Audubon Public Schools

Grade 3: Science

Curriculum Guide

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Course Description

Grade 3: Science

The third grade science curriculum is based on the Next Generation Science Standards. Each unit has three dimensions: disciplinary core ideas, scientific and engineering practices, and crosscutting concepts. The disciplinary core ideas focus on scientific knowledge. The science and engineering practices require involvement in scientific inquiry. The crosscutting concepts connect scientific knowledge to other areas of learning.
This curriculum will incorporate the three strands of Science: Earth Science, Life Science, and Physical Science. In third grade, the focus will be on Weather and Climate; Interdependent Relationships in Ecosystems; Inheritance and Variation of Traits; and, Forces and Interactions.

Overview / Progressions

Grade 3: Science

Overview		Earth and Space Sciences	Life Sciences	Physical Sciences
Unit 1 Weather and Climate	**Focus standards (Objectives)**	3-ESS2-1 3-ESS2-2 3-ESS3-1		
Unit 2 Forces and Motion	**Focus standards (Objectives)**			3-PS2-1 3-PS2- 2
Unit 3 Electrical and Magnetic Forces	**Focus standards (Objectives)**			3-PS2-3 3-PS2-4
Unit 4 Traits	**Focus standards (Objectives)**		3-LS3-1 3-LS3-2	

Unit 5 Continuing the Cycle			3-LS1-1 3-LS4-2	
Unit 6 Organisms and the Environment			3-LS2-1 3-LS4-3	
Unit 7 Using Evidence to Understand Change in Environments			3-LS4-1 3-LS4-4	

Earth Science	Grade 3	Unit 1 Weather and Climate	20 Instructional Days

Earth Science Unit 1-Weather and Climate: (20 Instructional Days) In this unit, students will investigate weather patterns during the different seasons and areas. They will create graphs to show these patterns and create buildings to sustain weather hazards. They will reflect on their design and discuss modifications that can be made to make their structure better. They will use their knowledge to predict a season and region based on a severe weather alert. Students demonstrate proficiency by asking questions and defining problems, analyzing and interpreting data, using evidence to support a claim, and obtaining, evaluating, and communicating information.	
Overarching Essential Questions	**Overarching Enduring Understandings**
• How can we predict weather during a particular season and area? • How do engineers design buildings keeping weather patterns in mind?	Weather goes in a pattern. We can predict typical weather during a certain season and in a particular area. Engineers use typical weather patterns in a given region when designing buildings. They design solutions to weather-related problems.
Student Learning Objectives	
Develop a model using an analogy, to describe how weather and climate are related. [Note: This SLO is based on the disciplinary core ideas found in the Framework. It is intended to serve as a scaffold to 3-ESS2-1.]	**ESS2.D**
Represent data in tables and graphical displays to describe typical weather conditions expected during a particular season. [Clarification Statement: Examples of data could include average temperature, precipitation, and wind direction.] [Assessment	**3-ESS2-1**

Boundary: Assessment of graphical displays is limited to pictographs and bar graphs. Assessment does not include climate change.]	
Obtain and combine information to describe climates in different regions of the world.	**3-ESS2-2**
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.]	**3-ESS3-1**

The Student Learning Objectives above were developed using the following elements from the NRC document *A Framework for K-12 Science Education*:

Science and Engineering Practices	Disciplinary Core Ideas	Crosscutting Concepts
Analyzing and Interpreting Data Analyzing data in 3–5 builds on K–2 experiences and progresses to introducing quantitative approaches to collecting data and conducting multiple trials of qualitative observations. When possible and feasible, digital tools should be used. • Represent data in tables and various graphical displays (bar graphs and pictographs) to reveal patterns that indicate relationships. (3-ESS2-1) **Engaging in Argument from Evidence**	**ESS2.D: Weather and Climate** • 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) **ESS3.B: Natural Hazards**	**Patterns** • Patterns of change can be used to make predictions. (3-ESS2-1),(3-ESS2-2) **Cause and Effect** • Cause and effect relationships are routinely identified, tested, and used to explain change. (3-ESS3-1) - ***Connections to Engineering, Technology, and Applications of Science*** **Influence of Engineering, Technology, and Science on Society and the Natural World** • Engineers improve existing technologies or develop new ones to increase their benefits (e.g., better artificial limbs), decrease

Engaging in argument from evidence in 3–5 builds on K–2 experiences and progresses to critiquing the scientific explanations or solutions proposed by peers by citing relevant evidence about the natural and designed world (s). • 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) **Obtaining, Evaluating, and Communicating Information** Obtaining, evaluating, and communicating information in 3–5 builds on K–2 experiences and progresses to evaluating the merit and accuracy of ideas and methods. Obtain and combine information from books and other reliable media to explain phenomena. (3-ESS2-2)	• 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.)*	known risks (e.g., seatbelts in cars), and meet societal demands (e.g., cell phones). (3-ESS3-1) ***Connections to Nature of Science*** **Science is a Human Endeavor** • Science affects everyday life. (3-ESS3-1)

Embedded English Language Arts/Literacy and Mathematics

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), (3-ESS3-1)
- **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.3.1** - 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)
- **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-ESS2-2)

Mathematics

- **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 scaled bar graphs. (3-ESS2-1)
- **MP.2** - Reason abstractly and quantitatively. (3-ESS2-1), (3-ESS2-2), (3-ESS3-1)
- **MP.4** - Model with mathematics. (3-ESS2-1), (3-ESS2-2), (3-ESS3-1)
- **MP.5** - Use appropriate tools strategically. (3-ESS2-1)

Three-Dimensional Teaching and Learning

In this unit, students will expand their experiences of collecting data and conducting multiple trials of observations. Students will represent their data through the use of tables and geographical displays. Students will build upon their understanding of scientific explanations and solutions and cite relevant evidence. Students will use reliable media to explain phenomena.

Students will record patterns of weather across different times and areas so they can make predictions of what kind of weather might happen next. They will use their understanding to take steps to reduce impacts of severe weather.

Students will be able to look for patterns to make predictions on future weather. They will be able to explain changes in weather patterns using cause and effect relationships. They will understand that engineers are constantly improving existing technologies or developing new ones to increase benefits and decrease known risks.

Prior Learning
• Kindergarten Unit 3: Weather • Weather is the combination of sunlight, wind, snow or rain, and temperature in a particular region at a particular time. People measure these conditions to describe and record the weather and to notice patterns over time. • 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. • Asking questions, making observations, and gathering information are helpful in thinking about problems. (secondary)

• **Part A: Weather Patterns**	
Concepts	**Formative Assessment**
• Weather goes in a pattern.	*Students who understand the concepts are able to:*

• Weather can be predicted during a certain season and in a particular area. • Weather patterns differ from area to area.	• Use data to make predictions using patterns of change. • Represent data in various ways to show similar weather during each season. • Use a variety of tools and reliable media to explain weather and climate in different areas.

Part B: Weather Related Hazard and Solutions	
Concepts	**Formative Assessment**
• We use weather patterns to determine a solution to a weather related problem. • Cause-and-effect relationships are routinely identified, tested, and used to explain change. • Science affects everyday life. • People's needs and wants change over time, as do their demands for new and improved technologies. • A variety of natural hazards result from natural processes (e.g., flooding, fast wind, or lightening). • Humans cannot eliminate natural hazards but can take steps to reduce their impacts. • Engineers improve technologies or develop new ones to increase their benefits and decrease known risks	*Students who understand the concepts are able to:* Identify and test cause-and-effect relationships to explain change. 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. Make a claim about the merit of a design solution that reduces the impacts of a weather-related hazard. Define a simple design problem that can be solved through the development of an object, tool, process, or system and include several criteria for success and constraints on materials, time, or cost. Define a simple design problem reflecting a need or a want that includes specified criteria for success and constraints on materials, time, or cost.

• 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 criteria for success or how well each takes the constraints into account.	

Modifications: ***Teachers identify the modifications that they will use in the unit. The unneeded modifications can then be deleted from the list.(See NGSS Appendix D)***

- *Restructure lesson using UDL principals (*http://www.cast.org/our-work/about-udl.html#.VXmoXcfD_UA*)*
- *Structure lessons around questions that are authentic, relate to students' interests, social/family background and knowledge of their community.*
- *Provide students with multiple choices for how they can represent their understandings (e.g. multisensory techniques- auditory/visual aids; pictures, illustrations, graphs, charts, data tables, multimedia, modeling).*
- *Provide opportunities for students to connect with people of similar backgrounds (e.g. conversations via digital tool such as SKYPE, experts from the community helping with a project, journal articles, and biographies).*
- *Provide multiple grouping opportunities for students to share their ideas and to encourage work among various backgrounds and cultures (e.g. multiple representation and multimodal experiences).*
- *Engage students with a variety of Science and Engineering practices to provide students with multiple entry points and multiple ways to demonstrate their understandings.*
- *Use project-based science learning to connect science with observable phenomena.*
- *Structure the learning around explaining or solving a social or community-based issue.*
- *Provide ELL students with multiple literacy strategies.*

- *Collaborate with after-school programs or clubs to extend learning opportunities*

Leveraging English Language Arts/Literacy and Mathematics

English Language Arts/Literacy-

- Create and present written descriptions to accompany the models developed
- Recall information from written and digital sources
- Ask and answer questions to demonstrate understanding

Mathematics-

- Use graphs to represent data
- Analyze and interpret data
- Use appropriate measuring tools effectively

Samples of Open Education Resources for this unit:

Differences between weather and climate - http://ngss.nsta.org/Resource.aspx?ResourceID=618- In this activity, students will collect weather data over several days or weeks, graph temperature data, and compare the temperature data collected with averaged climate data where they live

Waterproof the Roof - http://ngss.nsta.org/Resource.aspx?ResourceID=466 - Students will design and construct a roof that will protect a cardboard house from getting wet. Discuss how pitch and variety keep structures safe

NASA Data Lesson - Climate Graphs- http://ngss.nsta.org/Resource.aspx?ResourceID=731 - Students will analyze wind speed climate data using line plots. They will then create their own graphical displays using information collected.

Weather Instruments file:///home/chronos/u-9794fde29857a2eb5de0880228e6938abbad22f8/Downloads/cloudswindstorms_3-4_weather_instr_ifilestips%20(1).pdf - Students will read and discuss various tools scientists use to determine weather. They will need this information to help in their final design.

Wacky Weather Design - http://static.nsta.org/files/sc1302_37.pdf - Students will work together to research various weather patterns. They will create a building that will withstand a given type of weather (each group will be given a different severe weather). Students will have to determine what season their given weather is, as well as where they might be. Students will write down their observations when trying their building. Students will then write down what modifications they would make to create a better structure.

Mystery Science: Mystery Science provides ready-made science mysteries for elementary school students. Each lesson contains a central mystery, discussion questions, supplemental reading, and a hands-on activity.

Differentiation		
504	● preferential seating ● extended time on tests and assignments ● reduced homework or classwork ● verbal, visual, or technology aids	● modified textbooks or audio-video materials ● behavior management support ● adjusted class schedules or grading ● verbal testing
Enrichment	• Utilize collaborative media tools • Provide differentiated feedback • Opportunities for reflection •	• Encourage student voice and input • Model close reading • Distinguish long term and short term goals
IEP	• Utilize “skeleton notes” where some required information is already filled in for the student • Provide access to a variety of tools for responses • Provide opportunities to build familiarity and to practice with multiple media tools • Graphic organizers	• Leveled text and activities that adapt as students build skills • Provide multiple means of action and expression • Consider learning styles and interests • Provide differentiated mentors

ELLs	• Pre-teach new vocabulary and meaning of symbols • Embed glossaries or definitions • Provide translations • Connect new vocabulary to background knowledge	• Provide flash cards • Incorporate as many learning senses as possible • Portray structure, relationships, and associations through concept webs • Graphic organizers
At-risk	• Purposeful seating • Counselor involvement • Parent involvement	• Contracts • Alternate assessments • Hands-on learning
21st Century Skills		
• Creativity • Innovation • Critical Thinking		• Problem Solving • Communication • Collaboration
Integrating Technology		
• Chromebooks • Internet research • Online programs		• Virtual collaboration and projects • Presentations using presentation hardware and software

Physical Science	**Grade 3**	**Unit 2 Force and Motion**	**20 Instructional Days**

<table>
<tr><td colspan="2">Physical Science Unit 2 - Force and Motion (20 Instructional Days)
In this unit, students will investigate weather patterns during the different seasons and areas. They will create graphs to show these patterns and create buildings to sustain weather hazards. They will reflect on their design and discuss modifications that can be made to make their structure better. They will use their knowledge to predict a season and region based on a severe weather alert. Students demonstrate proficiency by asking questions and defining problems, analyzing and interpreting data, using evidence to support a claim, and obtaining, evaluating, and communicating information.</td></tr>
<tr><td>Overarching Essential Questions</td><td>Overarching Enduring Understandings</td></tr>
<tr><td>● How can the pattern of motion be effected
● How can two objects interact when not in contact with one another?</td><td>Balanced and unbalanced forces can affect the motion of an object.

