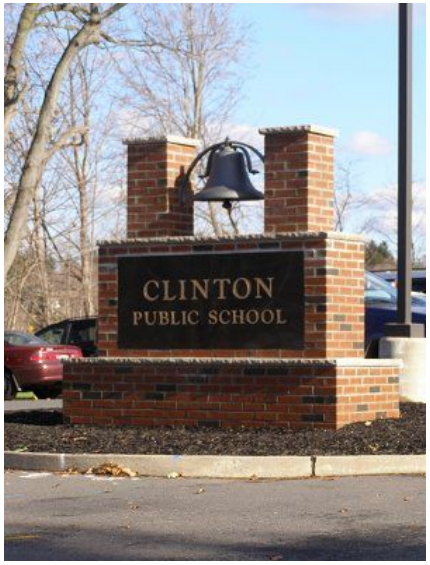
Clinton-Glen Gardner School District



Curriculum Management System

SCIENCE

Grade: 1

*** For adoption by all regular education programs as specified and for adoption or adaptation by all Special Education Programs in accordance with Board of Education Policy #2200.**

Board Approved:

CLINTON-GLEN GARDNER SCHOOL DISTRICT

ADMINISTRATION

Dr. Seth Cohen, Superintendent/Principal
Mrs. Lisa J. Craft, Business Administrator
Mrs. Jacqueline Turner, Assistant Principal
Mrs. Jenine Kastner, Director of Special Services

BOARD OF EDUCATION

Mr. Brenden McIssac, President
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Carl Sabatino
Charles Sampson
Lorraine Linfante

Acknowledgments

The following individuals are acknowledged for their assistance in the preparation of this Curriculum Management System:

Writers' Names: **Susan Haney**

Clinton-Glen Gardner School District

Mission

The Clinton-Glen Gardner School District is a community who values traditions. Our MISSION is to nurture and cultivate each child to be a compassionate, curious, and creative thinker, entrusted and empowered to build and lead the future.

Philosophy

Science, engineering, and technology influence and permeate every aspect of modern life. Some knowledge of science and engineering is required to engage with the major public policy issues of today as well as to make informed everyday decisions, such as selecting among alternative medical treatments or determining how to invest public funds for water supply options. In addition, understanding science and the extraordinary insights it has produced can be meaningful and relevant on a personal level, opening new worlds to explore and offering lifelong opportunities for enriching people's lives. In these contexts, learning science is important for everyone, even those who eventually choose careers in fields other than science or engineering.

The Next Generation Science Standards (NGSS) are K–12 science content standards. Standards set the expectations for what students should know and be able to do. The NGSS were developed by states to improve science education for all students.

A goal for developing the NGSS was to create a set of research-based, up-to-date K–12 science standards. These standards give local educators the flexibility to design classroom learning experiences that stimulate students' interests in science and prepares them for college, careers, and citizenship. The CPS Science Curriculum is designed to address the goals and philosophy of the New Jersey Next Generation Science Standards.

Grade 1
Science
Scope and Sequence

<table>
<tr><th colspan="2">Quarter I</th></tr>
<tr><td colspan="2">Unit 1: Patterns of Change in the Sky
● What patterns of change can be predicted when observing the sun, moon, and stars?
● What is the relationship between the amount of daylight and the time of year?</td></tr>
<tr><td>(The ones that apply for these units are in bold)

<u>21st Century Skills</u>
1. Creativity & Innovation
2. Critical Thinking & Problem Solving
3. Communication & Collaboration
4. Media Literacy
5. Information Literacy
6. Information, Communication & Technology</td><td><u>Cross Cutting Concepts</u>
1. Patterns
2. Cause and Effect
3. Scale, Proportion and Quantity
4. System and System Models
5. Energy and Matter: flows, cycles and conservation
6. Structure and Function
7. Stability and Change</td></tr>
<tr><td><u>21st Century Themes</u>
1. Global Awareness
2. Financial, Economic, Business and Entrepreneurial Literacy
3. Civic Literacy
4. Health Literacy
5. Environmental Literacy</td><td><u>Scientific and Engineering Practices</u>
1. Asking questions or defining a problem
2. Developing and using models
3. Planning and carrying out investigations
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http://www.state.nj.us/education/, Internet, Web Quests, content-related websites, wireless laptop computers, Chromebooks, computer laboratory, classroom computers, SMART Boards, CDs, DVDs, webinars, video streaming, podcasting</td></tr>
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Differentiation

