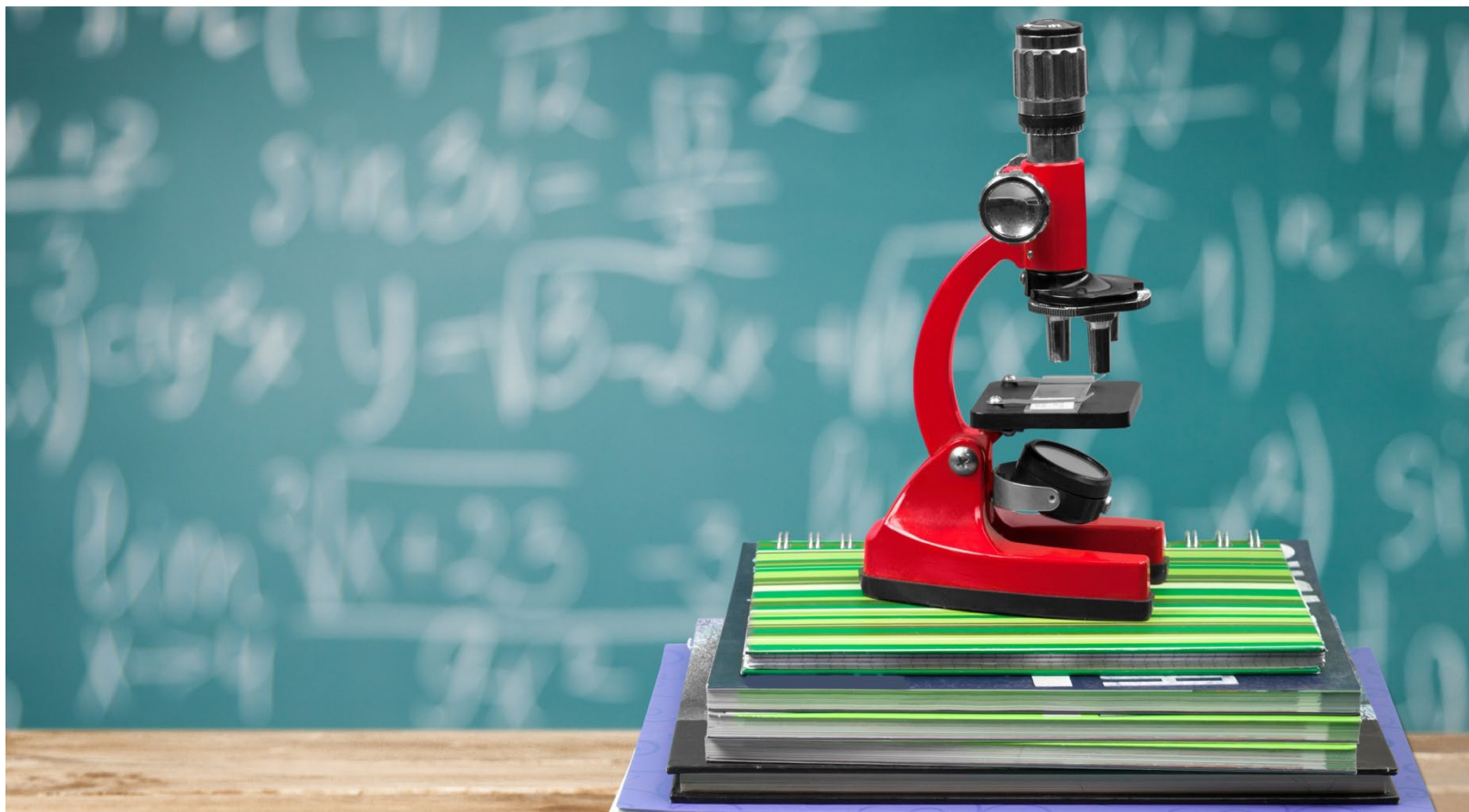


2019 Alabama Alternate Achievement Standards

Teaching and Learning Guide



Science



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Proprietary and Confidential

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Introduction

The *Alabama Alternate Teaching and Learning Guides* were developed in conjunction with Alabama special education and content educators. The guides provide instructional guidance to teachers in instruction and promote learning for students with significant cognitive disabilities who qualify for the Alabama Alternate Assessment. The Alabama Alternate Achievement Standards listed in this document have been prioritized to cover the grade-level expectations of the Alabama State Standards and reflect a decreased depth and breadth of the content. The Alabama Alternate Teaching and Learning Guides will aid teachers during instruction by showing the alignment to the general education standards, outlining the achievement elements of the alternate achievement standards, providing key vocabulary, listing the progressions of the content toward mastery of the alternate achievement standards, and providing examples of how to apply the alternate achievement standards during instruction.

Purpose of the Alabama Alternate Achievement Standards

The Alabama Alternate Achievement Standards are for the instruction and assessment of students in the one-percent population, which is defined as students who

- have the most significant cognitive disabilities or multiple disabilities that affect intellectual functioning and adaptive behaviors and
- are unable to participate in the general assessment even with accommodations.

Purpose and Rigor of the Alabama Alternate Achievement Standards

Evidence from the Alabama Alternate Assessment shows that students with significant cognitive disabilities can and do learn. The data from this assessment over time also show that students in the one-percent population are ready for increased rigor and content. Furthermore, the Every Student Succeeds Act (ESSA) requires states to adopt challenging academic standards and assessments, which include alternate academic achievement standards for students with the most significant cognitive disabilities. States must ensure that alternate achievement standards

- are aligned with state standards.

- promote access to the general education curriculum.
- reflect professional judgment to the highest possible standards achievable by such students.
- are aligned to ensure the students meet the alternate standards and are on track to pursue postsecondary education or employment.

Purpose of the Teaching and Learning Guides

The Teaching and Learning Guides are designed to meet the following goals:

- To provide guidance for teaching the Alabama Alternate Achievement Standards that align to the Alabama State Standards.
- To provide content-based differentiation strategies, tools, and methodologies for instruction for students with significant cognitive disabilities that are content based.
- To provide teachers with a method to delineate the skills and knowledge needed for students with significant cognitive disabilities to master the alternate standards.
- To provide content-based examples to aid in instruction for students with significant cognitive disabilities.

How to Use the Guide

The Teaching and Learning Guides are organized by grade, strand, and objective in the text box at the top of the page. For each strand and objective, the following information is included to help guide instruction for students with significant cognitive disabilities:

- **General Education Standards** The General Education Standards listed in this document are the Alabama State standards that are most essential for students with significant disabilities.
- **Alabama Alternate Achievement Standards** The Alabama Alternate Achievement Standards in this document are aligned to the general education standards and reflect a reduction of the depth and breadth of these standards.
- **Achievement Elements** The Achievement Elements are statements that identify the essential skills needed for students to achieve the Alabama Alternate achievement standards.
- **Key Vocabulary** The Key Vocabulary section identifies the content language specific to the standard that is necessary for students to know to meet that standard.

- **Teaching and Learning Progressions** The Teaching and Learning Progressions sections map out the sequence of knowledge and skills necessary to achieve the Alabama Alternate Achievement Standards. Note: The teaching and learning progressions are not all-encompassing because students in this population may need instruction or skills that are not outlined in this guide.
- **Application of Alabama Alternate Achievement Standards** The Application of Alabama Alternate Achievement Standards sections provide teachers with some activities that are related to the Achievement Elements.
- **Levels of Standards** The Levels of Standards tables show examples of the skills students may be working toward at each level of achievement.