Magnetic forces create interactions between two objects not in contact with each other.</td></tr>
<tr><td colspan="2">Student Learning Objectives</td></tr>
<tr><td>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-PS2-1)</td><td>3-PS2-1</td></tr>
<tr><td>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-PS2-2)</td><td>3-PS2-2</td></tr>
</table>

The Student Learning Objectives above were developed using the following elements from the NRC document *A Framework for K-12 Science Education*:		
Science and Engineering Practices	**Disciplinary Core Ideas**	**Crosscutting Concepts**
Planning and Carrying Out Investigations • 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)	PS2.A: Forces and Motion • 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	Cause and Effect • Cause and effect relationships are routinely identified. (3-PS2-1) Patterns • Patterns of change can be used to make predictions. (3-PS2-2) - Connections to Nature of Science Science Knowledge is Based on Empirical Evidence • 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)

	both size and direction to be described is developed.) (3-PS2-2) PS2.B: Types of Interactions • Objects in contact exert forces on each other. (3- PS2-1)	

Embedded English Language Arts/Literacy and Mathematics
ELA/Literacy **Ask and answer questions to demonstrate understanding of a text, referring explicitly to the text as the basis for the answers. RI.3.1 (3-PS2-1) Conduct short research projects that build knowledge about a topic. W.3.7 (3- PS2-1),(3-PS2-2) Recall information from experiences or gather information from print and digital sources; take brief notes on sources and sort evidence into provided categories. W.3.8 (3-PS2-1),(3-PS2-2)** **Mathematics** **Reason abstractly and quantitatively. MP.2 (3-PS2-1) Use appropriate tools strategically. MP.5 (3-PS2-1) 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.MD.A.2 (3-PS2-1)**

Three-Dimensional Teaching and Learning
In this unit, students will plan and conduct an investigation to provide evidence of the effects of balanced and unbalanced forces on the motion of an object. They will make observations and/or measurements of an object's motion to provide evidence that a pattern can be used to predict future motion.

Prior Learning
• Kindergarten Unit 1: Pushes and Pulls • Pushes and pulls can have different strengths and directions. • Pushing or pulling on an object can change the speed or direction of the object's motion and can start or stop it. • When objects touch or collide, they push on one another and can change motion. • A bigger push or pull causes things speed up or slow down more quickly. Grade 1 Unit 1: Patterns of Change in the Sky • Patterns of the motion of the sun, moon, and stars in the sky can be observed, described, and predicted.

- **Part A: How do scientists play soccer?**

Concepts	Formative Assessment
Science investigations use a variety of methods, tools, and techniques. • Cause-and-effect relationships are routinely identified. • Objects in contact exert forces on each other. • Each force that acts on a particular object has both strength and a direction.	Students who understand the concepts are able to: • Identify cause-and-effect relationships. • Plan and conduct investigations collaboratively to produce data to serve as the basis for evidence. • Use fair tests in which variables are controlled and the number of trials considered.

• An object at rest typically has multiple forces acting on it, but they add to 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. (Qualitative and conceptual, but not quantitative, addition of forces are used at this level.)	• Plan and conduct an investigation to provide evidence of the effects of balanced and unbalanced forces on the motion of an object. (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 also limited to gravity being addressed as a force that pulls objects down.) Examples could include: An unbalanced force on one side of a ball can make it start moving. Balanced forces pushing on a box from both sides

Part B: Can we use patterns that we observed to predict the future?	
Concepts	**Formative Assessment**
Science findings are based on recognizing patterns. • Patterns of change can be used to make predictions. • The patterns of an object's motion in various situations can be observed and measured. • When past motion exhibits a regular pattern, future motion can be predicted from it. (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.)	Students who understand the concepts are able to: • Make predictions using patterns of change. • Make observations and/or measurements to produce data to serve as the basis of evidence for an explanation of a phenomenon. • Make observations and/or measurements of an object's motion to provide evidence that a pattern can be used to predict future motion. (Assessment does not include technical terms such as period and frequency.) Examples of motion with a predictable pattern could include:

Modifications: ***Teachers identify the modifications that they will use in the unit. The unneeded modifications can then be deleted from the list.(See NGSS Appendix D)***

- *Restructure lesson using UDL principals (*http://www.cast.org/our-work/about-udl.html#.VXmoXcfD_UA*)*
- *Structure lessons around questions that are authentic, relate to students' interests, social/family background and knowledge of their community.*
- *Provide students with multiple choices for how they can represent their understandings (e.g. multisensory techniques- auditory/visual aids; pictures, illustrations, graphs, charts, data tables, multimedia, modeling).*
- *Provide opportunities for students to connect with people of similar backgrounds (e.g. conversations via digital tool such as SKYPE, experts from the community helping with a project, journal articles, and biographies).*
- *Provide multiple grouping opportunities for students to share their ideas and to encourage work among various backgrounds and cultures (e.g. multiple representation and multimodal experiences).*
- *Engage students with a variety of Science and Engineering practices to provide students with multiple entry points and multiple ways to demonstrate their understandings.*
- *Use project-based science learning to connect science with observable phenomena.*
- *Structure the learning around explaining or solving a social or community-based issue.*
- *Provide ELL students with multiple literacy strategies.*
- *Collaborate with after-school programs or clubs to extend learning opportunities*

Leveraging English Language Arts/Literacy and Mathematics

English Language Arts/Literacy-

- Conduct research projects to build knowledge about a topic
- Recall information from written and digital sources
- Ask and answer questions to demonstrate understanding

Mathematics-

- Measure and estimate
- Uses logical reasoning

- Use appropriate measuring tools effectively
- Problem Solving

Samples of Open Education Resources for this unit:

Read, discuss, and write about the topic using various non-fiction articles and books. (Sources available on Science A-Z, readworks.org, k-12reader.com)

Force and Motion Investigation - https://betterlesson.com/lesson/632779/force-and-motion-investigation

In this lesson, students will collaboratively conduct an investigation to test how the strength of a force and the mass of an object affects motion. The data produced will serve as the basis for explanation of this phenomena.

Changes in Motion - https://betterlesson.com/lesson/617199/change-in-motion

Students will be placed into groups with an assigned change in motion. They must use materials and tools to create a device that changes the ball's motion based on their group's assigned change.

Mystery Science: Mystery Science provides ready-made science mysteries for elementary school students. Each lesson contains a central mystery, discussion questions, supplemental reading, and a hands-on activity.

Differentiation

504	● preferential seating ● extended time on tests and assignments ● reduced homework or classwork ● verbal, visual, or technology aids	● modified textbooks or audio-video materials ● behavior management support ● adjusted class schedules or grading ● verbal testing

Enrichment	• Utilize collaborative media tools • Provide differentiated feedback • Opportunities for reflection •	• Encourage student voice and input • Model close reading • Distinguish long term and short term goals
IEP	• Utilize “skeleton notes” where some required information is already filled in for the student • Provide access to a variety of tools for responses • Provide opportunities to build familiarity and to practice with multiple media tools • Graphic organizers	• Leveled text and activities that adapt as students build skills • Provide multiple means of action and expression • Consider learning styles and interests • Provide differentiated mentors
ELLs	• Pre-teach new vocabulary and meaning of symbols • Embed glossaries or definitions • Provide translations • Connect new vocabulary to background knowledge	• Provide flash cards • Incorporate as many learning senses as possible • Portray structure, relationships, and associations through concept webs • Graphic organizers
At-risk	• Purposeful seating • Counselor involvement • Parent involvement	• Contracts • Alternate assessments • Hands-on learning
21st Century Skills		
• Creativity • Innovation		• Problem Solving • Communication

• Critical Thinking	• Collaboration
Integrating Technology	
• Chromebooks • Internet research • Online programs	• Virtual collaboration and projects • Presentations using presentation hardware and software

Physical Science	**Grade 3**	**Unit 3 Electrical and Magnetic Forces**	**15 Instructional Days**

Unit 3-Electrical and Magnetic Forces: (15 Instructional Days)
In this unit of study, students determine the effects of balanced and unbalanced forces on the motion of an object and the cause-and-effect relationships of electrical or magnetic interactions to define a simple design problem that can be solved with magnets. The crosscutting concept of cause and effect, and the interdependence of science, engineering, and technology, and the influence of

<table>
<tr><td colspan="2">engineering, technology, and science on society and the natural world are called out as organizing concepts for these disciplinary core ideas. Students are expected to demonstrate grade-appropriate proficiency in asking questions and defining problems. Students are also expected to use these practices to demonstrate understanding of the core ideas.</td></tr>
<tr><th>Overarching Essential Questions</th><th>Overarching Enduring Understandings</th></tr>
<tr><td>How can I determine the cause and effect relationships between electric or magnetic interactions between two objects that aren’t touching each other?
How can magnets be used to solve real world problems?</td><td>I can ask and answer questions to determine the relationship. I can use magnets and static electricity to see how the objects can interact when not touching each other.

We use magnets to solve problems. For example, magnets are used in locks.</td></tr>
<tr><th colspan="2">Student Learning Objectives</th></tr>
<tr><td>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.]</td><td>3-PS2-3</td></tr>
<tr><td>Define a simple design problem that can be solved by applying scientific ideas about magnets.* [Clarification Statement: Examples of problems could include constructing</td><td>3PS2-4</td></tr>
</table>

a latch to keep a door shut and creating a device to keep two moving objects from touching each other.]	
Define a simple design problem reflecting a need or a want that includes specified criteria for success and constraints on materials, time, or cost. .	**3-5-ETS1-1**

The Student Learning Objectives above were developed using the following elements from the NRC document *A Framework for K-12 Science Education*:

Science and Engineering Practices	Disciplinary Core Ideas	Crosscutting Concepts
Analyzing and Interpreting Data ● Analyze and interpret data to make sense of phenomena using logical reasoning. (3-LS3-1) **Asking Questions and Defining Problems** ● 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) ● Define a simple design problem that can be solved through the development of an object, tool, process, or system and includes	**PS2.B: Types of Interactions** ● Electric and magnetic forces between a pair of objects do not require that 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) **ETS1.A: Defining and Delimiting Engineering Problems** ● Possible solutions to a problem are limited by available materials and resources (constraints). The	**Cause and Effect** ● Cause and effect relationships are routinely identified, tested, and used to explain change. (3- PS2-3) - Connections to Engineering, Technology, and Applications of Science **Interdependence of Science, Engineering, and Technology** ● 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)

several criteria for success and constraints on materials, time, or cost. (3-5-ETS1-1)	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. (3- 5-ETS1-1)	

Embedded English Language Arts/Literacy and Mathematics
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-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)*

Three-Dimensional Teaching and Learning
In this unit, students will continue to analyze and interpret data. They will use the data to ask and answer questions that can be investigated. They will define a simple problem that can be solved by the development of a new or improved tool.

Students investigate magnetic and electrical forces between a pair of objects that do not need to be in contact with one another.