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.•Restructure lesson using UDL principles: (http://www.cast.org/our-work/about-udl.html#.VXmoXcfD_UA)

Assessment

Foss Kit I-Investigations at the end of each investigation as benchmark. Review of student documentation of learning process in Science notebook and observations of approach to investigations as formative assessment. Various opportunities during lab investigations for formative assessment and anecdotal notes.

During Work Period adjust lessons for individual students and small groups of students based on formative and summative data (Go back and re-teach for those that did not meet standard on benchmark and plan accordingly for those that exceeded benchmark)

Quarter II

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● How can you prove that you can only see something when someone shines a light on it or if the object gives off its own light?
● What happens to a beam of light when you put different kinds of things in front of it?
● How would you design an experiment to prove your thinking?</td>
<td>Unit 3: Communicating with Light and Sound
● How can light or sound be used to communicate over a distance?</td>
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Quarter III

Unit 4: Characteristics of Living Things

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

(The ones that apply for these units are in bold)

21st Century Skills

1. Creativity & Innovation
2. Critical Thinking & Problem Solving
3. Communication & Collaboration
4. Media Literacy
5. Information Literacy

Cross Cutting Concepts

1. **Patterns**
2. Cause and Effect
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Quarter IV

Unit 5: Mimicking Organisms to Solve Problems

- How can humans mimic how plants and animals use their external parts to help them survive and grow?

(The ones that apply for these units are in bold)

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2. Critical Thinking & Problem Solving
3. Communication & Collaboration
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1. Asking questions or defining a problem
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Grade 1	**Topic: Patterns of Change in the Sky**
	15 days
Essential Questions	What is the weather today? What time of day is the air the warmest? What types of clouds are in the sky today? What time of day can we observe the Moon? How can we describe the weather over a month? What does the Moon look like at different times during a month? How does the amount of daylight change over the year? How does the temperature and weather change over the seasons?
Disciplinary Core Concepts:	ESS1.A: The Universe and its Stars •Patterns of the motion of the sun, moon, and stars in the sky can be observed, described, and predicted. (1-ESS1-1) ESS1.B: Earth and the Solar System •Seasonal patterns of sunrise and sunset can be observed, described, and predicted. (1-ESS1-2)

How will they learn it? Learning Activities:	Students use instruments for 4–8 weeks to observe and record weather on a class calendar and in science notebooks. Students monitor temperature with a thermometer and (optionally) rainfall with a rain gauge. They learn to identify three basic cloud types by matching their observations with a cloud chart. they also monitor times of sunrise and sunset and record the number of daylight hours each day. Students organize monthly weather data, using graphs to describe weather trends. They continue to monitor weather throughout the year, comparing the seasons and looking for weather patterns. Students use the observations they have recorded on the calendar to look for monthly patterns of the Moon and annual patterns of daylight hours.
Resources	Foss Kit Investigation 2 and 4 Science Resources Books: What is the Weather Today?, Clouds, Water in the Air, Changes in the Sky, Seasons, Getting Through the Winter Online Activity: Cloud Catcher