Connectivity of the Alabama Alternate Achievement Standards to Instruction and the General Education Standards

The Alabama Alternate Achievement Standards are aligned to the general education standards by design so students with cognitive disabilities can have access to age-appropriate content and the general education curriculum. Because the Alabama Alternate Achievement Standards reflect a less rigorous depth and breadth of the general education standards, the alternate standards work in concert with the general education curriculum. The information in the Teaching and Learning Progressions section in the guides can be used to show how students with significant cognitive disabilities are connected to and can access the general curriculum.

Students Who Are Pre-Symbolic Learners

All students can and do learn. The students who are considered pre-symbolic learners have the following characteristics:

- They gain attention through vocalizations, body movements, cries, changes in facial expressions, or changes in body position.
- They exhibit unclear or irregular responses to stimuli from others (e.g., smell, touch, speech, or vision).
- They have wants and needs that are interpreted by others based on their vocalizations, body movements, cries, changes in facial expressions, or changes in body position.

When teaching students who are pre-symbolic learners, teachers may want to include the following skills in their instruction to facilitate communication and learning:

- Communicate intentionally to continue or repeat an activity or action.

- Identify own interests.
- Seek out or request attention of others.
- Search for objects or people of interest.
- Direct attention to objects or people.
- Express a preference (e.g., likes or dislikes).
- Express an interest in something.
- Respond to something new or different.
- Express a like or dislike for a stimulus.
- Respond to a stimulus (e.g., follows a light with eyes, vocalizes when spoken to, shows interest in objects).

Using the Standards and the Teaching and Learning Guides to Write IEP Goals

The Alabama Alternate Achievement Standards inform teachers about what to teach but not *how* to teach. The IEP needs to reference the alternate achievement standards, and the goals need to address the specific skills in the standards that an individual student needs to be taught in order to meet the standards. Teachers may use the teaching and learning progressions as a guide for specific skills the student may need to access the alternate achievement standard.

Accommodations and Supports

The accommodations and supports listed in the table below are supported by the most current research and are available for assessments. Students with significant support needs may have additional accommodations and supports that are not listed here but are necessary to access instruction.

Accommodations and Supports

Accommodation	Description
American Sign Language	A teacher may use American Sign Language (ASL) or manually coded English as a presentation accommodation.
Assistive Technology	An assistive technology device is any item, piece of equipment, or product system, whether acquired commercially off the shelf, modified, or customized, that is used to present materials to a student.
Braille	Braille, either contracted or uncontracted, may be used by students who are blind or visually impaired.
Brailler/Braille Tools	For students who use braille, a brailler and other braille tools such as a raised number line, braille ruler, and braille clock may be used.
Breaks	Students in the one percent population may need frequent breaks to refocus or rest.
Color Overlays/High Contrast	Color transparencies may be placed over a paper-based assessment, and the color of computer background screens or text may be changed to provide the student with high contrast.
Computer, Speech to Text, or Another Device to Write	A computer or other device may be used to respond to a writing prompt.
Extended Time	Extended time is generally time and a half.

Accommodation	Description
Flexible Scheduling	Flexible scheduling is imperative. A teacher is able to choose the time of day that is best for the student. Teachers may also stop and restart the test at any time based on the student's needs. Note: teachers may not administer any questions that had already been presented to or answered by the student.
Highlighters	Highlighters may be used to color text in items or passages.
Individualized Instruction and Assessment	Instruction and assessment is administered in small groups or in a one-to-one setting.
Large Print	In general, large print is 18 pt. font.
Line Readers	Line readers may be used to isolate text.
Magnification Tool or Device	A magnifying glass or CCTV may be used if the student requires further enlargement of the student materials.
Masking	Masking involves blocking off content that is not of immediate need or that may be distracting to the student. Students are able to focus their attention on a specific part of a test item by masking.
Math Manipulative	Math manipulatives such as counters, a hundreds chart, and specialized rulers may be provided.
Physical Prompting	The teacher may assist a student with limited physical and/or mobility manipulate objects.
Picture Symbols	Picture symbols may be used for the writing prompt. An array of pictures on and off topic should be presented to the student.
Real Objects	Real objects may be substituted for pictures.
Scratch Paper	Scratch paper to make notes, write computations, or record responses may be made available.

Accommodation	Description
Scribe	A scribe may be used for students who have difficulty with writing or pointing. Student will dictate his or her responses to the teacher who records what is dictated by the student.

Grade: Kindergarten
Content: Area: Science
Strand: Motion and Stability

General Education Standards

SCI.K.1- Investigate the resulting motion of objects when forces of different strengths and directions act upon them (e.g., object being pushed, object being pulled, two objects colliding).

SCI.K.2- Use observations and data from investigations to determine if a design solution (e.g., designing a ramp to increase the speed of an object in order to move a stationary object) solves the problem of using force to change the speed or direction of an object.

Alternate Achievement Standards

SCI.AAS.K.1- Investigate ways to move different objects to include pushing, pulling, and colliding objects.

SCI.AAS.K.2- Observe the movement of objects in a variety of real-world environments.

Essential Elements

Students need to observe and investigate the movement of a variety of objects (push, pull, collide).

Key Vocabulary

object names, push, pull, collide

Teaching and Learning Progressions

- When presented with moving objects, identify or cause the movements of a push, pull, or collision.
- Pair *collision* with the intersecting of two moving objects.
- Understand that two objects moving at the same time may collide.
- Understand that a moving object may collide with a stationary object.
- Recognize *collision*.
- When presented with an object, identify or cause the movement of a push or pull.
- Pair *push* with the movement of pushing an object.

- Recognize a *pull*.
- Pair *pull* with the movement of pulling an object.
- Recognize a *push*.
- Recognize that objects move as the result of a force being applied (push, pull).
- Recognize that objects move.
- Attend to objects.

Application of Alternate Achievement Standards

- Using hand-over-hand, demonstrate and identify pushing and pulling a small object.
- Demonstrate pushing and pulling large objects (box, chair) in the classroom environment.
- In a play environment, demonstrate and identify two objects colliding.

Levels of Standards

Level 4: Exceeds Standards	Level 3: Meets Standards	Level 2: Developing	Level 1: Emerging
In a variety of situations, move objects and/or identify movement of those objects as <i>push, pull, or collide</i> .	When presented with an object, move the object in response to <i>push, pull, and collide</i> .	When presented with an object, move the object.	Express an interest in an object presented.

Grade: Kindergarten

Content Area: Science

Strand: Ecosystems: Interactions, Energy, and Dynamics

General Education Standards

SCI.K.3- Distinguish between living and nonliving things and verify what living things need to survive (e.g., animals needing food, water, and air; plants needing nutrients, water, sunlight, and air).

SCI.K.4- Gather evidence to support how plants and animals provide for their needs by altering their environment (e.g., tree roots breaking a sidewalk to provide space, red fox burrowing to create a den to raise young, humans growing gardens for food and building roads for transportation).

SCI.K.5- Construct a model of a natural habitat (e.g., terrarium, ant farm, diorama) conducive to meeting the needs of plants and animals native to Alabama.

SCI.K.6- Identify and plan possible solutions (e.g., reducing, reusing, recycling) to lessen the human impact on the local environment.

Alternate Achievement Standards

SCI.AAS.K.3- Sort a group of items based on whether the items are living or nonliving.

SCI.AAS.K.4- Observe and/or identify ways plants and animals alter their environment to live.

SCI.AAS.K.5- Participate in the construction and/or care of a model habitat of plants and animals native to Alabama.