Students will be able to use cause and effect to explain a change. They will identify, test, and explain these changes.

Prior Learning
Kindergarten Unit 1: Pushes and Pulls ● Pushes and pulls can have different strengths and directions. ● Pushing or pulling on an object can change the speed or direction of its motion and can start or stop it. ● When objects touch or collide, they push on one another and can change motion. ● A bigger push or pull makes things speed up or slow down more quickly. ● 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. (secondary) **Grade 1 Unit 1: Patterns of Change in the Sky** ● Patterns of the motion of the sun, moon, and stars in the sky can be observed, described, and predicted.

● **Part A: Relationship between magnetic and electrical forces**	
Concepts	**Formative Assessment**
● Cause-and-effect relationships are routinely identified, tested, and used to explain change. ● Electric and magnetic forces between a pair of objects do not require that 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	*Students who understand the concepts are able to:* • Identify and test cause-and-effect relationships in order to explain change. • Ask questions that can be investigated based on patterns such as cause-and effect relationships.

forces between two magnets, on their orientation relative to each other.	• Ask questions to determine cause-and-effect relationships in electric or magnetic interactions between two objects not in contact with each other. (Assessment is limited to forces produced by objects that can be manipulated by students, and electrical interactions are limited to static electricity.) • Magnetic forces could include: The force between two permanent magnets; The force between an electromagnet and steel paperclips; The force exerted by one magnet versus the force exerted by two magnets. • Cause-and-effect relationships could include: How the distance between objects affects the strength of the force How the orientation of magnets affects the direction of the magnetic force.

Part B: Solving Problems Using Magnets	
Concepts	**Formative Assessment**
• Scientific discoveries about the natural world can often lead to new and improved technologies, which are developed through the engineering design process. • People's needs and wants change over time, as do their demands for new and improved technologies. • Electric and magnetic forces between a pair of objects do not require that the objects be in contact. • The sizes of the forces in each situation depend on the properties of the objects and their distances apart.	*Students who understand the concepts are able to:* Define a simple problem that can be solved through the development of a new or improved object or tool. Define a simple design problem that can be solved by applying scientific ideas about magnets (e.g., constructing a latch to keep a door shut or creating a device to keep two moving objects from touching each other). Define a simple design problem that can be solved through the development of an object, tool, process, or system, and

• For forces between two magnets, the size of the force depends on their orientation relative to each other. • 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.	include several criteria for success and constraints on material, time, or cost. Define a simple design problem reflecting a need or a want that includes specified criteria for success and constraints on materials, time, or cost

Modifications: ***Teachers identify the modifications that they will use in the unit. The unneeded modifications can then be deleted from the list.(See NGSS Appendix D)***
• *Restructure lesson using UDL principals (*http://www.cast.org/our-work/about-udl.html#.VXmoXcfD_UA*)* • *Structure lessons around questions that are authentic, relate to students' interests, social/family background and knowledge of their community.* • *Provide students with multiple choices for how they can represent their understandings (e.g. multisensory techniques- auditory/visual aids; pictures, illustrations, graphs, charts, data tables, multimedia, modeling).* • *Provide opportunities for students to connect with people of similar backgrounds (e.g. conversations via digital tool such as SKYPE, experts from the community helping with a project, journal articles, and biographies).* • *Provide multiple grouping opportunities for students to share their ideas and to encourage work among various backgrounds and cultures (e.g. multiple representation and multimodal experiences).* • *Engage students with a variety of Science and Engineering practices to provide students with multiple entry points and multiple ways to demonstrate their understandings.* • *Use project-based science learning to connect science with observable phenomena.*

- *Structure the learning around explaining or solving a social or community-based issue.*
- *Provide ELL students with multiple literacy strategies.*
- *Collaborate with after-school programs or clubs to extend learning opportunities*

Leveraging English Language Arts/Literacy and Mathematics

English Language Arts/Literacy-

- Conduct short research projects that build knowledge about electric and magnetic forces.
- Ask and answer questions
- Answer questions, describe cause-and-effect relationships, make comparisons, and explain interactions between objects when electrical or magnetic forces are involved.
- Use a variety of texts for students to explore in order to develop students' note-taking skills.

Mathematics-

- Use measurement tools in a variety of ways as they conduct investigations.
- Find mass of an object
- Analyze data

Samples of Open Education Resources for this unit:

Read, discuss, and write about the topic using various non-fiction articles and books. (Sources available on Science A-Z, readworks.org, k-12reader.com)

Scratching Records - http://static.nsta.org/files/sc1604_26.pdf: Students explore static electricity.

I Need a Magnet! - https://betterlesson.com/lesson/639709/i-need-a-magnet: Students will be able to use their knowledge of magnetism to solve a problem or respond to a situation.

Playground Design Challenge - Students will analyze playgrounds, discuss challenges, and use knowledge of force and motion to design playground modifications to make the playground safe but still fun. One of their modifications must include magnetic force.

chrome-extension://bpmcpldpdmajfigpchkicefoigmkfalc/views/app.html

Mystery Science: Mystery Science provides ready-made science mysteries for elementary school students. Each lesson contains a central mystery, discussion questions, supplemental reading, and a hands-on activity.

How to Read NGSS is a guide to reading and interpreting the Next Generation Science Standards.

How to Grade STEM Projects is a blog post explaining how to assess STEM projects using rubrics and scales.

Differentiation		
504	● preferential seating ● extended time on tests and assignments ● reduced homework or classwork ● verbal, visual, or technology aids	● modified textbooks or audio-video materials ● behavior management support ● adjusted class schedules or grading ● verbal testing
Enrichment	• Utilize collaborative media tools • Provide differentiated feedback • Opportunities for reflection •	• Encourage student voice and input • Model close reading • Distinguish long term and short term goals

IEP	• Utilize “skeleton notes” where some required information is already filled in for the student • Provide access to a variety of tools for responses • Provide opportunities to build familiarity and to practice with multiple media tools • Graphic organizers	• Leveled text and activities that adapt as students build skills • Provide multiple means of action and expression • Consider learning styles and interests • Provide differentiated mentors
ELLs	• Pre-teach new vocabulary and meaning of symbols • Embed glossaries or definitions • Provide translations • Connect new vocabulary to background knowledge	• Provide flash cards • Incorporate as many learning senses as possible • Portray structure, relationships, and associations through concept webs • Graphic organizers
At-risk	• Purposeful seating • Counselor involvement • Parent involvement	• Contracts • Alternate assessments • Hands-on learning
21st Century Skills		
• Creativity • Innovation • Critical Thinking		• Problem Solving • Communication • Collaboration
Integrating Technology		

• Chromebooks • Internet research • Online programs	• Virtual collaboration and projects • Presentations using presentation hardware and software

Life Science	**Grade 3**	**Unit 4 Traits**	**15 Instructional Days**

Life Science Unit 4-Traits: (15 Instructional Days)

In this unit of study, students acquire an understanding that organisms have different inherited traits and that the environment can also affect the traits that an organism develops. The crosscutting concepts of patterns and cause and effect are called out as organizing concepts for these disciplinary core ideas. Students are expected to demonstrate grade-appropriate proficiency in analyzing and interpreting data, constructing explanations, and designing solutions. Students are also expected to use these practices to demonstrate understanding of the core ideas.

Overarching Essential Questions	Overarching Enduring Understandings
• How do similar plants and animals have a variation of similar traits? • How can traits be influenced by the environment?	• Plants and animals have traits inherited from parents. These traits exist among similar organisms. • Environments affect a trait of an organism. For example, a pet dog that eats too much will become overweight.
Student Learning Objectives	
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-LS3-1**
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.]	**3-LS3-2**

The Student Learning Objectives above were developed using the following elements from the NRC document *A Framework for K-12 Science Education*:

Science and Engineering Practices	Disciplinary Core Ideas	Crosscutting Concepts
Analyzing and Interpreting Data • Analyze and interpret data to make	**LS3.A: Inheritance of Traits**	**Patterns**

sense of phenomena using logical reasoning. (3-LS3-1) **Constructing Explanations and Designing Solutions** • Use evidence (e.g., observations, patterns) to support an explanation. (3-LS3-2)	• 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) **LS3.B: Variation of Traits** • 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)	• Similarities and differences in patterns can be used to sort and classify natural phenomena. (3- LS3-1) **Cause and Effect** • Cause and effect relationships are routinely identified and used to explain change. (3-LS3-2)

Embedded English Language Arts/Literacy and Mathematics

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)
- **RI3.3** - 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),(3-LS4-2)
- **SL3.4**- 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)

Mathematics

- **MP.2** Reason abstractly and quantitatively. (3-LS3-1),(3-LS3-2)
- **MP.4** Model with mathematics. (3-LS3-1),(3-LS3-2)
- **3.MD.8.4** 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)

Three-Dimensional Teaching and Learning

In this unit, students will expand their experiences of collecting and analyzing data. They will then use this data to support an explanation.

Students will identify the characteristics that are inherited from parents. They will describe how environments can also affect characteristics.

Students will be able to look for patterns to make predictions on the inheritance of traits. They will also use cause and effect relationships to determine traits that are inherited for affected by environment.

Prior Learning
• By the end of Grade 1, students understand that: • Young animals are very much, but not exactly like, their parents. Plants also are very much, but not exactly, like their parents. • Individuals of the same kind of plant or animal are recognizable as similar but can also vary in many ways.

• **Part A: Inherited Traits**	
Concepts	**Formative Assessment**
• Similarities and differences in patterns can be used to sort and classify natural phenomena (e.g., inherited traits that occur naturally). • Many characteristics of organisms are inherited from their parents. • Different organisms vary in how they look and function because they have different inherited information.	*Students who understand the concepts are able to:* • Sort and classify natural phenomena using similarities and differences. (Clarification: Patterns are the similarities and differences in traits shared between offspring and their parents or among siblings, with an emphasis on organisms other than humans).

	• Analyze and interpret data to make sense of phenomena using logical reasoning. • 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. (Assessment does not include genetic mechanisms of inheritance and prediction of traits, and is limited to nonhumans.)

Part B: Traits influenced by environmental factors	
Concepts	**Formative Assessment**
• Cause-and-effect relationships are routinely identified and used to explain change. • Other characteristics, which can range from diet to learning, result from individuals' interaction with the environment. • Many characteristics involve both inheritance and environment. • The environment also affects the traits that an organism develops.	*Students who understand the concepts are able to:* Identify cause-and-effect relationships in order to explain change. Use evidence (e.g., observations, patterns) to support an explanation. Use evidence to support the explanation that traits can be influenced by the environment. Examples of the environment's affect on traits could include: Normally tall plants that grow with insufficient water are stunted. A pet dog that is given too much food and little exercise may become overweight.

Modifications: ***Teachers identify the modifications that they will use in the unit. The unneeded modifications can then be deleted from the list.(See NGSS Appendix D)***

- *Restructure lesson using UDL principals (*http://www.cast.org/our-work/about-udl.html#.VXmoXcfD_UA*)*
- *Structure lessons around questions that are authentic, relate to students' interests, social/family background and knowledge of their community.*
- *Provide students with multiple choices for how they can represent their understandings (e.g. multisensory techniques- auditory/visual aids; pictures, illustrations, graphs, charts, data tables, multimedia, modeling).*
- *Provide opportunities for students to connect with people of similar backgrounds (e.g. conversations via digital tool such as SKYPE, experts from the community helping with a project, journal articles, and biographies).*
- *Provide multiple grouping opportunities for students to share their ideas and to encourage work among various backgrounds and cultures (e.g. multiple representation and multimodal experiences).*
- *Engage students with a variety of Science and Engineering practices to provide students with multiple entry points and multiple ways to demonstrate their understandings.*
- *Use project-based science learning to connect science with observable phenomena.*
- *Structure the learning around explaining or solving a social or community-based issue.*
- *Provide ELL students with multiple literacy strategies.*
- *Collaborate with after-school programs or clubs to extend learning opportunities*

Leveraging English Language Arts/Literacy and Mathematics

English Language Arts/Literacy-

- Determine the main idea of a text using key details
- Recall information from written and digital sources
- Ask and answer questions to demonstrate understanding
- Describe the relationship between scientific ideas or concepts, using language that pertains to time, sequence, and cause and effect.

