <ul style="list-style-type: none"> • 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) <p>LS1.C: Organization for Matter and Energy Flow in Organisms</p> <ul style="list-style-type: none"> • 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) <p>LS1.C: Organization for Matter and Energy Flow in Organisms</p> <ul style="list-style-type: none"> • Plants acquire their material for growth chiefly from air and water. (5-LS1-1) <p>LS2.A: Interdependent Relationships in Ecosystems</p> <ul style="list-style-type: none"> • 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 	<p>Energy and Matter</p> <ul style="list-style-type: none"> • Energy can be transferred in various ways and between objects. (5-PS3-1) • Matter is transported into, out of, and within systems. (5-LS1-1) <p>Systems and System Models</p> <ul style="list-style-type: none"> • A system can be described in terms of its components and their interactions. (5-LS2-1) 	<p>Developing and Using Models</p> <ul style="list-style-type: none"> • Use models to describe phenomena. (5-PS3-1) <p>Engaging in Argument from Evidence</p> <ul style="list-style-type: none"> • Support an argument with evidence, data, or a model. (5-LS1-1) <p>-----</p> <p>Connections to the Nature of Science</p> <p>Science Models, Laws, Mechanisms, and Theories Explain Natural Phenomena</p> <p>Science explanations describe the mechanisms for natural events. (5-LS2-1)</p>

Unit 3: Ecosystems and Webs

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. (5-LS2-1)

What to Assess: Student Performance Expectations

Students who demonstrate understanding can:

5-PS3-1. Use models to describe that that energy in animals’ food (used for body repair, growth, motion, and to maintain body warmth) was once energy from the sun. **[Clarification Statement: Examples of models could include diagrams, and flow charts.]**

5-LS1-1. Support an argument that plants get the materials they need for growth chiefly from air and water. **[Clarification Statement: Emphasis is on the idea that plant matter comes mostly from air and water, not from the soil.]**

5-LS2-1. Develop a model to describe the movement of matter among plants, animals, decomposers, and the environment. **[Clarification Statement: Emphasis is on the idea that matter that is not food (air, water, decomposed materials in soil) is changed by plants into matter that is food. Examples of systems could include organisms, ecosystems, and the Earth.] [Assessment Boundary: Assessment does not include molecular explanations.]**

Unit 3: Ecosystems and Webs

Integrated Common Core State Standards

For ELA/Literacy

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

RI.5.7 - 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)

RI.5.9 - Integrate information from several texts on the same topic in order to write or speak about the subject knowledgeably. (5-LS1-1)

W.5.1 - Write opinion pieces on topics or texts, supporting a point of view with reasons and information. (5-LS1-1)

SL.5.5 - 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)

For Mathematics

MP.2 - Reason abstractly and quantitatively. (5-LS1-1)

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

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

5.MD.A.1 - 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)

Connections to Former DC Science Standards

Cell Biology: 5.10.1-3

Inheritance: 5.11.1-2

Adaptation and Survival: 5.12.1-10

Advisory 4

Unit 4: Humans vs. Earth: Conservation		
What to Teach		What Students Do
Disciplinary Core Ideas	Crosscutting Concepts	Science & Engineering Practices
<p>ESS3.C: Human Impacts on Earth Systems</p> <ul style="list-style-type: none"> 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) 	<p>Systems and System Models</p> <ul style="list-style-type: none"> A system can be described in terms of its components and their interactions. (5-ESS3-1) <hr style="border-top: 1px dashed black;"/> <p>Connections to Nature of Science</p> <p>Science Addresses Questions About the Natural and Material World.</p> <ul style="list-style-type: none"> Science findings are limited to questions that can be answered with empirical evidence. (5-ESS3-1) 	<p>Obtaining, Evaluating, and Communicating Information</p> <ul style="list-style-type: none"> Obtain and combine information from books and/or other reliable media to explain phenomena or solutions to a design problem. (5-ESS3-1)
What to Assess: <i>Student Performance Expectations</i>		
<p>Students who demonstrate understanding can: 5-ESS3-1. Obtain and combine information about ways individual communities use science ideas to protect the Earth’s resources and environment.</p>		
Integrated Common Core State Standards		
<p>For ELA/Literacy</p> <p>RI.5.1- Quote accurately from a text when explaining what the text says explicitly and when drawing inferences from the text. (5-ESS3-1)</p> <p>RI.5.7 - 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-ESS3-1)</p> <p>RI.5.9 - Integrate information from several texts on the same topic in order to write or speak about the subject knowledgeably. (5-ESS3-1)</p> <p>W.5.8 - Recall relevant information from experiences or gather</p>	<p>For Mathematics</p> <p>MP.2 - Reason abstractly and quantitatively. (5-ESS3-1)</p> <p>MP.4 - Model with mathematics. (5-ESS3-1)</p>	

Unit 4: Humans vs. Earth: Conservation

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

Connections to *Former* DC Science Standards

Scientific Thinking: 5.1.1

Technology: 5.3.2-3