SCI.AAS.K.6- Classify human activities as harmful or helpful to the environment.

Achievement Elements

Students need to be aware of and identify living and nonliving things in their environment.

Students need to recognize ways that living things change their environment for life functions.

Students need to recognize human activities that are either harmful or helpful to the environment.

Key Vocabulary

environment, names of animals and plants, living, nonliving, change, harmful, helpful, model, habitat

Teaching and Learning Progressions

- When presented with a human activity that impacts the environment, identify the activity as helpful or harmful.
- Identify human activities that are helpful to the environment.
- Identify human activities that are harmful to the environment.
- Discriminate between *helpful* and *harmful*.
- Recognize helpful actions.
- Recognize harmful actions.
- Identify ways plants and animals change their environment to live.
- Understand basic ways that plants and animals change their environment to live (gardens for food, animals dig burrows, plants expand root systems).
- Understand basic needs of plants and animals in order to live.
- Recognize ways that plants and animals change as they grow.
- Recognize basic needs of plants and animals to live.
- When presented with a group of items, sort into living and nonliving.
- When presented with an item, identify it as living or nonliving.
- Recognize a nonliving object using the lack of simple criteria.
- Recognize a living object using simple criteria.
- Associate the characteristics of *grow*, *move*, and *breathe* with living things.

Application of Alternate Achievement Standards

- Use books and videos to reinforce the concepts of living and nonliving things.
- Demonstrate classification of living and nonliving things in the classroom and school environment.
- Create simple classroom task charts identifying actions that are helpful to the environment (e.g., recycling bin for paper).

Levels of Standards

Level 4: Exceeds Standards	Level 3: Meets Standards	Level 2: Developing	Level 1: Emerging
Use comparative language to describe two groups of objects resulting from a living/nonliving sort.	Correctly sort up to 10 objects into living and nonliving groups.	Identify whether a given object grows.	Identify common objects in the environment.
Predict a change a plant or animal may make in a given environment.	Identify at least one way a plant and an animal change their environment in order to live.	Identify at least one thing plants and animals need in order to live.	Differentiate between a plant and an animal.
Identify environmentally helpful and harmful activities of humans outside of the classroom/school setting.	Classify up to three activities in the classroom/school as helpful or harmful to the environment.	Participate in one environmentally helpful activity in the classroom/school.	Appropriately dispose of personal trash in the classroom.

Grade: Kindergarten
Content Area: Science
Strand: Earth's Systems

General Education Standards

SCI.K.7- Observe and describe the effects of sunlight on Earth's surface (e.g., heat from the sun causing evaporation of water or increased temperature of soil, rocks, sand, and water).

SCI.K.8- Design and construct a device (e.g., hat, canopy, umbrella, tent) to reduce the effects of sunlight.

SCI.K.9- Observe, record, and share findings of local weather patterns over a period of time (e.g., increase in daily temperature from morning to afternoon, typical rain and storm patterns from season to season).

Alternate Achievement Standards

SCI.AAS.K.7- Give examples of the sun's effects on the Earth (limited to heat and light).

SCI.AAS.K.8- Participate in the construction of a device to reduce the effects of sunlight.

SCI.AAS.K.9- Participate in daily weather activities with common symbols (e.g., sun, cloud, rain, wind, snowflake).

Achievement Elements

Students need to understand that the sun provides the Earth with heat and light.

Students need to participate in activities that reduce the effects of sunlight.

Students need to understand common weather symbols (sun, cloud, rain, wind, snowflake) in the context of daily weather activities.

Key Vocabulary

sun, heat, light, sunlight, weather, cloud, rain, wind, snow, snowflake

Teaching and Learning Progressions

- Identify heat and light as coming to Earth from the sun.
- Identify heat indoors and outdoors.
- Identify light/sunlight indoors and outdoors.

- Explore heat and light in various environments along with their synonyms and antonyms (e.g., warm/cold, light/dark).
- Understand common weather symbols (sun, cloud, rain, wind, snowflake) and use them appropriately during daily weather activities.
- Pair the following weather conditions with their symbol: sunny/sun, cloudy/cloud, rainy/rain, windy/wind, snow/snowflake.
- Identify outdoor weather conditions: sunny, cloudy, rainy, windy, snowing.
- Express an interest in weather conditions.

Application of Alternate Achievement Standards

- Use outdoor times during the school day to demonstrate weather conditions and sunlight and heat from the sun.
- Demonstrate the use of daily weather symbols on a weather chart.
- Demonstrate weather conditions using pictures and other visual stimuli.

Levels of Standards

Level 4: Exceeds Standards	Level 3: Meets Standards	Level 2: Developing	Level 1: Emerging
Explain that heat and light travel from the sun to the Earth.	Identify the sun as the source of heat and light on the Earth.	Identify the sun and the Earth in models.	Identify warm/cold and light/dark in context.
Identify the daily weather conditions and select the appropriate weather symbol, including sunny, partly cloudy, cloudy, rainy, windy, snowing.	Select the appropriate weather symbol for a daily weather chart, including sunny, cloudy, rainy, windy, snowing.	Identify a weather condition in real life or a visual stimulus.	Direct attention to weather conditions in real life.

Grade: Kindergarten

Content Area: Science

Strand: Earth and Human Activity

General Education Standards

SCI.K.10- Ask questions to obtain information about the purpose of weather forecasts in planning for, preparing for, and responding to severe weather.

Alternate Achievement Standards

SCI.AAS.K.10- Associate seasons of the year with various weather conditions and identify how to prepare for certain conditions (e.g., tornados, floods, snow).

Essential Elements

Students need to associate seasons of the year with typical weather conditions and how to prepare for them.

Key Vocabulary

spring, summer, fall (autumn), winter, tornado, flood, snow

Teaching and Learning Progressions

- Identify how to prepare for special weather conditions (tornado, flood, snow).
- Pair special weather conditions with seasons of the year (tornado, flood, snow).
- Associate spring, summer, fall (autumn), and winter with typical weather conditions.
- Identify the four seasons of the year.

Application of the Alternate Achievement Standards

- Demonstrate characteristics of the four seasons through stories, pictures, and other visual stimuli.
- Use outdoor activities such as recess or field trips to demonstrate changes in the seasons.
- Use story characters to demonstrate how to prepare for weather conditions during each season of the year.

Levels of Standards

Level 4: Exceeds Standards	Level 3: Meets Standards	Level 2: Developing	Level 1: Emerging
Describe the four seasons of the year, using various weather conditions.	Match the four seasons with their typical weather conditions.	Identify the four seasons of the year.	Express an interest in the seasons of the year.
Describe how to prepare for tornados, floods, and snowstorms.	Identify a way to prepare for a tornado, flood, or snowstorm.	Identify pictures of a tornado, flood, or snowstorm.	Express an interest in pictures of a tornado, flood, or snowstorm.

Grade: 1

Content Area: Science

Strand: Waves and Their Applications in Technologies for Information Transfer

General Education Standards

SCI.1.2-Construct explanations from observations that objects can be seen only when light is available to illuminate them (e.g., moon being illuminated by the sun, colors and patterns in a kaleidoscope being illuminated when held toward a light).

SCI.1.3- Investigate materials to determine which types allow light to pass through (e.g., transparent materials such as clear plastic wrap), allow only partial light to pass through (e.g., translucent materials such as wax paper), block light (e.g., opaque materials such as construction paper), or reflect light (e.g., shiny materials such as aluminum foil).