- Use various resources to write an essay

Mathematics-

- Use graphs to represent data
- Analyze and interpret data
- Use appropriate measuring tools effectively

Samples of Open Education Resources for this unit:

Read, discuss, and write about the topic using various non-fiction articles and books. (Sources available on Science A-Z, readworks.org, k-12reader.com)

Mammals and their Parents - Perfect Together Lesson - http://betterlesson.com/lesson/623417/mammals-and-their-parents-perfect-together

Animal Traits inherited and influenced by environment socratic circle activity- http://betterlesson.com/lesson/630502/socratic-circles-in-science

Animal Detectives Activities - http://ngss.nsta.org/Resource.aspx?ResourceID=505

Final Animal Detective Project - Students will investigate an animal to answer questions. Students will model this animal's life cycle.. Students will analyze data and provide evidence on inherited traits explain how an environment change will affect the traits. Students will use cause and effect examples who explain how variations on traits can help different animals of the same trait survive.

Mystery Science: Mystery Science provides ready-made science mysteries for elementary school students. Each lesson contains a central mystery, discussion questions, supplemental reading, and a hands-on activity.

Differentiation		
504	● preferential seating ● extended time on tests and assignments ● reduced homework or classwork ● verbal, visual, or technology aids	● modified textbooks or audio-video materials ● behavior management support ● adjusted class schedules or grading ● verbal testing
Enrichment	● Utilize collaborative media tools ● Provide differentiated feedback ● Opportunities for reflection ●	● Encourage student voice and input ● Model close reading ● Distinguish long term and short term goals
IEP	● Utilize “skeleton notes” where some required information is already filled in for the student ● Provide access to a variety of tools for responses ● Provide opportunities to build familiarity and to practice with multiple media tools ● Graphic organizers	● Leveled text and activities that adapt as students build skills ● Provide multiple means of action and expression ● Consider learning styles and interests ● Provide differentiated mentors
ELLs	● Pre-teach new vocabulary and meaning of symbols ● Embed glossaries or definitions ● Provide translations ● Connect new vocabulary to background knowledge	● Provide flash cards ● Incorporate as many learning senses as possible ● Portray structure, relationships, and associations through concept webs ● Graphic organizers

<table>
<tr><td>At-risk</td><td>● Purposeful seating
● Counselor involvement
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Life Science	Grade 3	Unit 5 Continuing the Cycle	10 Instructional Days

Life Science Unit 5- Continuing the Cycle (10 Instructional Days)

In this unit of study, students develop an understanding of the similarities and differences in organisms' life cycles. In addition, students 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. The crosscutting concepts of patterns and cause and effect are called out as organizing concepts for these disciplinary core ideas. Students demonstrate grade appropriate proficiency in developing and using models and constructing explanations and designing solutions. Students are also expected to use these practices to demonstrate understanding of the core ideas.

Overarching Essential Questions	Overarching Enduring Understandings
• How do different organisms' life cycles compare to each other?	All organisms have unique life cycles but all have common birth, growth, reproduction and death.

Student Learning Objectives	
Develop models to describe that organisms have unique and diverse life cycles but all have in common birth, growth, reproduction, and death. [Clarification Statement: Changes organisms go through during their life form a pattern.] [Assessment Boundary: Assessment of plant life cycles is limited to those of flowering plants. Assessment does not include details of human reproduction.] (3-LS1-1)	**3-LS1-1**
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.] (3-LS4-2)	**3-LS4-2**

The Student Learning Objectives above were developed using the following elements from the NRC document *A Framework for K-12 Science Education*:		
Science and Engineering Practices	**Disciplinary Core Ideas**	**Crosscutting Concepts**
Developing and Using Models • Develop models to describe phenomena. (3-LS1- 1) Constructing Explanations and Designing Solutions • Use evidence (e.g., observations, patterns) to construct an explanation. (3-LS4-2)	• LS1.B: Growth and Development of Organisms • Reproduction is essential to the continued existence of every kind of organism. Plants and animals have unique and diverse life cycles. (3-LS1-1) LS4.B: Natural Selection • Sometimes the differences in characteristics between individuals of the same species provide advantages in surviving, finding mates, and reproducing. (3-LS4-2)	**Patterns** **• Patterns of change can be used to make predictions. (3-LS1-1) Cause and Effect** **• Cause and effect relationships are routinely identified and used to explain change. (3-LS4-2),(3-LS4-3)** - **Connections to Nature of Science** **Scientific Knowledge is Based on Empirical Evidence** **• Science findings are based on recognizing patterns. (3-LS1-1)**

Embedded English Language Arts/Literacy and Mathematics

ELA
Ask and answer questions to demonstrate understanding of a text, referring explicitly to the text as the basis for the answers. (3-LS4-2) RI.3.1
Determine the main idea of a text; recount the key details and explain how they support the main idea. (3-LS4-2)RI.3.2
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-LS4-2) RI.3.3

Mathematics
Reason abstractly and quantitatively. (3-LS4-2) MP.2
Model with mathematics. (3-LS1-1), (3-LS4-2) MP.4
Number and Operations in Base Ten (3-LS1-1) 3.NBT
Number and Operations—Fractions (3-LS1-1) 3.NF
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

Three-Dimensional Teaching and Learning
In this unit, students will develop models and use evidence to construct and explanation.

Prior Learning
• Grade 1 Unit 2: Characteristics of Living Things • Individuals of the same kind of plant or animal are recognizable as similar but can also vary in many ways.

• **Part A: Do all living things have the same life cycle?**	
Concepts • Science findings are based on recognizing patterns.	**Students who understand the concepts are able to:**

• Similarities and differences in patterns can be used to sort and classify natural phenomena. • Patterns of change can be used to make predictions. • Reproduction is essential to the continued existence of every kind of organism. • Plants and animals have unique and diverse life cycles.	• Sort and organisms (inherited traits) using similarities and differences in patterns. • Make predictions using patterns of change. • Develop models to describe phenomena. • Develop models to describe that organisms have unique and diverse life cycles but all have in common birth, growth, reproduction, and death. (I.e., Changes organisms go through during their life form a pattern.) (Assessment of plant life cycles is limited to those of flowering plants. Assessment does not include details of human reproduction.)Formative Assessment

Part B: Are there advantages of being different?	
Concepts	**Formative Assessment**
• Cause-and-effect relationships are routinely identified and used to explain change. • Sometimes the differences in characteristics between individuals of the same species provide advantages in surviving, finding mates, and reproducing.	Students who understand the concepts are able to: Identify cause-and-effect relationships in order to explain change. • Use evidence (e.g., observations, patterns) to construct an explanation. • 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. Examples of causeand-effect relationships could include: Plants that have larger thorns than other plants may be less likely to be eaten by predators. Animals that have better camouflage coloration than other animals

	may be more likely to survive and therefore more likely to leave offspring.

Modifications: ***Teachers identify the modifications that they will use in the unit. The unneeded modifications can then be deleted from the list.(See NGSS Appendix D)***

- *Restructure lesson using UDL principals (*http://www.cast.org/our-work/about-udl.html#.VXmoXcfD_UA*)*
- *Structure lessons around questions that are authentic, relate to students' interests, social/family background and knowledge of their community.*
- *Provide students with multiple choices for how they can represent their understandings (e.g. multisensory techniques- auditory/visual aids; pictures, illustrations, graphs, charts, data tables, multimedia, modeling).*
- *Provide opportunities for students to connect with people of similar backgrounds (e.g. conversations via digital tool such as SKYPE, experts from the community helping with a project, journal articles, and biographies).*
- *Provide multiple grouping opportunities for students to share their ideas and to encourage work among various backgrounds and cultures (e.g. multiple representation and multimodal experiences).*
- *Engage students with a variety of Science and Engineering practices to provide students with multiple entry points and multiple ways to demonstrate their understandings.*
- *Use project-based science learning to connect science with observable phenomena.*
- *Structure the learning around explaining or solving a social or community-based issue.*
- *Provide ELL students with multiple literacy strategies.*
- *Collaborate with after-school programs or clubs to extend learning opportunities*

Leveraging English Language Arts/Literacy and Mathematics

English Language Arts/Literacy-

- Create and present written descriptions to accompany the models developed

- Recall information from written and digital sources
- Ask and answer questions to demonstrate understanding

Mathematics-

- Use graphs to represent data
- Analyze and interpret data
- Use appropriate measuring tools effectively

Samples of Open Education Resources for this unit:
Read, discuss, and write about the topic using various non-fiction articles and books. (Sources available on Science A-Z, readworks.org, k-12reader.com) BrainpopJr video and quiz - "Plant Life Cycle" Plant Terarrium - https://jr.brainpop.com/science/plants/plantlifecycle/activity/ Mystery Science: Mystery Science provides ready-made science mysteries for elementary school students. Each lesson contains a central mystery, discussion questions, supplemental reading, and a hands-on activity.

Differentiation		
504	● preferential seating ● extended time on tests and assignments ● reduced homework or classwork ● verbal, visual, or technology aids	● modified textbooks or audio-video materials ● behavior management support ● adjusted class schedules or grading ● verbal testing

Enrichment	• Utilize collaborative media tools • Provide differentiated feedback • Opportunities for reflection •	• Encourage student voice and input • Model close reading • Distinguish long term and short term goals
IEP	• Utilize “skeleton notes” where some required information is already filled in for the student • Provide access to a variety of tools for responses • Provide opportunities to build familiarity and to practice with multiple media tools • Graphic organizers	• Leveled text and activities that adapt as students build skills • Provide multiple means of action and expression • Consider learning styles and interests • Provide differentiated mentors
ELLs	• Pre-teach new vocabulary and meaning of symbols • Embed glossaries or definitions • Provide translations • Connect new vocabulary to background knowledge	• Provide flash cards • Incorporate as many learning senses as possible • Portray structure, relationships, and associations through concept webs • Graphic organizers
At-risk	• Purposeful seating • Counselor involvement • Parent involvement	• Contracts • Alternate assessments • Hands-on learning
21st Century Skills		
• Creativity • Innovation		• Problem Solving • Communication

• Critical Thinking	• Collaboration
Integrating Technology	
• Chromebooks • Internet research • Online programs	• Virtual collaboration and projects • Presentations using presentation hardware and software

Life Science	Grade 3	Unit 6 Organisms and the Environment	15 Instructional Days

Life Science Unit 6: Organisms and the Environment: (15 Instructional Days)

In this unit of study, students develop an understanding of the idea that when the environment changes, some organisms survive and reproduce, some move to new locations, some move into the transformed environment, and some die. The crosscutting concepts of cause and effect and the interdependence of science, engineering, and technology are called out as organizing concepts for these disciplinary core ideas. Students demonstrate grade-appropriate proficiency in engaging in argument from evidence. Students are also expected to use this practice to demonstrate understanding of the core ideas.