How do we know that they know it? Assessment	Benchmark assessments are short summative assessments given after each investigation. These I-Checks are actually hybrid tools: they provide summative information about students' achievement, and because they occur soon after teaching each investigation, they can be used diagnostically as well. Reviewing specific items on an I-Check with the class provides additional opportunities for students to clarify their thinking. The embedded assessments are based on authentic work produced by students during the course of participating in the FOSS activities. Students do their science, and teachers review their notebook entries. Bullet points in the Guiding the Investigation tell you specifically what students should know and be able to communicate. If student work is incorrect or incomplete, you know that there has been a breakdown in the learning/communicating process. The assessment system then provides a menu of next-step strategies to resolve the situation. Embedded assessment is assessment for learning, not assessment of learning.
Interdisciplinary Connections	**English Language Arts** Participate in shared research and writing projects (e.g., explore a number of "how-to" books on a given topic and use them to write a sequence of instructions). (1-ESS1-1),(1-ESS1-2) W.1.7 With guidance and support from adults, recall information from experiences or gather information from provided sources to answer a question. (1-ESS1-1),(1-ESS1-2) W.1.8 **Mathematics** Reason abstractly and quantitatively. (1-ESS1-2)MP2 Model with mathematics)1-ESS1-2)MP.5 Use appropriate tools strategically. (1-ESS1-2)MP5 Use addition and subtraction within 20 to solve word problems involving situations of adding to, taking from, putting together, taking apart, and comparing, with unknowns in all positions, e.g., by using objects, drawings, and equations to represent the problem. (1-ESS1-2) 1.OA.A.1 Organize, represent, and interpret data with up to three categories; ask and answer questions about the total

	number of data points, how many in each category, and how many more or less are in one category than in another. (1-ESS1-2)1.MD.C.4
What will students be able to do as a result of the learning in this unit?	Students who understand the concepts can: •Observe and use patterns in the natural world as evidence and to describe phenomena. •Use observations (firsthand or from media) to describe patterns in the natural world in order to answer scientific questions. •Use observations of the sun, moon, and stars to describe patterns that can be predicted. Examples of patterns could include: ● The sun and moon appear to rise in one part of the sky, move across the sky, and set. ● Stars other than our sun are visible at night but not during the day. Make observations at different times of the year to relate the amount of daylight to the time of year.

Grade 1	**Topic: Light and Sound and Communicating with Light and Sound**
	45 Days

Essential Questions	What causes sound? What kinds of sounds are easy to identify? What information does sound give us? How can we make loud/soft and low/high-pitched sounds? How does sound travel from the source to the receiver? How can we use sound to communicate over long distances? What makes a shadow? How can we use the Sun to create shadows? What happens when different materials block light? How can we redirect a light beam? What can we see with a mirror? What can be seen with no light? How can we communicate with light?
Disciplinary Core Concepts:	PS4.A Wave Properties Sound can make matter vibrate, and vibrating matter can make sound. (1-PS4-1) PS4.B Electromagnetic Radiation Objects can be seen if light is available to illuminate them or if they give off their own light. (1-PS4-2) Some materials allow light to pass through them, others allow only some light through and others block all the light and create a dark shadow on any surface beyond them, where the light cannot reach. Mirrors can be used to redirect a light beam. (1-PS4-3) PS4.C Information Technologies and Instrumentation People also use a variety of devices to communicate over long distances. (1-PS4-4)

	ETS1.A Defining and Delimiting Engineering Problems A situation that people want to change or create can be approached as a problem to be solved through engineering. (K-2-ETS1-1) Asking questions, making observations, and gathering information are helpful in thinking about problems. (K-2-ETS1-1) Before beginning to design a solution, it is important to clearly understand the problem. (K-2-ETS1-1) ETS1.B Developing Possible Solutions Designs can be conveyed through sketches, drawings, or physical models. These representations are useful in communicating ideas for a problem's solutions to other people. (K-2-ETS1-2)
How will they learn it? Learning Activities:	Students explore the production of sound with a table fiddle, tuning forks, a tone generator, cups, sticks, and rubber bands. Students look for vibrations at the sound source and come up with words to describe different sounds. They learn how to discriminate between different kinds of sounds and what information sounds convey. Students find out about sounds that different animals make. Students use simple instruments to investigate how to change the volume of sound and the pitch of sound. Using a spoon gong, students develop a model of how sound travels from a source to a receiver. They redesign the spoon gong to make a device to both send and receive sound. Students learn about sound receivers used by different animals. Students use flashlights, sunlight, and solid materials that block light to create and change shadows. Students investigate how light interacts with objects that are transparent, translucent, and opaque. Students position mirrors to reflect images so they can see their own eyes and view objects behind them. They explore the shapes and location of eyes on different animals. Students read about devices that use light to communicate information.