SCI.1.4- Design and construct a device that uses light or sound to send a communication signal over a distance (e.g., using a flashlight and a piece of cardboard to simulate a signal lamp for sending a coded message to a classmate, using a paper cup and string to simulate a telephone for talking to a classmate).

Alternate Achievement Standards

SCI.AAS.1.2- Recognize that light illuminates objects so they can be seen.

SCI.AAS.1.3- Identify objects that are see through (transparent) and objects that are not see through (opaque).

SCI.AAS.1.4- Participate in the construction of a device and/or activities that use light or sound.

Essential Elements

Students need to be able to recognize that light illuminates objects so they can be seen.

Students need to be able to identify objects that are see-through (transparent) and objects that are not see-through (opaque).

Key Vocabulary

light, see-through, transparent, not see-through, opaque

Teaching and Learning Progressions

- Recognize that light is needed in order for objects to be seen.
- Recognize that it is difficult to see objects in the dark.
- Identify objects that are see-through.
- Identify objects that are not see-through.

Application of the Alternate Achievement Standards

- Demonstrate the contrast of seeing something in bright light versus in the dark.
- Demonstrate objects in the classroom that are see-through and those that are not see-through.
- Design classroom activities using flashlights and various kinds of paper (waxed paper, construction paper, cardboard) as filters to demonstrate light passing through or being blocked.

Levels of Standards

Level 4: Exceeds Standards	Level 3: Meets Standards	Level 2: Developing	Level 1: Emerging
Give extemporaneous examples that show light is needed in order to see objects.	Recognize that light is needed in order to see objects.	Recognize when light is present and when light is absent in indoor and outdoor settings.	Recognize when a light is on or off in a given indoor location.
Identify objects as transparent or opaque.	Identify objects as being see-through or not see-through.	Identify objects that are see-through.	Engage with objects that can be seen through.

Grade: 1

Content Area: Science

Strand: From Molecules to Organisms: Structures and Processes

General Standards

SCI.1.5- Design a solution to a human problem by using materials to imitate how plants and/or animals use their external parts to help them survive, grow, and meet their needs (e.g., outerwear imitating animal furs for insulation, gear mimicking tree bark or shells for protection).

SCI.1.6- Obtain information to provide evidence that parents and their offspring engage in patterns of behavior that help the offspring survive (e.g., crying of offspring indicating need for feeding, quacking or barking by parents indicating protection of young).

Alternate Achievement Standards

SCI.AAS.1.5- Match an environmental situation with an appropriate human action (e.g., wearing a jacket when it is cold; animals growing a thick coat during the winter; wearing protective gear like a turtle has a shell).

SCI.AAS.1.6- Identify ways parents and their babies communicate to help babies survive and grow.

Essential Elements

Students need to recognize environmental situations and appropriate human actions needed to survive those situations.

Students need to identify ways parents and their babies communicate to help babies survive and grow.

Key Vocabulary

environment, human, action, situation, communication

Teaching and Learning Progressions

- Match an environmental situation with an appropriate human action.
- Identify common environmental situations (e.g., hot, cold, rainy).
- Identify appropriate human actions (e.g., drinking water, putting on a jacket, using an umbrella).
- Identify ways parents and their babies communicate to help babies survive and grow.

- Recognize humans and animals in a parental role (e.g., feeding, protection).
- Recognize the offspring of humans and common animals.
- Recognize communication modes for humans and common animals. (e.g., talking, crying, barking, meowing, quacking).
- Recognize common animals.

Application of the Alternate Achievement Standards

- Use rhymes, songs, and picture books to demonstrate animals, their offspring, and the sounds they make.
- Demonstrate appropriate actions in everyday life in response to the environment (e.g., putting on a jacket to go outside when it is cold).
- Demonstrate appropriate communication for wants or needs in everyday activities.

Levels of Standards

Level 4: Exceeds Standards	Level 3: Meets Standards	Level 2: Developing	Level 1: Emerging
Express an appropriate action spontaneously in response to an environmental situation (e.g., “I need my jacket because it is cold.”).	Match an environmental situation with an appropriate human action.	Respond appropriately with prompts to at least one environmental situation.	Direct attention to an appropriate response to at least one environmental situation.
Interpret communication between parents and babies in a given situation (e.g., “The baby is crying because it is hungry.”).	Identify ways parents and their babies (human and common animals) communicate to help babies survive and grow.	Match common animals (including humans) with their offspring.	Identify the sounds common animals make.

Grade: 1

Content Area: Science

Strand: Heredity: Inheritance and Variation of Traits

General Education Standards

SCI.1.7- Make observations to identify the similarities and differences of offspring to their parents and to other members of the same species (e.g., flowers from the same kind of plant being the same shape, but differing in size; dog being same breed as parent, but differing in fur color or pattern).

Alternate Achievement Standards

SCI.AAS.1.7-Identify similarities and differences between parents and offspring in animals.

Achievement Elements

Students need to identify similarities and differences between parents and offspring in animals.

Key Vocabulary

same, similarities, different, differences, parents, offspring

Teaching and Learning Progressions

- Identify similarities and differences between parents and offspring in animals.
- Understand *same* and *different*.
- Identify characteristics of common animal offspring.
- Identify characteristics of common adult animals.
- Match adult and offspring of common animals.
- Identify common animal offspring.
- Identify common adult animals.

Application of the Alternate Achievement Standards

- Use books, videos, and pictures to demonstrate characteristics of common animals.
- Play simple matching games to pair animals and their offspring.
- Arrange a field trip to a farm or zoo to demonstrate parent and offspring animals in real life.

Levels of Standards

Level 4: Exceeds Standards	Level 3: Meets Standards	Level 2: Developing	Level 1: Emerging
Identify similarities and differences between members of the same species (e.g., dog, cat, cow, horse).	Identify similarities and differences in parents and offspring in common animals.	Match parents and offspring in common animals.	Engage with pictures of common animals and their offspring.

Grade: 1

Content Area: Science

Strand: Earth's Place in the Universe

General Education Standards

SCI.1.8- Observe, describe, and predict patterns of the sun, moon, and stars as they appear in the sky (e.g., sun and moon appearing to rise in one part of the sky, move across the sky, and set; stars other than our sun being visible at night, but not during the day).

SCI.1.9- Observe seasonal patterns of sunrise and sunset to describe the relationship between the number of hours of daylight and the time of year (e.g., more hours of daylight during summer as compared to winter).

Alternate Achievement Standards

SCI.AAS.1.8- Identify major celestial objects (e.g., moon, sun, other stars) and when they can be seen in the sky.

SCI.AAS.1.9- Identify the four seasons of the year in Alabama using common representations.

Achievement Elements

Students need to identify major celestial objects and when they can be seen in the sky.

Students need to identify the four seasons of the year in Alabama.

Key Vocabulary

moon, sun, stars, spring, summer, fall/autumn, winter

Teaching and Learning Progressions

- Identify major celestial objects and when they can be seen in the sky.
- Understand that the sun is visible during the day, and the moon and stars are visible at night.
- Identify major celestial objects (moon, sun, stars).
- Recognize that celestial objects (moon, sun, stars) exist.
- Identify the four seasons of the year in Alabama, using common representations.

- Pair changes of common things with the specific seasons of the year in Alabama.
- Identify common things that change over the four seasons of the year in Alabama (e.g., trees, temperature, moisture).
- Identify the four seasons of the year in Alabama.
- Identify changes in weather in Alabama over the course of a year.