Overarching Essential Questions	Overarching Enduring Understandings
• How do animals survive in the wild? • How does the environment affect organisms?	• Some animals form groups to help them survive. • Different organisms can survive in different environments. When these environments change, the organisms that live there may change.
Student Learning Objectives	
Construct an argument that some animals form groups that help members survive.	**3-LS2-1**
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 involved. The organisms and their habitat make up a system in which the parts depend on each other.]	**3-LS4-3**

The Student Learning Objectives above were developed using the following elements from the NRC document *A Framework for K-12 Science Education*:		
Science and Engineering Practices	**Disciplinary Core Ideas**	**Crosscutting Concepts**
Engaging in Argument from Evidence ● Construct an argument with evidence, data, and/or a model. (3-LS2-1) ● Construct an argument with evidence. (3-LS4-3)	**LS2.D: Social Interactions and Group Behavior** ● 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) **LS4.C: Adaptation** ● For any particular environment, some kinds of organisms survive well, some survive less well, and some cannot survive at all. (3-LS4-3)	**Cause and Effect** ● Cause and effect relationships are routinely identified and used to explain change. (3-LS2-1),(3-LS4-3)

Embedded English Language Arts/Literacy and Mathematics

ELA/Literacy

- **RI3.1** 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-LS4-3)
- **RI3.2** Determine the main idea of a text; recount the key details and explain how they support the main idea. (3-LS4-3)
- **RI3.3** 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-LS4-3)
- **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-LS4-3)
- **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-LS4-3)

Mathematics

- **MP.4** Model with mathematics. (3-LS2-1),(3-LS4-3)
- **3.NBT** Number and Operations in Base Ten. (3-LS2-1)

Three-Dimensional Teaching and Learning

In this unit, students will expand their experiences of collecting data and conducting multiple trials of observations. Students will represent their data through the use of tables and geographical displays. Students will build upon their understanding of scientific explanations and solutions and cite relevant evidence. Students will use reliable media to explain phenomena. They will use their research and data to create an argument with evidence.

Students will describe how animals interact with one another to survive. Students will explain how animals may live in groups to obtain food, defend themselves, and cope with change.

Students will be able to explain animal interactions and animals adaptations using cause and effect relationships.

Prior Learning
Kindergarten Unit 4: Basic Needs of Living Things ● 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. **Grade 1 Unit 2: Characteristics of Living Things** ● 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. **Grade 2 Unit 1: Relationships in Habitats** ● Plants depend on water and light to grow. ● Plants depend on animals for pollination or to move their seeds around. ● There are many different kinds of living things in any area, and they exist in different places on land and in water.

● **Part A: Animal Survival in its habitat**	
Concepts	**Formative Assessment**
● Cause-and-effect relationships are routinely identified and used to explain change. ● Knowledge of relevant scientific concepts and research findings is important in engineering.	*Students who understand the concepts are able to:* ● Identify cause-and-effect relationships in order to explain change. ● Construct an argument with evidence.

• For any particular environment, some kinds of organisms survive well, some survive less well, and some cannot survive at all. • Organisms and their habitat make up a system in which the parts depend on each other.	• Construct an argument with evidence (e.g., needs and characteristics of the organisms and habitats involved) that in a particular habitat, some organisms can survive well, some can survive less well, and some cannot survive at all.

Modifications: ***Teachers identify the modifications that they will use in the unit. The unneeded modifications can then be deleted from the list.(See NGSS Appendix D)***

- *Restructure lesson using UDL principals (*http://www.cast.org/our-work/about-udl.html#.VXmoXcfD_UA*)*
- *Structure lessons around questions that are authentic, relate to students' interests, social/family background and knowledge of their community.*
- *Provide students with multiple choices for how they can represent their understandings (e.g. multisensory techniques- auditory/visual aids; pictures, illustrations, graphs, charts, data tables, multimedia, modeling).*
- *Provide opportunities for students to connect with people of similar backgrounds (e.g. conversations via digital tool such as SKYPE, experts from the community helping with a project, journal articles, and biographies).*
- *Provide multiple grouping opportunities for students to share their ideas and to encourage work among various backgrounds and cultures (e.g. multiple representation and multimodal experiences).*
- *Engage students with a variety of Science and Engineering practices to provide students with multiple entry points and multiple ways to demonstrate their understandings.*
- *Use project-based science learning to connect science with observable phenomena.*
- *Structure the learning around explaining or solving a social or community-based issue.*

- *Provide ELL students with multiple literacy strategies.*
- *Collaborate with after-school programs or clubs to extend learning opportunities*

Leveraging English Language Arts/Literacy and Mathematics

English Language Arts/Literacy-

- Create and present written descriptions to accompany the models developed
- Recall information from written and digital sources
- Ask and answer questions to demonstrate understanding

Mathematics-

- Use graphs to represent data
- Analyze and interpret data
- Use appropriate measuring tools effectively

Samples of Open Education Resources for this unit:

Read, discuss, and write about the topic using various non-fiction articles and books. (Sources available on Science A-Z, readworks.org, k-12reader.com)

Animal Groups - Benefits and Disadavantages http://betterlesson.com/lesson/632399/animal-groups-benefits-and-disadvantages

BrainpopJr video and quizzes - “Freshwater Habitats”, “Arctic Habitats”, “Ocean Habitats”, “Fossils", “Rainforests”, “Migration”

Freshwater Habitats and Ocean Habitats activity - find which freezes first - freshwater or saltwater, answer questions on how this might affect animals living in these types of habitats in the winter - BrainpopJr

Mass Environmental Change - Students will be given scenario cards that represent changes in the environment. After categorizing and discussing each scenario, students will create a potential solution to one of the scenarios. http://ngss.nsta.org/Resource.aspx?ResourceID=272

Design animal adaptation. (Science A-Z: Design animal adaptations activity) Students will design adaptations for an animal to suit its environment. Students will make a claim that includes if this animal survives in a group or independently; as well as evaluate the evidence to determine its relevance. Students will make a claim about the environment this animal needs to survive and provide evidence. They will then make a claim and evaluate a solution to the animal's survival when environment changes; as well as the effect of this change on other organisms. This project will describe what the fossil of this animal looks like, including a graph to organize the data.

Mystery Science: Mystery Science provides ready-made science mysteries for elementary school students. Each lesson contains a central mystery, discussion questions, supplemental reading, and a hands-on activity.

Differentiation		
504	● preferential seating ● extended time on tests and assignments ● reduced homework or classwork ● verbal, visual, or technology aids	● modified textbooks or audio-video materials ● behavior management support ● adjusted class schedules or grading ● verbal testing
Enrichment	• Utilize collaborative media tools • Provide differentiated feedback • Opportunities for reflection •	• Encourage student voice and input • Model close reading • Distinguish long term and short term goals
IEP	• Utilize "skeleton notes" where some required information is already filled in for the student • Provide access to a variety of tools for responses • Provide opportunities to build familiarity and to practice with multiple media tools • Graphic organizers	• Leveled text and activities that adapt as students build skills • Provide multiple means of action and expression • Consider learning styles and interests • Provide differentiated mentors

ELLs	• Pre-teach new vocabulary and meaning of symbols • Embed glossaries or definitions • Provide translations • Connect new vocabulary to background knowledge	• Provide flash cards • Incorporate as many learning senses as possible • Portray structure, relationships, and associations through concept webs • Graphic organizers
At-risk	• Purposeful seating • Counselor involvement • Parent involvement	• Contracts • Alternate assessments • Hands-on learning
21st Century Skills		
• Creativity • Innovation • Critical Thinking		• Problem Solving • Communication • Collaboration
Integrating Technology		
• Chromebooks • Internet research • Online programs		• Virtual collaboration and projects • Presentations using presentation hardware and software

Life Science	Grade 3	Unit 7 Using Evidence to Understand Change in Environments	15 Instructional Days

Life Science Unit 7-Using Evidence to Understand Change in Environments: (15 Instructional Days)

In this unit of study, students develop an understanding of the types of organisms that lived long ago and also about the nature of their environments. Students develop an understanding of the idea that when the environment changes, some organisms survive and reproduce, some move to new locations, some move into the transformed environment, and some die. The crosscutting concepts of systems and system models; scale, proportion, and quantity; and the influence of engineering, technology, and science on society and the natural world are called out as organizing concepts for these disciplinary core ideas. Students are expected to demonstrate grade-appropriate proficiency in asking questions and defining problems, analyzing and interpreting data, and engaging in argument from evidence. Students are also expected to use these practices to demonstrate understanding of the core ideas.

Overarching Essential Questions	Overarching Enduring Understandings
• How do fossils help us understand the environment?	Fossils can give us information about their environments from long ago.
Student Learning Objectives	
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-LS4-1)	**3-LS4-1**
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.*	**3-LS4-4**

[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.] (3-LS4-4)	
Define a simple design problem reflecting a need or a want that includes specified criteria for success and constraints on materials, time, or cost. (3-5-ETS1-1)	**3-5-ETS1-1**

The Student Learning Objectives above were developed using the following elements from the NRC document *A Framework for K-12 Science Education*:		
Science and Engineering Practices	**Disciplinary Core Ideas**	**Crosscutting Concepts**
Analyzing and Interpreting Data • Analyze and interpret data to make sense of phenomena using logical reasoning. (3-LS4-1) Engaging in Argument from Evidence • 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) Asking Questions and Defining Problems • Define a simple design problem that can be solved through the development of an object, tool, process, or system	LS4.A: Evidence of Common Ancestry and Diversity • Some kinds of plants and animals that once lived on Earth are no longer found anywhere. (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) LS4.D: Biodiversity and Humans • Populations live in a variety of habitats, and change in those habitats affects the organisms living there. (3-LS4-4) LS2.C: Ecosystem Dynamics, Functioning, and Resilience • When the environment changes in ways that affect a place's physical characteristics, temperature, or	Scale, Proportion, and Quantity • Observable phenomena exist from very short to very long time periods. (3-LS4-1) Systems and System Models • A system can be described in terms of its components and their interactions. (3-LS4-4) - Connections to Engineering, Technology, and Applications of Science Interdependence of Engineering, Technology, and Science on Society and the Natural World • Knowledge of relevant scientific concepts and research findings is important in engineering. (3- LS4-4) Influence of Science, Engineering, and Technology on Society and the Natural World • People's needs and wants change over time, as do their demands for new and improved

and includes several criteria for success and constraints on materials, time, or cost. (3-5-ETS1-1)	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) ETS1.A: Defining and Delimiting Engineering Problems • 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. (3- 5-ETS1-1)	technologies. (3-5-ETS1-1) Connections to Nature of Science Scientific Knowledge Assumes an Order and Consistency in Natural Systems • Science assumes consistent patterns in natural systems. (3-LS4-1)

Embedded English Language Arts/Literacy and Mathematics

ELA/Literacy

Ask and answer questions to demonstrate understanding of a text, referring explicitly to the text as the basis for the answers. (3-LS4-4) RI.3.1
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.3.2
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) RI.3.3
Write opinion pieces on topics or texts, supporting a point of view with reasons. (3-LS4-1),(3-LS4- 4) W.3.1
Write informative/explanatory texts to examine a topic and convey ideas and information clearly. (3-LS4-1),(3-LS4-4) W.3.2
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) W.3.8
Conduct short research projects that use several sources to build knowledge through investigation of different aspects of a topic. (3-5-ETS1-1) W.5.7
Recall relevant information from experiences or gather relevant information from print and digital sources; summarize or paraphrase information in notes and finished work, and provide a list of sources. (3-5-ETS1-1) W.5.8
Draw evidence from literary or informational texts to support analysis, reflection, and research. (3-5-ETS1-1) W.5.9
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) SL.3.4

Mathematics

Reason abstractly and quantitatively. (3-LS4-1),(3-LS4-4), (3-5- ETS1-1) MP.2

Model with mathematics. (3-LS4-1),(3-LS4-4), (3-5-ETS1-1) MP.4

Use appropriate tools strategically. (3-LS4-1), (3-5-ETS1-1) MP.5

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) 3.MD.B.3

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) 3.MD.B.4 Operations and Algebraic Thinking (3-ETS1-1) 3-5.OA

Three-Dimensional Teaching and Learning

In this unit, students will analyze and interpret data about fossils using logical reasoning. They will provide evidence of the organisms and environments where they lived. Create a solution to a problem caused when the environment changes or the plants and animals living there changes.

Prior Learning

Kindergarten Unit 4: Basic Needs of Living Things

• 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.

• Asking questions, making observations, and gathering information are helpful in thinking about problems. (secondary) Grade 2 Unit 1: Relationships in Habitats

• Plants depend on water and light to grow.

• Plants depend on animals for pollination or to move their seeds around.