Resources	Foss Kit Investigation 1-4 Science Resources Books: Vibrations and Sound, Listen to This, Animal Ears and Hearing, Strings in Motion, More Musical Instruments, Playing with Light, Reflections, Seeing Light, Communicating with Light Foss Kit Videos: All About Sound, Light and Shadows, All About Light, My Shadow, Light and Darkness Online Activity: Sorting Sounds
How do we know that they know it? Assessment	Benchmark assessments are short summative assessments given after each investigation. These I-Checks are actually hybrid tools: they provide summative information about students' achievement, and because they occur soon after teaching each investigation, they can be used diagnostically as well. Reviewing specific items on an I-Check with the class provides additional opportunities for students to clarify their thinking. The embedded assessments are based on authentic work produced by students during the course of participating in the FOSS activities. Students do their science, and teachers review their notebook entries. Bullet points in the Guiding the Investigation tell you specifically what students should know and be able to communicate. If student work is incorrect or incomplete, you know that there has been a breakdown in the learning/communicating process. The assessment system then provides a menu of next-step strategies to resolve the situation. Embedded assessment is assessment for learning, not assessment of learning.
Interdisciplinary Connections	**English Language Arts** Write informative/explanatory texts in which they name a topic, supply facts about the topic, and provide some sense of closure. (1-PS4-2) W.1.2 Participate in shared research and writing projects (e.g., explore a number of "how-to" books on a given topic and use them to write a sequence of instructions). (1-PS401), (1-PS4-2), (1-PS4-3), W.1.7 With guidance and support from adults, recall information from experiences or gather information from provided sources to answer a question. (1-PS4-1), (1-PS4-2), (1-PS4-3), W.1.8

	Ask and answer such questions as who, what, where, when, why, and how to demonstrate understanding of key details in a text. (K-2-ETS1-1) RI.2.1 With guidance and support from adults, use a variety of digital tools to produce and publish writing, including in collaboration with peers. (K-2-ETS1-1) W.2.6 Recall information from experiences or gather information from provided sources to answer a question. (K-2-ETS1-1) W.2.8 Create audio recordings of stories or poems; add drawings or other visuaql displays to stories or recounts of experiences when appropriate to clarify ideas, thoughts, and feelings. (K-2-ETS1-2) SL.2.5 **Mathematics** Reason abstractly and quantitatively. (K-2-ETS1-1)MP.2 Model with mathematics. (K-2-ETS1-1)MP.4 Use appropriate tools strategically. (1-PS4-4, K-2-ETS1-1) MP.5 Order threee objects by length; compare the lengths of two objects indirectly by using a third object. (1-PS4-4) 1.MD.A.1 Express the length of an object as a whole number of length units, by layering multiple copies of a shorter object end to end; understand that the length measurement of an object is the number of same-size length units that span it with no gaps or overlaps. Limit to contexts where the object being measured is spanned by whold number of length units with no gaps or overlaps. (1-PS4-4) 1.MD.A.2 Draw a picture graph and a bar graph (with single-unit scale) to represent a data set with up to four categories. Solve simple put-together, take-apart, and compare problems using information presented in a bar graph. (K-2-ETS1-1)2.MD.D.10