Application of the Alternate Achievement Standards

- Create a classroom “sky” with reflective stars and moon to demonstrate celestial bodies that can be seen at night.
- Use art time to create pictures of trees in Alabama during different seasons of the year.
- Create sorting games to match changes in the environment to each season of the year in Alabama.

Levels of Standards

Level 4: Exceeds Standards	Level 3: Meets Standards	Level 2: Developing	Level 1: Emerging
Identify major celestial objects and when they can be seen in the sky, the sun, moon, stars, planets, and comets.	Identify major celestial objects and when they can be seen in the sky, including the sun, moon, and stars.	Identify the sun, moon, and stars.	Recognize day and night.
Explain the change of one common representation over the four seasons of the year in Alabama.	Identify the four seasons of the year in Alabama, using common representations.	Know that there are four seasons in a year.	Direct attention to the current season of the year.

Grade: 2

Content Area: Science

Strand: Matter and Its Interaction

General Education Standards

SCI.2.1- Conduct an investigation to describe and classify various substances according to physical properties (e.g., milk being a liquid, not clear in color, assuming shape of its container, mixing with water; mineral oil being a liquid, clear in color, taking shape of its container, floating in water; a brick being a solid, not clear in color, rough in texture, not taking the shape of its container, sinking in water).

SCI.2.2- Collect and evaluate data to determine appropriate uses of materials based on their properties (e.g., strength, flexibility, hardness, texture, absorbency).

SCI.2.3- Demonstrate and explain how structures made from small pieces (e.g., linking cubes, blocks, building bricks, creative construction toys) can be disassembled and then rearranged to make new and different structures.

SCI.2.4- Provide evidence that some changes in matter caused by heating or cooling can be reversed (e.g., heating or freezing of water) and some changes are irreversible (e.g., baking a cake, boiling an egg).

Alternate Achievement Standards

SCI.AAS.2.1- Participate in investigations to describe and sort various substances according to physical properties.

SCI.AAS.2.2- Identify common materials and appropriate uses based on their physical properties (e.g., rubber bands stretch, sidewalks are hard, paper tears).

SCI.AAS.2.3 Participate in building then disassembling structures to make new structures.

SCI.AAS.2.4- Predict changes to matter, reversible and irreversible, that may occur when matter is heated or cooled (e.g., heating or freezing water, boiling an egg, baking a cake).

Achievement Elements

Students need to participate in investigations exploring the physical properties of substances.

Students need to identify common materials and their uses based on their physical properties.

Students need to predict changes to matter that may occur when matter is heated or cooled.

Students need to participate in assembling and disassembling structures to make new structures.

Key Vocabulary

substances, change

Teaching and Learning Progressions

- Identify common materials and their uses based on physical properties.
- Identify the physical properties of common materials.
- Recognize observable physical properties of common materials.
- Identify common materials.
- Predict changes to matter that may occur when it is heated or cooled.
- Observe demonstrations (real life or simulated) of physical changes of common materials.
- Identify common materials that change when heated or cooled. (e.g., water, items that are cooked, items that are burned).
- Recognize that some common materials change when heated or cooled.

Application of the Alternate Achievement Standards

- Provide students with experiences to explore a variety of common materials that have specific physical characteristics that make them useful (rubber bands that stretch, string that does not; envelopes that bend, cardboard boxes that do not).
- Demonstrate physical properties by describing common objects in the classroom.
- Demonstrate heating and cooling common substances by freezing ice cubes, boiling water, or baking a cake.

Levels of Standards

Level 4: Exceeds Standards	Level 3: Meets Standards	Level 2: Developing	Level 1: Emerging
Predict new uses for common materials, based on physical properties.	Identify common materials and their uses, based on physical properties.	Match a common item and one physical characteristic.	Engage with a named item.
Predict whether physical changes are reversible or irreversible.	Predict changes to matter when heated or cooled.	Identify that ice cubes are frozen water and/or steam is heated water.	Express an interest in changes of state of water (freezing/boiling).
Explain a new structure that can	Build a simple structure,	Build a simple structure out of	Engage with building pieces.

be built by disassembling a structure and reusing the materials.	disassemble it, and build something new.	manageable pieces.	
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Grade: 2

Content Area: Science

Strand: Ecosystems: Interactions, Energy, and Dynamics

General Education Standards

SCI.2.5- Plan and carry out an investigation, using one variable at a time (e.g., water, light, soil, air), to determine the growth needs of plants.

SCI.2.6- Design and construct models to simulate how animals disperse seeds or pollinate plants (e.g., animals brushing fur against seed pods and seeds falling off in other areas, birds and bees extracting nectar from flowers and transferring pollen from one plant to another).

SCI.2.7- Obtain information from literature and other media to illustrate that there are many different kinds of living things and that they exist in different places on land and in water (e.g., woodland, tundra, desert, rainforest, ocean, river).

Alternate Achievement Standards

SCI.AAS.2.5- Participate in investigations of the growth needs of plants (e.g., water, light, soil, air) over a period of time.

SCI.AAS.2.6- Recognize that most plants produce seeds and the seeds can be transferred by animals to cause new plants to be planted in other areas.

SCI.AAS.2.7- Participate in activities that show many different living things in different environments.

Achievement Elements

Students need to participate in activities that show many different living things in different environments and in investigations of what plants need to grow over time.

Students need to recognize that most plants produce seeds that can be moved by animals to new places.

Key Vocabulary

plants, water, light, soil, seeds, transferred, moved, living things, environment

Teaching and Learning Progressions

- Recognize that plants need water, light, soil, and air in order to grow.

- Participate in investigations of plant growth that explore the growth needs of plants.
- Engage in investigations.
- Recognize that plants produce seeds that can be transferred by animals to new places.
- Recognize that seeds may be dropped to the ground, collected by humans, or carried away to new places.
- Identify that seeds are planted and produce new plants.
- Identify that plants produce seeds.
- Identify plants as living things.
- Recognize that living things exist in various environments.
- Identify that an environment is the place where a plant or an animal lives.
- Participate in investigations about the needs of various living things.
- Recognize that living things need food, air, and water to live.
- Identify living things.

Application of the Alternate Achievement Standards

- Use classroom investigations to demonstrate that plants need water, soil, light, and air in order to grow.
- Demonstrate plant growth, using sequential diagrams that show the progress from seed to adult plant.
- Use books, pictures, and videos to demonstrate that living things live in various environments.

Levels of Standards

Level 4: Exceeds Standards	Level 3: Meets Standards	Level 2: Developing	Level 1: Emerging
Participate in presenting the results of investigations of what plants need in order to grow (water, soil, and light).	Participate in investigations of what plants need in order to grow (water, soil, and light).	Observe investigations of what plants need in order to grow (water, soil, and light).	Express interest in classroom investigations in science.
Identify the seeds of up to five plants and identify at least two modes and how seeds can be transferred to other places by animals and insects.	Identify that most plants produce seeds and the seeds can be transferred to other places by animals.	Recognize that seeds come from plants.	Direct attention to seeds during classroom activities.

Give simple reasons why a given common animal lives in its habitat.	Recognize the habitats of common animals.	Answer the question “Where does this animal live?” when given a visual or verbal prompt of at least three common animals.	Interact with pictures of common animals.
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Grade: 2

Content Area: Science

Strand: Earth's Systems

General Education Standards

SCI.2.8- Make observations from media to obtain information about Earth's events that happen over a short period of time (e.g., tornados, volcanic explosions, earthquakes) or over a time period longer than one can observe (e.g., erosion of rocks, melting of glaciers).