• **Part A: What do fossils tell us about the organisms and the environments in which they lived?**	
Concepts	**Formative Assessment**
Observable phenomena exist from very short to very long periods of time. • Science assumes consistent patterns in natural systems. • Some kinds of plants and animals that once lived on Earth are no longer found anywhere. • Fossils provide evidence about the types of organisms that lived long ago, and also about the nature of their environments.	Students who understand the concepts are able to: • Observe that phenomena exist from very short to very long periods of time. • Analyze and interpret data to make sense of phenomena using logical reasoning. • Analyze and interpret data from fossils (e.g., type, size, distributions of fossil organisms) to provide evidence of the organisms and the environments in which they lived long ago. (Assessment does not include identification of specific fossils or present plants and animals. Assessment is limited to major fossil types and relative ages.) Examples of fossils and environments could include: Marine fossils found on dry land; Tropical plant fossils found in Arctic areas; or Fossils of extinct organisms.

Part B: What happens to the plants and animals when the environment changes?	
Concepts	**Formative Assessment**
• • A system can be described in terms of its components and their interactions. • • People's needs and wants change over time, as do their demands for new and improved technologies.	Students who understand the concepts are able to: • Describe a system in terms of its components and interactions.

• Populations live in a variety of habitats, and change in those habitats affects the organisms living there. • 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, others move into the transformed environment, and some die.	• 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 a problem. • 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. (Assessment is limited to a single environmental change and does not include the greenhouse effect or climate change.) Examples of environmental changes could include changes inLand characteristics, Water distribution, Temperature, Food, or Other organisms. • Define a simple design problem that can be solved through the development of an object, tool, process, or system and that includes several criteria for success and constraints on materials, time, or cost. • Define a simple design problem reflecting a need or want that includes specified criteria for success and constraints on materials, time, or cost.

Modifications: ***Teachers identify the modifications that they will use in the unit. The unneeded modifications can then be deleted from the list.(See NGSS Appendix D)***
• *Restructure lesson using UDL principals (*http://www.cast.org/our-work/about-udl.html#.VXmoXcfD_UA*)* • *Structure lessons around questions that are authentic, relate to students' interests, social/family background and knowledge of their community.*

- *Provide students with multiple choices for how they can represent their understandings (e.g. multisensory techniques- auditory/visual aids; pictures, illustrations, graphs, charts, data tables, multimedia, modeling).*
- *Provide opportunities for students to connect with people of similar backgrounds (e.g. conversations via digital tool such as SKYPE, experts from the community helping with a project, journal articles, and biographies).*
- *Provide multiple grouping opportunities for students to share their ideas and to encourage work among various backgrounds and cultures (e.g. multiple representation and multimodal experiences).*
- *Engage students with a variety of Science and Engineering practices to provide students with multiple entry points and multiple ways to demonstrate their understandings.*
- *Use project-based science learning to connect science with observable phenomena.*
- *Structure the learning around explaining or solving a social or community-based issue.*
- *Provide ELL students with multiple literacy strategies.*
- *Collaborate with after-school programs or clubs to extend learning opportunities*

Leveraging English Language Arts/Literacy and Mathematics

English Language Arts/Literacy-

- Create and present written descriptions to accompany the models developed
- Recall information from written and digital sources
- Determine main idea of a text using key details
- Ask and answer questions to demonstrate understanding

Mathematics-

- Use graphs to represent data
- Analyze and interpret data
- Use appropriate tools strategically

Samples of Open Education Resources for this unit:
Read, discuss, and write about the topic using various non-fiction articles and books. (Sources available on Science A-Z, readworks.org, k-12reader.com) Analyze fossils and determine the type of environment these fossils came from. United Streaming Videos - Exploring Fossils BrainpopJr video and quizzes - “Fossils” Mystery Science: Mystery Science provides ready-made science mysteries for elementary school students. Each lesson contains a central mystery, discussion questions, supplemental reading, and a hands-on activity.

Differentiation		
504	● preferential seating ● extended time on tests and assignments ● reduced homework or classwork ● verbal, visual, or technology aids	● modified textbooks or audio-video materials ● behavior management support ● adjusted class schedules or grading ● verbal testing
Enrichment	• Utilize collaborative media tools • Provide differentiated feedback • Opportunities for reflection •	• Encourage student voice and input • Model close reading • Distinguish long term and short term goals

IEP	• Utilize “skeleton notes” where some required information is already filled in for the student • Provide access to a variety of tools for responses • Provide opportunities to build familiarity and to practice with multiple media tools • Graphic organizers	• Leveled text and activities that adapt as students build skills • Provide multiple means of action and expression • Consider learning styles and interests • Provide differentiated mentors
ELLs	• Pre-teach new vocabulary and meaning of symbols • Embed glossaries or definitions • Provide translations • Connect new vocabulary to background knowledge	• Provide flash cards • Incorporate as many learning senses as possible • Portray structure, relationships, and associations through concept webs • Graphic organizers
At-risk	• Purposeful seating • Counselor involvement • Parent involvement	• Contracts • Alternate assessments • Hands-on learning
21st Century Skills		
• Creativity • Innovation • Critical Thinking		• Problem Solving • Communication • Collaboration
Integrating Technology		

● Chromebooks ● Internet research ● Online programs	● Virtual collaboration and projects ● Presentations using presentation hardware and software

Appendix

	Earth and Space Science **Unit 3: Weather and Climate** (25 Instructional Days) Rationale: Students will research and analyze various weather patterns during different seasons and regions. Weather can be predicted using similar weather patterns during that season and in a particular region. Engineers use these patterns to create solutions to weather-related hazards and problems.

	Content Statement: Students will investigate weather patterns during the different seasons and areas. They will create graphs to show these patterns and create buildings to sustain weather hazards. They will reflect on their design and discuss modifications that can be made to make their structure better. They will use their knowledge to predict a season and region based on a severe weather alert.

Overarching Essential Questions	**Overarching Enduring Understandings**
How can we predict weather during a particular season and area? How do engineers design buildings keeping weather patterns in mind?	Weather goes in a pattern. We can predict typical weather during a certain season and in a particular area. Engineers use typical weather patterns in a given region when designing buildings. They design solutions to weather-related problems.
Essential Questions	Enduring Understandings
How can I display typical weather expected during a particular season? Is the weather different in other regions of the world, or the United States? How do I know? How do different designs provide a solution for weather-related problems?	I can use line plots and bar graphs to show patterns of similar weather during each season. I notice that there is similar weather during the same season. For example, I can expect snow and blizzards during the winter. There is a different climate in different areas of the world. I know this because information given on different regions show this. We can use weather patterns to help determine a solution to a weather related problem. For example, we can design barriers to prevent flooding.

Student Learning Experiences and Formative Assessments	
List and describe the learning experiences that will lead to answers to the essential questions, (the answers to the EQs are the enduring understandings). Some of the experiences will also be formative assessment (how you assess students during active instruction and learning experiences).	NGSS *Standards*
Read, discuss, and write about the topic using various non-fiction articles and books. (Sources available on Science A-Z, readworks.org, k-12reader.com)	3-ESS2-1,2 3-ESS3-1

Differences between weather and climate - http://ngss.nsta.org/Resource.aspx?ResourceID=618 In this activity, students will collect weather data over several days or weeks, graph temperature data, and compare the temperature data collected with averaged climate data where they live.	3-ESS2-2
Waterproof the Roof - http://ngss.nsta.org/Resource.aspx?ResourceID=466 Students will design and construct a roof that will protect a cardboard house from getting wet. Discuss how pitch and variety keep strctures safe	3-ESS3-1
NASA Data Lesson - Climate Graphs- http://ngss.nsta.org/Resource.aspx?ResourceID=731 Students will analyze wind speed climate data using line plots. They will then create their own graphical displays using information collected.	3-ESS2-1
Fog - Science A-z Students will read an article on fog and discuss how fog forms. Students will then work in partners to create fog in a jar. Students will then make changes to the water in the jar and create a graph to show these changes and the effect on the fog.	3-ESS2-1
Weather Instruments - file:///home/chronos/u-9794fde29857a2eb5de0880228e6938abbad22f8/Downloads/cloudswindstorms_3-4_weather_instr_ifilestips%20(1).pdf Students will read and discuss various tools scientists use to determine weather. They will need this information to help in their final design.	

Summative (Benchmark) Assessment
Wacky Weather Design - http://static.nsta.org/files/sc1302_37.pdf Students will work together to research various weather patterns. They will create a building that will withstand a given type of weather (each group will be given a different severe weather). Students will have to determine what season their given weather is, as well as where they might be. Students will write down their observations when trying their building. Students will then write down what modifications they would make to create a better structure.

Embedded English Language Arts/Literacy and Mathematics

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), (3-ESS3-1)
- **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.3.1** - 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)
- **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-ESS2-2)

Mathematics

- **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 scaled bar graphs. (3-ESS2-1)
- **MP.2** - Reason abstractly and quantitatively. (3-ESS2-1), (3-ESS2-2), (3-ESS3-1)
- **MP.4** - Model with mathematics. (3-ESS2-1), (3-ESS2-2), (3-ESS3-1)
- **MP.5** - Use appropriate tools strategically. (3-ESS2-1)

Three-Dimensional Teaching and Learning		
Science and Engineering Practices	**Disciplinary Core Ideas**	**Crosscutting Concepts**
Analyzing and Interpreting Data Analyzing data in 3–5 builds on K–2 experiences and progresses to introducing quantitative approaches to collecting data and conducting multiple trials of qualitative observations. When possible and feasible, digital tools should be used. • Represent data in tables and various graphical displays (bar graphs and pictographs) to reveal patterns that indicate relationships. (3-ESS2-1) **Engaging in Argument from Evidence**	**ESS2.D: Weather and Climate** • 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) **ESS3.B: Natural Hazards**	**Patterns** • Patterns of change can be used to make predictions. (3-ESS2-1),(3-ESS2-2) **Cause and Effect** • Cause and effect relationships are routinely identified, tested, and used to explain change. (3-ESS3-1) - ***Connections to Engineering, Technology, and Applications of Science***

Engaging in argument from evidence in 3–5 builds on K–2 experiences and progresses to critiquing the scientific explanations or solutions proposed by peers by citing relevant evidence about the natural and designed world (s). • 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) **Obtaining, Evaluating, and Communicating Information** Obtaining, evaluating, and communicating information in 3–5 builds on K–2 experiences and progresses to evaluating the merit and accuracy of ideas and methods. • Obtain and combine information from books and other reliable media to explain phenomena. (3-ESS2-2)	• 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.)*	**Influence of Engineering, Technology, and Science on Society and the Natural World** • 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) - ***Connections to Nature of Science*** **Science is a Human Endeavor** • Science affects everyday life. (3-ESS3-1)

Prior Learning
Science: • Different types of weather - thunderstorms, tornadoes, snow, etc. • The purpose of responding and forecasting severe weather. ELA: • Record observations and retell in their own words. • Write an opinion piece using data and facts. • Ask questions based on reading and discussion. • Work in a cooperative group. Math: • Show data using graphs. • Be able to use a standard units of measurement.

Modifications: *Teachers identify the modifications that they will use in the unit. The unneeded modifications can then be deleted from the list.(See NGSS Appendix D)*

Students with disabilities:

- Use of computer to read and write.
- Work in partnerships or small groups.
- Multiple choice assessment.
- Extra time on assessments.
- Leveled texts.
- Opportunities for hands-on learning.