What will students be able to do as a result of the learning in this unit?	Students who understand the concepts can: •Design simple tests to gather evidence to support or refute ideas about cause and effect relationships. •Make observations (firsthand or from media) to construct an evidence-based account for natural phenomena. •Make observations (e.g., in a completely dark room, using a pinhole box, using video of a cave explorer with a flashlight) to construct an evidence-based account that objects can be seen only when illuminated(from an external light source or by an object giving off its own light). Design simple tests to gather evidence to support or refute ideas about cause and effect relationships. •Plan and conduct investigations collaboratively to produce data to serve as the basis for evidence to answer a question. •Plan and conduct an investigation to determine the effect of placing objects made with different materials in the path of a beam of light. •Plan and conduct investigations to provide evidence that vibrating materials can make sound and that sound can make materials vibrate. •Examples of vibrating materials that make sound could include tuning forks and plucking a stretched string. •Examples of how sound can make matter vibrate could include holding a piece of paper near a speaker making sound and holding an object near a vibrating tuning fork. •Describe how the shape and stability of structures are related to their function. •Ask questions based on observations to find more information about thenatural and/or designed world. •Define a simple problem that can be solved through the development of a new or improved object or tool. •Ask questions, make observations, and gather information about a situation people want to change in order to define a simple problem that can be solved through the development of a new or improved object or tool. •Develop a simple model based on evidence to represent a proposed object or tool. •Develop a simple sketch, drawing, or physical model to illustrate how the shape of an object helps it function as needed to solve a given problem. •Use tools and materials provided to design a device that solves a specific problem. •Use tools and materials to design and build a device that uses light or sound to solve the problem of communicating over a distance.

Grade 1	**Topic: Mimicking Organisms to Solve Problems**
	25 days
Essential Questions	What do plants need to live and grow in a terrarium? What do animals need to live in a terrarium? What structures or behaviors do plants or animals have that help them live in their habitat? How do the behaviors of squirrels help them survive the winter?
Disciplinary Core Concepts:	LS1.A Structure and Function All organisms have external parts. Different animals use their body parts in different ways to see, hear, grasp objects, protect themselves, move from place to place, and seek, find, and take in food, water, and air. Plants also have different parts that help them survive and grow. (1-LS1-1) LS1.B Growth and Development f Organisms Adult plants and animals can have young. In many kinds of animals, parents and the offspring themselves engage in behaviors that help the offspring to survive. (1-LS1-2) LS1.D Information Processing Animals have body parts that capture and convey different kinds of information needed for growth and survival. Animals respond to these inputs with behaviors that help them survive. Plants also respond to some external inputs. (1-LS1-1)

	ETS1.B Developing Possible Solutions Designs can be conveyed through sketches, drawings, or physical models. These representations are useful in communicating ideas for a problem's solutions to other people. (K-2-ETS1-2)
How will they learn it? Learning Activities:	Students set up terrariums using seeds and plants from investigations 1 and 2. They add local animals such as snails and isopods and provide for the needs of the plants and animals. Students learn about other animals and plants through readings and multimedia and compare and sort structures and functions. Through an outdoor simulation, students learn about variations in how squirrels store food for winter survival. Students read about how engineers learn from nature to solve human problems.
Resources	Foss Kit Investigation #3 of Plants and Animals Science Resources Books: What do Animals Need?, Plants and Animals Around the World, Learning from Nature Videos: How Plants Live in Different Places?, Animal Growth Online Activity: Sorting Animals by Structures

How do we know that they know it? Assessment	Benchmark assessments are short summative assessments given after each investigation. These I-Checks are actually hybrid tools: they provide summative information about students' achievement, and because they occur soon after teaching each investigation, they can be used diagnostically as well. Reviewing specific items on an I-Check with the class provides additional opportunities for students to clarify their thinking. The embedded assessments are based on authentic work produced by students during the course of participating in the FOSS activities. Students do their science, and teachers review their notebook entries. Bullet points in the Guiding the Investigation tell you specifically what students should know and be able to communicate. If student work is incorrect or incomplete, you know that there has been a breakdown in the learning/communicating process. The assessment system then provides a menu of next-step strategies to resolve the situation. Embedded assessment is assessment for learning, not assessment of learning.
Interdisciplinary Connections	**English Language Arts** Participate in shared research and writing projects (e.g., explore a number of "how-to" books on a given topic and use them to write a sequence of instructions). (1-LS1-1) Create audio recordings of stories or poems; add drawings or other visual displays to stories or recounts of experiences when appropriate to clarify ideas, thoughts, and feelings. (K-2-ETS1-2) SL.2.5
What will students be able to do as a result of the learning in this unit?	**Students who understand the concepts are able to:** **•Observe and describe how the shape and stability of structures of natural and designed objects are related to their functions.** **•Use materials to design a device that solves a specific problem or [design] a solution to a specific problem.** **•Use materials to design a solution to a human problem that mimics how plants and/or animals use their external parts to help them survive, grow, and meet their needs.** **•Develop a simple model based on evidence to represent a proposed object** **or tool.**