SCI.2.9- Create models to identify physical features of Earth (e.g., mountains, valleys, plains, deserts, lakes, rivers, oceans).

SCI.2.10- Collect and evaluate data to identify water found on Earth and determine whether it is a solid or a liquid (e.g., glaciers as solid forms of water, oceans, lakes, rivers, streams as liquid forms of water).

Alternate Achievement Standards

SCI.AAS.2.8- Participate in multimedia activities (i.e., reading and video) that show Earth events happening over the short term or long term (e.g., volcano, earthquake, erosion, glacier).

SCI.AAS.2.9- Identify physical features of Earth (e.g., mountain, valley, river, lake).

SCI.AAS.2.10- Identify places water is found on Earth as a liquid (e.g., river, lake, ocean) and as a solid (ice/glacier).

Achievement Elements

Students need to be exposed to Earth events (volcano, earthquake, erosion, glacier) through multimedia activities.

Students need to identify physical features of Earth (mountain, valley, river, lake).

Students need to identify places water is found in liquid and solid state on Earth.

Key Vocabulary

volcano, earthquake, erosion, glacier, mountain, valley, river, lake, ocean, liquid, solid

Teaching and Learning Progressions

- Increase awareness of major Earth events such as volcanoes, earthquakes, erosion, and movement of glaciers, using multimedia activities.
- Identify *river, lake, and ocean* as places where water is found as a liquid and glaciers and polar ice caps as places where water is found as a solid on Earth.
- Identify *river, lake, ocean, and glacier* as land features.
- Recognize that Earth has different land features.
- Recognize that the land in the local community is not all the same.
- Differentiate between land and sky.

Application of the Alternate Achievement Standards

- Use multimedia activities to introduce major landforms and events.
- Use a sand/water table to have students create landforms, including mountains, valleys, and rivers, to show how erosion affects soil.
- Demonstrate the liquid and solid states of water in the classroom.

Levels of Standards

Level 4: Exceeds Standards	Level 3: Meets Standards	Level 2: Developing	Level 1: Emerging
Identify how a volcano, earthquake, or erosion changes the landform of Earth.	Express awareness of major Earth events (volcanoes, earthquakes, glacial movement, and erosion).	Engage in pictorial or multimedia activities that show major Earth events, including volcanoes and earthquakes.	Direct attention to pictures or multimedia activities about Earth.
Differentiate between various landforms, including streams and rivers, lakes and oceans, and hills and mountains.	Identify physical features of Earth, including mountain, valley, river, and lake.	Engage in multimedia and/or play activities that include various landforms.	Show interest in pictures of landforms.
Identify environmental conditions that cause glaciers and polar ice to form.	Identify water as liquid in lakes, rivers, and oceans and as solid in glaciers and polar ice.	Recognize ice as water in the solid state.	Engage with water in solid and liquid states.

Grade: 2

Content Area: Science

Strand: Earth and Human Activity

General Education Standards

SCI.2.11- Examine and test solutions that address changes caused by Earth's events (e.g., dams for minimizing flooding, plants for controlling erosion).

Alternate Achievement Standards

SCI.AAS.2.11- Participate in activities that model changes caused by Earth's events.

Essential Elements

Students need to participate in activities that model changes caused by major Earth events.

Key Vocabulary

volcano, earthquake, flooding, erosion, changes, cause

Teaching and Learning Progressions

- Express awareness of changes caused by volcanoes, earthquakes, flooding, and erosion.
- Express awareness of volcanoes, earthquakes, flooding, and erosion.
- Attend to presentations of pictures, books, stories, and multimedia presentation of major Earth events.
- Look at pictures about landforms on Earth.

Application of the Alternate Achievement Standards

- Encourage sand/water play where students can explore making landforms and model Earth events that change the landforms.
- Demonstrate in the classroom the action of volcanoes, earthquakes, flooding, and erosion.
- Pair before and after photographs of areas where volcanoes, earthquakes, flooding, and erosion have occurred.

Levels of Standards

Level 4: Exceeds Standards	Level 3: Meets Standards	Level 2: Developing	Level 1: Emerging
Match major Earth events to the changes they can cause.	Participate in activities that model changes caused by major Earth events.	Observe activities that model changes caused by major Earth events.	Direct attention to science activities in the classroom.

Grade: 3

Content Area: Science

Strand: Motion and Stability: Forces and Interactions

General Education Standards

SCI.3.1- Plan and carry out an experiment to determine the effects of balanced and unbalanced forces on the motion of an object using one variable at a time, including number, size, direction, speed, position, friction, or air resistance (e.g., balanced forces pushing from both sides on an object, such as a box, producing no motion; unbalanced force on one side of an object, such as a ball, producing motion), and communicate these findings graphically.

SCI.3.2- Investigate, measure, and communicate in a graphical format how an observed pattern of motion (e.g., a child swinging in a swing, a ball rolling back and forth in a bowl, two children teetering on a see-saw, a model vehicle rolling down a ramp of varying heights, a pendulum swinging) can be used to predict the future motion of an object.

SCI.3.3- Explore objects that can be manipulated in order to determine cause-and-effect relationships (e.g., distance between objects affecting strength of a force, orientation of magnets affecting direction of a magnetic force) of electric interactions between two objects not in contact with one another (e.g., force on hair from an electrically charged balloon, electrical forces between a charged rod and pieces of paper) or magnetic interactions between two objects not in contact with one another (e.g., force between two permanent magnets or between an electromagnet and steel paperclips, force exerted by one magnet versus the force exerted by two magnets).

SCI.3.4- Apply scientific ideas about magnets to solve a problem through an engineering design project (e.g., constructing a latch to keep a door shut, creating a device to keep two moving objects from touching each other such as a maglev system).

Alternate Achievement Standards

SCI.AAS.3.1--Identify the effect of a force (e.g., push, pull, gravity) applied to an object.

SCI.AAS.3.2- Recognize patterns of motion (e.g., straight, back and forth, zigzag, fast, slow, falling, rolling); predict the motion of a common object when a force (push, pull, gravity) is applied.

SCI.AAS.3.3- Recognize cause-and-effect relationships of magnetic interactions between two objects (opposite poles attract; similar poles repel).

SCI.AAS.3.4- Apply scientific ideas about magnets to solve a problem. (e.g., using a magnet to pick up an object, using a magnet to push or pull an object)

Achievement Elements

Students need to identify the effect of a push, a pull, and gravity applied to an object.

Students need to recognize patterns of motion and predict the motion of a common object when a push, a pull, or gravity is applied.

Students need to recognize that opposite poles attract and like poles repel in magnets and apply scientific ideas about magnets to solve a problem.

Key Vocabulary

force, push, pull, gravity, straight, back and forth, zigzag, fast, slow, falling, rolling, cause, effect, magnet, magnetism, attract, repel

Teaching and Learning Progressions

- Solve a simple problem using a magnet.
- Recognize that opposite poles attract and similar poles repel in magnets.
- Recognize that magnets have positive and negative poles.
- Recognize that magnets are attracted to some materials and not to other materials.
- Predict the motion of an object when a push, a pull, or gravity is applied.
- Recognize various patterns of motion as objects move.
- Identify the effect of a push, a pull, or gravity on an object.
- Recognize that gravity can cause the movement of an object.
- Identify a push.
- Identify a pull.

Application of the Alternate Achievement Standards

- Demonstrate the effect of a push, a pull, and gravity on common objects in the classroom.
- Have students generate different patterns of motion that objects can take.
- Create activities that allow students to explore the behavior of magnets when exposed to various materials, and to other magnets.