Economically disadvantaged students:

- connect science education to lives
- use project-based learning as a form of connected science

Students from major racial and ethnic groups:

- culturally relevant pedagogy
- community involvement

Students with limited English proficiency:

- language support strategies - text to speech, text written in known language
- literacy strategies

Gifted and Talented:

- fast pacing
- level of challenge
- self-direction
- strategic grouping

Samples of Open Education Resources for this unit:
Science A-Z, BrainpopJr, United Streaming, Readworks.org, k-12reader.com, nsta.org, betterlesson.com

Appendix

Differentiation	
Enrichment	● Utilize collaborative media tools ● Provide differentiated feedback ● Opportunities for reflection ● Encourage student voice and input ● Model close reading ● Distinguish long term and short term goals
Intervention & Modification	● Utilize “skeleton notes” where some required information is already filled in for the student ● Provide access to a variety of tools for responses ● Provide opportunities to build familiarity and to practice with multiple media tools ● Leveled text and activities that adapt as students build skills ● Provide multiple means of action and expression ● Consider learning styles and interests ● Provide differentiated mentors ● Graphic organizers

ELLs	• Pre-teach new vocabulary and meaning of symbols • Embed glossaries or definitions • Provide translations • Connect new vocabulary to background knowledge • Provide flash cards • Incorporate as many learning senses as possible • Portray structure, relationships, and associations through concept webs • Graphic organizers
21st Century Skills	
• Creativity • Innovation • Critical Thinking • Problem Solving • Communication • Collaboration	
Integrating Technology	
• Chromebooks • Internet research • Online programs • Virtual collaboration and projects • Presentations using presentation hardware and software	

Physical Science

Unit 4: Forces and Interactions (25 Instructional Days)

Rationale: Students will research, analyze and solve problems that include force, motion, electric and magnetic interactions. Motion has predictable patterns, but can be effected when including balanced and unbalanced forces. Electric and magnetic forces create interactions between objects that are not in contact with each other. Magnetic forces are also used to solve problems.

Content Statement: Students will investigate how forces can affect interactions between objects. They will conduct investigations to determine how weight and mass can also affect the pattern of motion. Students will investigate static electricity and magnetic forces. They will have the opportunity to solve problems using their knowledge of forces and magnetism.

Overarching Essential Questions	Overarching Enduring Understandings
How can the pattern of motion be effected How can two objects interact when not in contact with one another?	Balanced and unbalanced forces can affect the motion of an object. Magnetic forces create interactions between two objects not in contact with each other.
Essential Questions	Enduring Understandings
How do balanced and unbalanced forces affect the motion of objects? How can patterns be used to predict future motion? How can I determine the cause and effect relationships between electric or magnetic interactions between two objects that aren't touching each other? How can magnets be used to solve real world problems?	When two forces are unbalanced, the object will start to move. When two forces are balanced, an object will stay still. Many objects, such as swinging on a swing, have a predictable pattern of motion. I can ask and answer questions to determine the relationship. I can use magnets and static electricity to see how the objects can interact when not touching each other. We use magnets to solve problems. For example, magnets are used in locks.

Student Learning Experiences and Formative Assessments	
List and describe the learning experiences that will lead to answers to the essential questions, (the answers to the EQs are the enduring understandings). Some of the experiences will also be formative assessment (how you assess students during active instruction and learning experiences).	NGSS *Standards*

Read, discuss, and write about the topic using various non-fiction articles and books. (Sources available on Science A-Z, readworks.org, k-12reader.com)	3-PS2-1, 2, 3, 4
Force and Motion Investigation - https://betterlesson.com/lesson/632779/force-and-motion-investigation In this lesson, students will collaboratively conduct an investigation to test how the strength of a force and the mass of an object affects motion. The data produced will serve as the basis for explanation of this phenomena.	3-PS2-2
Scratching Records - http://static.nsta.org/files/sc1604_26.pdf Students explore static electricity.	3-PS2-3
Changes in Motion - https://betterlesson.com/lesson/617199/change-in-motion Students will be placed into groups with an assigned change in motion. They must use materials and tools to create a device that changes the ball's motion based on their group's assigned change.	3-PS2-1,2
I Need a Magnet! - https://betterlesson.com/lesson/639709/i-need-a-magnet Students will be able to use their knowledge of magnetism to solve a problem or respond to a situation.	3-PS2-3,4

Summative (Benchmark) Assessment
Playground Design Challenge - Students will analyze playgrounds, discuss challenges, and use knowledge of force and motion to design playground modifications to make the playground safe but still fun. One of their modifications must include magnetic force. **chrome-extension://bpmcpldpdmajfigpchkicefoigmkfalc/views/app.html**

Embedded English Language Arts/Literacy and Mathematics	
Common Core State Standards Connections:	
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-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)*
Mathematics -	
MP.2	Reason abstractly and quantitatively. *(3-PS2-1)*
MP.5	Use appropriate tools strategically. *(3-PS2-1)*
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-PS2-1)*

Three-Dimensional Teaching and Learning		
Science and Engineering Practices	**Disciplinary Core Ideas**	**Crosscutting Concepts**
Asking Questions and Defining Problems Asking questions and defining problems in grades 3–5 builds on grades K–2 experiences and progresses to specifying qualitative relationships. • 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)	**PS2.A: Forces and Motion** • 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	**Patterns** • Patterns of change can be used to make predictions. (3-PS2-2) **Cause and Effect** • 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)

Planning and Carrying Out Investigations Planning and carrying out investigations to answer questions or test solutions to problems in 3–5 builds on K–2 experiences and progresses to include investigations that control variables and provide evidence to support explanations or design solutions. ● 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) - ***Connections to Nature of Science*** **Science Knowledge is Based on Empirical Evidence** ● 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)	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) **PS2.B: Types of Interactions** ● Objects in contact exert forces on each other. (3-PS2-1) ● Electric, and magnetic forces between a pair of objects do not require that 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)	- ***Connections to Engineering,Technology, and Applications of Science*** **Interdependence of Science, Engineering, and Technology** ● 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)

Prior Learning
Science ● Objects can change directions using pushes and pulls. ● Magnets can pull objects together. ELA/Literacy ● Be able to research a topic and report about it. ● Ask and answer questions ● Understand cause and effect Mathematics

- Use math tools
- Measure masses of objects

Modifications: *Teachers identify the modifications that they will use in the unit. The unneeded modifications can then be deleted from the list.(See NGSS Appendix D)*

Students with disabilities:

- Use of computer to read and write.
- Work in partnerships or small groups.
- Multiple choice assessment.
- Extra time on assessments.
- Leveled texts.
- Opportunities for hands-on learning.

Economically disadvantaged students:

- connect science education to lives
- use project-based learning as a form of connected science

Students from major racial and ethnic groups:

- culturally relevant pedagogy
- community involvement

Students with limited English proficiency:

- language support strategies - text to speech, text written in known language
- literacy strategies

Gifted and Talented:

- fast pacing
- level of challenge
- self-direction
- strategic grouping

Samples of Open Education Resources for this unit:
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Appendix

Differentiation	
Enrichment	● Utilize collaborative media tools ● Provide differentiated feedback ● Opportunities for reflection ● Encourage student voice and input ● Model close reading ● Distinguish long term and short term goals

Intervention & Modification	● Utilize “skeleton notes” where some required information is already filled in for the student ● Provide access to a variety of tools for responses ● Provide opportunities to build familiarity and to practice with multiple media tools ● Leveled text and activities that adapt as students build skills ● Provide multiple means of action and expression ● Consider learning styles and interests ● Provide differentiated mentors ● Graphic organizers
ELLs	● Pre-teach new vocabulary and meaning of symbols ● Embed glossaries or definitions ● Provide translations ● Connect new vocabulary to background knowledge ● Provide flash cards ● Incorporate as many learning senses as possible ● Portray structure, relationships, and associations through concept webs ● Graphic organizers
21st Century Skills	
● Creativity ● Innovation ● Critical Thinking ● Problem Solving ● Communication ● Collaboration	

Integrating Technology
● Chromebooks ● Internet research ● Online programs ● Virtual collaboration and projects ● Presentations using presentation hardware and software

Life Science **Unit 1: Inheritance and Variation of Traits** (15 Instructional Days) Rationale:Students will describe how organisms' life cycles are different from other organisms. They will investigate traits from plants and animals that they have inherited from parents and how these traits are influenced by the environment. Content Statement: Students will research animals and investigate the animal's life cycle, traits inherited from parents, and traits that offspring will inherit. They will read articles, watch videos, and demonstrate knowledge with project-based learning.	
Overarching Essential Questions	**Overarching Enduring Understandings**
How do different organisms' life cycles compare to each other? How do similar plants and animals have a variation of similar traits? How can traits be influenced by the environment?	All organisms have unique life cycles but all have common birth, growth, reproduction and death. Plants and animals have traits inherited from parents. These traits exist among similar organisms. Environments affect a trait of an organism. For example, a pet dog that eats too much will become overweight.
Essential Questions	Enduring Understandings

How do organism's life cycle make a pattern? How is this different from other organisms? What are the similarities and differences of traits between offspring and parents? How can these traits be affected by the environment? How do different characteristics of organisms of the same species help them survive?	Organism's change as they mature. Each species of plant and animal have the same life cycle. Different species' life cycles are different. All organisms share similar traits with parents. Plant and animal traits are influenced by the environment. For example, a plant that does not get enough sunlight will not grow a tall. Traits in animals and plants allow them to survive. For example, an animal that has better camouflage will survive better than one that does not.

Student Learning Experiences and Formative Assessments	
List and describe the learning experiences that will lead to answers to the essential questions, (the answers to the EQs are the enduring understandings). Some of the experiences will also be formative assessment (how you assess students during active instruction and learning experiences).	NGSS *Standards*
Read, discuss, and write about the topic using various non-fiction articles and books. (Sources available on Science A-Z, readworks.org, k-12reader.com)	3-LS1-1, 3-LS3-1,2 3-LS4-2
Animal Detectives Activities - http://ngss.nsta.org/Resource.aspx?ResourceID=505	3-LS3-1,2 3-LS1-1 3-LS4-2

BrainpopJr video and quiz - “Plant Life Cycle”	3-LS1-1
Mammals and their Parents - Perfect Together Lesson - http://betterlesson.com/lesson/623417/mammals-and-their-parents-perfect-together	3-LS3-1
Animal Traits inherited and influenced by environment socratic circle activity- http://betterlesson.com/lesson/630502/socratic-circles-in-science	3-LS3-1,2
Plant Terarrium - https://jr.brainpop.com/science/plants/plantlifecycle/activity/	3-LS1-1

Summative (Benchmark) Assessment
Final Animal Detective Project Students will investigate an animal to answer questions. Students will model this animal’s life cycle.. Students will analyze data and provide evidence on inherited traits explain how an environment change will affect the traits. Students will use cause and effect examples who explain how variations on traits can help different animals of the same trait survive.

Embedded English Language Arts/Literacy and Mathematics

Common Core State Standards Connections:
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),*(3-LS4-2)*
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),(3-LS4-2)*
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),(3-LS4-2)*
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)*
W.3.2	Write informative/explanatory texts to examine a topic and convey ideas and information clearly. *(3-LS3-1)*,(3-LS3-2),(3-LS4-2)
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),(3-LS4-2)*
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)*

Mathematics —

MP.2	Reason abstractly and quantitatively. *(3-LS3-1),(3-LS3-2),(3-LS4-2)*
MP.4	Model with mathematics. *(3-LS1-1),(3-LS3-1),(3-LS3-2),(3-LS4-2)*
3.NBT	Number and Operations in Base Ten *(3-LS1-1)*
3.NF	Number and Operations—Fractions *(3-LS1-1)*
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.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)*

Three-Dimensional Teaching and Learning		
Science and Engineering Practices	**Disciplinary Core Ideas**	**Crosscutting Concepts**
Developing and Using Models Modeling in 3–5 builds on K–2 experiences and progresses to building and revising simple models and using models to represent events and design solutions. • Develop models to describe phenomena. (3-LS1-1) **Analyzing and Interpreting Data** Analyzing data in 3–5 builds on K–2 experiences and progresses to introducing quantitative approaches to collecting data and conducting multiple trials of	**LS1.B: Growth and Development of Organisms** • Reproduction is essential to the continued existence of every kind of organism. Plants and animals have unique and diverse life cycles. (3-LS1-1) **LS3.A: Inheritance of Traits** • Many characteristics of organisms are inherited from their parents. (3-LS3-1) • Other characteristics result from individuals' interactions with the	**Patterns** • Similarities and differences in patterns can be used to sort and classify natural phenomena. (3-LS3-1) • Patterns of change can be used to make predictions. (3-LS1-1) **Cause and Effect** • Cause and effect relationships are routinely identified and used to explain change. (3-LS3-2),(3-LS4-2)

qualitative observations. When possible and feasible, digital tools should be used. ● Analyze and interpret data to make sense of phenomena using logical reasoning. (3-LS3-1) **Constructing Explanations and Designing Solutions** Constructing explanations and designing solutions in 3–5 builds on K–2 experiences and progresses to the use of evidence in constructing explanations that specify variables that describe and predict phenomena and in designing multiple solutions to design problems. ● Use evidence (e.g., observations, patterns) to support an explanation. (3-LS3-2) ● Use evidence (e.g., observations, patterns) to construct an explanation. (3-LS4-2) - ***Connections to Nature of Science*** **Scientific Knowledge is Based on Empirical Evidence** ● Science findings are based on recognizing patterns. (3-LS1-1)	environment, which can range from diet to learning. Many characteristics involve both inheritance and environment. (3-LS3-2) **LS3.B: Variation of Traits** ● 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) **LS4.B: Natural Selection** ● Sometimes the differences in characteristics between individuals of the same species provide advantages in surviving, finding mates, and reproducing. (3-LS4-2)	

Prior Learning
Science: ● Organisms change as they get older. ELA: ● Record observations and retell in their own words. ● Write an informational piece using data and facts. ● Ask questions based on reading and discussion. ● Work in a cooperative group. Math: ● Show data using graphs.