	•Develop a simple sketch, drawing, or physical model to illustrate how the shape of an object helps it function as needed to solve a given problem.

Grade 1	**Topic: Characteristics of Living Things**
	15 Days
Essential Questions	How does a bulb grow? What parts of the plant can grow new plants? How do the plants in the schoolyard compare to the plants studied in class? What do animal parents do to help their young survive?
Disciplinary Core Concepts:	LS3.A Inheritance of Traits Many characteristics of organisms are inherited from their parents. (3-LS3-1) LS1.B Growth and Development of Organisms Adult plants and animals can have young. In many kinds of animals, parents and the offspring themselves engage in behaviors that help the offspring to survive. (1-LS1-2)

How will they learn it? Learning Activities:	Students plant onion or garlic bulbs in moist cotton and observe as they develop into new plants.they plant parts of roots—carrots and radishes—to discover which parts will develop into new plants. Students adopt a schoolyard plant and compare it to other plants. They use media to learn about the behavior of animals and their young and how these behaviors help the young to survive. Students observe how young plants and animals resemble their parents.
Resources	Foss Kit Investigation #4 Plants and Animals Science Resources Books: Animals and Their Young Foss Kit Videos: Animal Offspring and Caring for Animals Online Activity: Watch it Grow!, Find the Parent
How do we know that they know it? Assessment	Benchmark assessments are short summative assessments given after each investigation. These I-Checks are actually hybrid tools: they provide summative information about students' achievement, and because they occur soon after teaching each investigation, they can be used diagnostically as well. Reviewing specific items on an I-Check with the class provides additional opportunities for students to clarify their thinking. The embedded assessments are based on authentic work produced by students during the course of participating in the FOSS activities. Students do their science, and teachers review their notebook entries. Bullet points in the Guiding the Investigation tell you specifically what students should know and be able to communicate. If student work is incorrect or incomplete, you know that there has been a breakdown in the learning/communicating process. The assessment system then provides a menu of next-step strategies to resolve the situation. Embedded assessment is assessment for learning, not assessment of learning.
Interdisciplinary	**English Language Arts**

Connections	Ask and answer questions to demonstrate understanding of a text, referring explicitly to the text as the basis for the answers. (3-LS3-1)RI.3.1 Determine the main idea of a text; recount the key details and explain how they support the main idea. (3-LS3-1)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-LS3-1) RI.3.3 Participate in shared research and writing projects (e.g., explore a number of “how-to” books on a given topic and use them to write a sequence of instructions). (1-LS1-1)W.1.7 Write informative/explanatory texts to examine a topic and convey ideas and information clearly. (3-LS3-1)SL.3.4 Report on a topic or text, tell a story, or recount an experience with appropriate facts and relevant, descriptive details, speaking clearly at an understandable pace. (3-LS3-1)W.3.2 **Mathematics** Reason abstractly and quantitatively. (3-LS3-1)MP.2 Model with mathematics. (3-LS3-1)MP.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.MD.B.4

What will students be able to do as a result of the learning in this unit?	Students who understand the concepts are able to: •Observe and use patterns in the natural world as evidence and to describe phenomena. •Make observations (firsthand or from media) to construct an evidence-based account for natural phenomena. •Make observations to construct an evidence-based account that young plants and animals are like, but not exactly like, their parents. •Observe and use patterns in the natural world as evidence and to describe phenomena. •Read grade-appropriate texts and use media to obtain scientific information to determine patterns in the natural world. •Read texts and use media to determine patterns in behavior of parents and offspring that help offspring survive.