Levels of Standards

Level 4: Exceeds Standards	Level 3: Meets Standards	Level 2: Developing	Level 1: Emerging
Communicate the effect of various strengths of pushes and pulls on an object.	Identify the effect of a push, a pull, or gravity on an object.	With prompting, push, pull or drop an object.	Interact with moving objects.
Predict the motion and destination of a ball when it is thrown with various force.	Predict the motion of a common object when a force (push, pull, gravity) is applied.	With prompting, throw a ball toward a target.	Interact with objects that can move.
Investigate the interaction of three magnets in close proximity.	Identify that like poles of magnets repel and opposite poles of magnets attract.	Engage in play activities with magnets.	Express interest in magnets.
Recognize the use of magnets in real life.	Solve a simple problem using magnets (e.g., how to pick up metal pins that have dropped on the floor).	Use a magnet to try to pick up various objects (metallic and nonmetallic).	Interact with magnets and metallic materials.

Grade: 3

Content Area: Science

Strand: From Molecules to Organisms: Structures and Processes

General Education Standards

SCI.3.5- Obtain and combine information to describe that organisms are classified as living things, rather than nonliving things, based on their ability to obtain and use resources, grow, reproduce, and maintain stable internal conditions while living in a constantly changing external environment.

SCI.3.6- Create representations to explain the unique and diverse life cycles of organisms other than humans (e.g., flowering plants, frogs, butterflies), including commonalities such as birth, growth, reproduction, and death.

Alternate Achievement Standards

SCI.AAS.3.5- Classify common objects as living, rather than nonliving, based on their ability to obtain and use resources, grow, reproduce, and adapt to the environment.

SCI.AAS.3.6- Observe and recognize the major stages (birth, growth, reproduction, and death) in the life cycles of organisms other than humans (e.g., flowering plants, frogs, butterflies).

Essential Elements

Students need to differentiate between living and nonliving things using the criteria of the ability to obtain and use resources, grow, reproduce, and adapt to the environment.

Students need to recognize the major stages in the life cycles of organisms other than humans.

Key Vocabulary

living, nonliving, ability, resources, grow, reproduce, adapt, birth, growth, reproduction, death

Teaching and Learning Progressions

- Classify things as living or nonliving on the basis of criteria (obtain and use resources, grow, reproduce, and adapt to the environment).
- Recognize what it means to obtain and use resources.

- Identify objects that grow and do not grow.
- Identify objects that reproduce.
- Understand what it means to adapt to the environment.
- Sort common objects into living or nonliving.
- Recognize the major stages in the life cycles of flowering plants, frogs, and butterflies.

Application of the Alternate Achievement Standards

- Using drawings and diagrams, demonstrate the life cycles of organisms other than humans (e.g., frogs, butterflies, flowering plants).
- Have students select a non-human organism and create a book showing the life cycle of that organism.
- Create a sorting chart for students with two to three columns titled with criteria for being a living thing.

Levels of Standards

Level 4: Exceeds Standards	Level 3: Meets Standards	Level 2: Developing	Level 1: Emerging
Describe how one living thing has used their ability to obtain and use resources to adapt to a changing environment.	Classify things as living or nonliving based on their ability to obtain and use resources, grow, reproduce, and adapt to the environment.	Recognize that some things are living and other things are nonliving.	Engage with living and nonliving things.
Explain the life cycle of one non-human plant or animal from birth to death.	Recognize the major stages of life cycles of frogs, butterflies, and flowering plants.	Recognize the birth and adult stages of frogs, butterflies, and flowering plants.	Recognize adult and baby humans and common animals.

Grade: 3

Content Area: Science

Strand: Heredity: Inheritance and Variation of Traits

General Education Standards

SCI.3.7- Examine data to provide evidence that plants and animals, excluding humans, have traits inherited from parents and that variations of these traits exist in groups of similar organisms (e.g., flower colors in pea plants, fur color and pattern in animal offspring).

SCI.3.8- Engage in argument from evidence to justify that traits can be influenced by the environment (e.g., stunted growth in normally tall plants due to insufficient water, change in an arctic fox's fur color due to light and/or temperature, stunted growth of a normally large animal due to malnourishment).

Alternate Achievement Standards

SCI.AAS.3.7- Recognize similarities between traits of plant and animal (other than human) parents and their offspring.

SCI.AAS.3.8- Recognize that living things have specific needs (water, light, temperature, food, shelter) to live and grow in an environment.

Achievement Elements

Students need to recognize similarities between traits of plant and nonhuman animal parents and their offspring.

Students need to recognize that living things have specific needs (water, light, temperature, food, shelter) to live and grow in an environment.

Key Vocabulary

trait, parent, offspring, needs, water, light, temperature, food, shelter, live, grow

Teaching and Learning Progressions

- Recognize similarities between traits of plants and nonhuman animal parents and their offspring.
- Understand *trait*.
- Identify similarities and differences between parents and offspring in plants and nonhuman animals.
- Understand *same* and *different*.

- Identify characteristics of common plants.
- Match like common plants.
- Identify characteristics of common nonhuman animal offspring.
- Identify characteristics of common adult nonhuman animals.
- Match adult and offspring of common nonhuman animals.
- Recognize that living things need water, light, temperature, food, and shelter in order to live and grow in an environment.
- Identify basic parts of an environment in which plants and nonhuman animals live, including water, light, temperature, food, and shelter.
- Identify that living things (plants and nonhuman animals) need water, light, and food in order to live and grow.
- Identify plants and nonhuman animals as living things.

Application of the Alternate Achievement Standards

- Have students in small groups create models of environments that include the things a specific nonhuman animal needs in order to live and grow.
- Use books, multimedia, and pictures to demonstrate a variety of environments for plants and animals that include the things they need to grow and live.
- Develop sorting/matching activities using common plants and nonhuman animals and their offspring.

Levels of Standards

Level 4: Exceeds Standards	Level 3: Meets Standards	Level 2: Developing	Level 1: Emerging
Recognize similarities between members of the same nonhuman species.	Recognize similarities between plant and nonhuman animal parents and their offspring.	Match a plant or nonhuman animal parent with its offspring.	Match a common nonhuman animal with its offspring.
Describe an environment for a specific nonhuman animal that includes water, light, temperature, food, and shelter needed to grow and live.	Recognize that living things need water, light, temperature, food, and shelter in order to grow and live.	Recognize that living things need water, light, and food in order to grow and live.	Identify that living things need water and food in order to grow and live.

Grade: 3

Content Area: Science

Strand: Unity and Diversity

General Education Standards

SCI.3.9- Analyze and interpret data from fossils (e.g., type, size, distribution) to provide evidence of organisms and the environments in which they lived long ago (e.g., marine fossils on dry land, tropical plant fossils in arctic areas, fossils of extinct organisms in any environment).

SCI.3.10- Investigate how variations in characteristics among individuals of the same species may provide advantages in surviving, finding mates, and reproducing (e.g., plants having larger thorns being less likely to be eaten by predators, animals having better camouflage coloration being more likely to survive and bear offspring).

SCI.3.11- Construct an argument from evidence to explain the likelihood of an organism's ability to survive when compared to the resources in a certain habitat (e.g., freshwater organisms survive well, less well, or not at all in saltwater; desert organisms survive well, less well, or not at all in woodlands).