- Be able to use a ruler to measure.

Modifications: *Teachers identify the modifications that they will use in the unit. The unneeded modifications can then be deleted from the list.(See NGSS Appendix D)*

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- Work in partnerships or small groups.
- Multiple choice assessment.
- Extra time on assessments.
- Leveled texts.
- Opportunities for hands-on learning.

Economically disadvantaged students:

- connect science education to lives
- use project-based learning as a form of connected science

Students from major racial and ethnic groups:

- culturally relevant pedagogy
- community involvement

Students with limited English proficiency:

- language support strategies - text to speech, text written in known language
- literacy strategies

Gifted and Talented:

- fast pacing
- level of challenge
- self-direction
- strategic grouping

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21st Century Skills	
• Creativity • Innovation • Critical Thinking • Problem Solving • Communication • Collaboration	
Integrating Technology	
• Chromebooks • Internet research • Online programs • Virtual collaboration and projects • Presentations using presentation hardware and software	

Life Science

Unit 1: Interdependent Relationships in Ecosystems (15 Instructional Days)

Rationale: Students will learn that organisms and their habitats depend on each other to survive. Organisms are also able to adapt to their surrounding, if they change (either by temperature, water distribution, or lack of food).

Content Statement: Students will analyze fossils and animal groups to determine how animals survive in their environment. They will read articles, watch videos, and demonstrate knowledge with project-based learning. They will have an opportunity to create a solution to a problem animals face when their environments change.

Overarching Essential Questions	Overarching Enduring Understandings
How do animals survive in the wild? How do fossils help us understand the environment? How does the environment affect organisms?	Some animals form groups to help them survive. Fossils can give us information about their environments from long ago. Different organisms can survive in different environments. When these environments change, the organisms that live there may change.
Essential Questions	Enduring Understandings
How does forming groups help animals survive? How do fossils give us information about their environments? What happens to animals if temperatures change in their environment?	Some groups of organisms create groups to help survive in their environment. There are advantages and disadvantages for organisms in their groups. Fossils have been preserved and can give us information on the type of environment that organism lived in. Organisms live in various habitats depending on their needs. When the habitat changes, organisms must either adapt, or change their environment.
Student Learning Experiences and Formative Assessments	

List and describe the learning experiences that will lead to answers to the essential questions, (the answers to the EQs are the enduring understandings). Some of the experiences will also be formative assessment (how you assess students during active instruction and learning experiences).	NGSS *Standards*
Read, discuss, and write about the topic using various non-fiction articles and books. (Sources available on Science A-Z, readworks.org, k-12reader.com)	3-LS2-1 3-LS4-1,3,4
Animal Groups - Benefits and Disadavantages http://betterlesson.com/lesson/632399/animal-groups-benefits-and-disadvantages	3-LS2-1
Analyze fossils and determine the type of environment these fossils came from.	3-LS4-1
United Streaming Videos - Exploring Fossils	3-LS4-1
BrainpopJr video and quizzes - “Freshwater Habitats”, “Arctic Habitats”, “Ocean Habitats”, “Fossils", “Rainforests”, “Migration”	3-LS2-1 3-LS4-1,3,4
Freshwater Habitats and Ocean Habitats activity - find which freezes first - freshwater or saltwater, answer questions on how this might affect animals living in these types of habitats in the winter - BrainpopJr	3-LS4-3
Mass Environmental Change - Students will be given scenario cards that represent changes in the environment. After categorizing and discussing each scenario, students will create a potential solution to one of the scenarios. http://ngss.nsta.org/Resource.aspx?ResourceID=272	3-LS4-4

Summative (Benchmark) Assessment
Design animal adaptation. (Science A-Z: Design animal adaptations activity) Students will design adaptations for an animal to suit its environment. Students will make a claim that includes if this animal survives in a group or independently; as well as evaluate the evidence to determine its relevance. Students will make a claim about the environment this animal needs to survive and provide evidence. They will then make a claim and evaluate a solution to the animal's survival when environment changes; as well as the effect of this change on other organisms. This project will describe what the fossil of this animal looks like, including a graph to organize the data. **Teacher created assessment on vocabulary and enduring understandings.** Analyze groups of animals and describe why they form groups to survive. Students will analyze evidence to determine if being a member of a group has a survival advantage, as well other other effects living in groups have. Students will analyze the environment organisms live in and how it affects their survival. Analyze evidence of the characteristics of the given environment and the needs of the particular organism. Compare and contrast the needs of at least three types of organisms; how and what features the habitat fits and does not fit the need of the organisms. Students will also make a claim about what happens to these organisms when the environment changes and how these organisms can adapt to survive the change. Students will identify and describe relationships in data on fossils of animals and plants. They will identify and describe the relationships between fossils of organisms and the environments they live in, and the relationship between long ago and modern counterparts. Students will describe that fossils provide evidence of how organisms have become extinct.

Embedded English Language Arts/Literacy and Mathematics
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-LS2-1), (3-LS4-1), (3-LS4-3), (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-LS4-3), (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-LS2-1), (3-LS4-1), (3-LS4-3), (3-LS4-4) ● **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-LS4-3), (3-LS4-4) ● **W.3.1** - Write opinion pieces on topics or texts, supporting a point of view with reasons. (3-LS2-1), (3-LS4-1), (3-LS4-3), (3-LS4-4) ● **W.3.2** - Write informative/explanatory texts to examine a topic and convey ideas and information clearly. (3-LS4-1), (3-LS4-3), (3-LS4-4) ● **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-LS4-1)

Mathematics

- **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-LS4-3)
- **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 unitsâ€” whole numbers, halves, or quarters. (3-LS4-1)
- **3.NBT** - Number and Operations in Base Ten. (3-LS2-1)
- **MP.2** - Reason abstractly and quantitatively. (3-LS4-1), (3-LS4-3), (3-LS4-4)
- **MP.4** - Model with mathematics. (3-LS2-1), (3-LS4-1), (3-LS4-3), (3-LS4-4)
- **MP.5** - Use appropriate tools strategically. (3-LS4-1)

Three-Dimensional Teaching and Learning		
Science and Engineering Practices **Analyzing and Interpreting Data** Analyzing data in 3–5 builds on K–2 experiences and progresses to introducing quantitative approaches to collecting data and conducting multiple trials of qualitative observations. When possible and feasible, digital tools should be used. ● Analyze and interpret data to make sense of phenomena using logical reasoning. (3-LS4-1) **Engaging in Argument from Evidence** Engaging in argument from evidence in 3–5 builds on K–2 experiences and progresses to critiquing the scientific explanations or solutions proposed by peers by citing relevant evidence about the natural and designed world(s). ● Construct an argument with evidence, data, and/or a model. (3-LS2-1) ● Construct an argument with evidence. (3-LS4-3) ● Make a claim about the merit of a solution to a problem by citing relevant evidence about how it meets the criteria and	**Disciplinary Core Ideas** **LS2.C: Ecosystem Dynamics, Functioning, and Resilience** ● 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)* **LS2.D: Social Interactions and Group Behavior** ● 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) **LS4.A: Evidence of Common Ancestry and Diversity** ● Some kinds of plants and animals that once lived on Earth are no longer found anywhere. *(Note: moved from K-2)* (3-LS4-1)	**Crosscutting Concepts** **Cause and Effect** ● Cause and effect relationships are routinely identified and used to explain change. (3-LS2-1),(3-LS4-3) **Scale, Proportion, and Quantity** ● Observable phenomena exist from very short to very long time periods. (3-LS4-1) **Systems and System Models** ● A system can be described in terms of its components and their interactions. (3-LS4-4) - ***Connections to Engineering, Technology, and Applications of Science*** **Interdependence of Engineering, Technology, and Science on Society and the Natural World** ● Knowledge of relevant scientific concepts and research findings is important in engineering. (3-LS4-4) -

constraints of the problem. (3-LS4-4)	• Fossils provide evidence about the types of organisms that lived long ago and also about the nature of their environments. (3-LS4-1) **LS4.C: Adaptation** • For any particular environment, some kinds of organisms survive well, some survive less well, and some cannot survive at all. (3-LS4-3) **LS4.D: Biodiversity and Humans** • Populations live in a variety of habitats, and change in those habitats affects the organisms living there. (3-LS4-4)	***Connections to Nature of Science*** **Scientific Knowledge Assumes an Order and Consistency in Natural Systems** • Science assumes consistent patterns in natural systems.

Prior Learning

Science:

- Organisms need water and food to survive.
- Organisms live in different habitats depending on their needs.

ELA:

- Record observations and retell in their own words.
- Write an informational piece using data and facts.

Math:

- Show data using graphs.
- Be able to use a ruler to measure.

Modifications: *Teachers identify the modifications that they will use in the unit. The unneeded modifications can then be deleted from the list.(See NGSS Appendix D)*

Students with disabilities:

- Use of computer to read and write.
- Work in partnerships or small groups.

- Multiple choice assessment.
- Extra time on assessments.
- Leveled texts.
- Opportunities for hands-on learning.

Economically disadvantaged students:

- connect science education to lives
- use project-based learning as a form of connected science

Students from major racial and ethnic groups:

- culturally relevant pedagogy
- community involvement

Students with limited English proficiency:

- language support strategies - text to speech, text written in known language
- literacy strategies

Gifted and Talented:

- fast pacing
- level of challenge
- self-direction
- strategic grouping

Samples of Open Education Resources for this unit:
Science A-Z, BrainpopJr, United Streaming, Readworks.org, k-12reader.com, nsta.org, betterlesson.com

Appendix

Differentiation	
Enrichment	● Utilize collaborative media tools ● Provide differentiated feedback ● Opportunities for reflection ● Encourage student voice and input ● Model close reading ● Distinguish long term and short term goals
Intervention & Modification	● Utilize “skeleton notes” where some required information is already filled in for the student ● Provide access to a variety of tools for responses ● Provide opportunities to build familiarity and to practice with multiple media tools ● Leveled text and activities that adapt as students build skills ● Provide multiple means of action and expression ● Consider learning styles and interests ● Provide differentiated mentors ● Graphic organizers
ELLs	● Pre-teach new vocabulary and meaning of symbols ● Embed glossaries or definitions ● Provide translations ● Connect new vocabulary to background knowledge ● Provide flash cards ● Incorporate as many learning senses as possible ● Portray structure, relationships, and associations through concept webs ● Graphic organizers

21st Century Skills
● Creativity ● Innovation ● Critical Thinking ● Problem Solving ● Communication ● Collaboration
Integrating Technology
● Chromebooks ● Internet research ● Online programs ● Virtual collaboration and projects ● Presentations using presentation hardware and software