- a) Construct explanations that forming groups helps some organisms survive.
- b) Create models that illustrate how organisms and their habitats make up a system in which the parts depend on each other.
- c) Categorize resources in various habitats as basic materials (e.g., sunlight, air, freshwater, soil), produced materials (e.g., food, fuel, shelter), or as nonmaterial (e.g., safety, instinct, nature-learned behaviors).

SCI.3.12- Evaluate engineered solutions to a problem created by environmental changes and any resulting impacts on the types and density of plant and animal populations living in the environment (e.g., replanting of sea oats in coastal areas due to destruction by hurricanes, creating property development restrictions in vacation areas to reduce displacement and loss of native animal populations).

Alternate Achievement Standards

SCI.AAS.3.9- Match a fossil to the organism from which it was formed.

SCI.AAS.3.10- Sort common plants and animals by observable characteristics needed for survival.

SCI.AAS.3.11- Match common plants and animals with their best environment for growth and survival.

SCI.AAS.3.12- Predict the effect of a simple change in habitat on a plant or animal (e.g., lack of water, lack of plants).

Achievement Elements

Students need to match fossils to the organisms from which they were formed.

Students need to sort common plants and animals by observable characteristics they require to survive and match them with their best environment for growth and survival.

Students need to predict the effect of a simple change in the habitat of a plant or animal.

Key Vocabulary

fossil, organism, environment, growth, survival, change, habitat

Teaching and Learning Progressions

- Match fossils to the organisms from which they were formed.
- Identify a fossil as the remains or impression of an organism that lived long ago.
- Match common organisms and their skeletons.
- Recognize that common organisms have skeletons that give them form.
- Identify common organisms.
- Predict the effect of a simple change in habitat on plants or animals that live there.
- Recognize that simple changes in a habitat can affect the plants and animals that live there.
- Identify simple changes that can take place in habitats.
- Sort common plants and animals by observable characteristics needed to survive and match them with their best environments for growth and survival.
- Match plants and animals to environments where they can grow and survive.
- Recognize that different plants and animals survive in different environments.
- Recognize different environments (habitats) where plants and animals live.
- Recognize observable characteristics that are needed to survive.
- Sort common plants and animals by observable characteristics.
- Differentiate between plants and animals.
- Recognize plants and animals as living things.

Application of the Alternate Achievement Standards

- Have students make their own fossils using simple objects and plaster of Paris.

- Provide opportunities for students to sort plant and animal cards into habitat boxes.
- Using animal crackers, have the students sort the animals into habitats drawn on construction paper.

Levels of Standards

Level 4: Exceeds Standards	Level 3: Meets Standards	Level 2: Developing	Level 1: Emerging
Describe characteristics that are similar between two fossils.	Match a fossil to the organism from which it was formed.	Identify a fossil as the remains or impression of an organism that lived long ago.	Match pictures of common organisms and their skeletons.
Describe how certain characteristics help common plants and animals survive.	Sort common plants and animals by the characteristics they need for survival.	Identify obvious characteristics of common plants and animals.	Differentiate between plants and animals.
Create a simple habitat of common plants and animals where they could grow and survive.	Match common plants and animals with their best environment for growth and survival.	Recognize that different plants and animals live in different environments.	Engage with a variety of different environments for plants and animals.
Describe how a given change in habitat affects the plants and animals that live there.	Predict the effect of a simple change in the habitat of a given plant or animal.	Recognize that habitats can change.	Recognize that plants and animals live in different places.

Grade: 3

Content Area: Science

Strand: Earth's Systems

General Education Standards

SCI.3.13- Display data graphically and in tables to describe typical weather conditions expected during a particular season (e.g., average temperature, precipitation, wind direction).

SCI.3.14- Collect information from a variety of sources to describe climates in different regions of the world.

Alternate Achievement Standards

SCI.AAS.3.13- Use a graph or pictograph to answer questions about weather.

SCI.AAS.3.14- Identify differences in climate regions (e.g., desert, oceans).

Achievement Elements

Students need to use graphs or pictographs to answer questions about weather.

Students need to identify differences in common climate regions including desert and oceans.

Key Vocabulary

graph, pictograph, weather-related terms and symbols, climate, desert, oceans

Teaching and Learning Progressions

- Use a graph or pictograph to answer basic questions about weather.
- Use symbols to identify common weather conditions (sunny, cloudy, rainy, dry, windy, stormy, humid).
- Use symbols to identify terms used for temperature (hot, mild, cold).
- Use a graph or pictograph to answer simple numerical questions.
- Engage with simple graphs and pictographs.
- Recognize that symbols represent information.
- Identify differences in common climate regions, including deserts and oceans.
- Recognize extreme temperatures and wide variation in daily temperatures as characteristics of deserts.

- Recognize that deserts are generally dry.
- Recognize moderate temperature and stable temperatures over time as characteristics of ocean climate.
- Recognize that oceans have fog and storms.
- Identify a desert.
- Identify an ocean.

Application of the Alternate Achievement Standards

- Present a variety of audiovisual and pictorial representations of ocean and desert climates.
- Create matching and sorting games about ocean and desert climates and the plants and animals that live in each climate.
- Create a desert biome in a jar.
- Use art projects and materials to demonstrate characteristics of ocean and desert climate.

Levels of Standards

Level 4: Exceeds Standards	Level 3: Meets Standards	Level 2: Developing	Level 1: Emerging
Answer questions about weather using a graph or pictograph.	Answer basic questions about weather using a graph or pictograph.	Recognize basic weather information for the current day.	Express interest in a daily weather chart.
Identify differences in common climate regions, including desert, polar, temperate, and ocean.	Identify differences in common climate regions, including desert and ocean.	Match up to five plants and animals with the climate regions of desert and ocean.	Recognize a desert and an ocean, using pictures or descriptions.

Grade: 3

Content Area: Science

Strand: Earth and Human Activity

General Education Standards

SCI.3.15- Evaluate a design solution (e.g., flood barriers, wind resistant roofs, lightning rods) that reduces the impact of a weather-related hazard.

Alternate Achievement Standards

SCI.AAS.3.15- Identify practices that keep people safe during severe weather.

Achievement Elements

Students need to identify practices that keep people safe during severe weather.

Key Vocabulary

safe, severe

Teaching and Learning Progressions

- Identify practices that keep people safe during severe weather.
- Recognize that people need to take action to stay safe during severe weather.
- Identify warnings signs for severe weather (high winds, clouds, heavy rain, etc.).
- Identify thunderstorms, tornados, and hurricanes as severe weather.
- Recognize pictures of thunderstorms, tornados, and hurricanes.

Application of the Alternate Achievement Standards

- Use school drills as opportunities to demonstrate practices that teachers and students take to stay safe during severe weather.
- Demonstrate safe practices by creating a list of actions that will be taken during a tornado drill at school.
- Use visual aids to compare non-threatening and severe weather conditions.

Levels of Standards

Level 4: Exceeds Standards	Level 3: Meets Standards	Level 2: Developing	Level 1: Emerging
Identify preparations that can be taken before severe weather erupts.	Identify practices that keep people safe during severe weather.	Identify warning signs for severe weather.	Recognize pictures of a thunderstorm, tornado, or hurricane.

Grade: 4

Content Area: Science

Strand: Energy

General Education Standards

SCI.4.1- Use evidence to explain the relationship of the speed of an object to the energy of that object.

SCI.4.2- Plan and carry out investigations that explain transference of energy from place to place by sound, light, heat, and electric currents.

- a. Provide evidence that heat can be produced in many ways (e.g., rubbing hands together, burning leaves) and can move from one object to another by conduction.
- b. Demonstrate that different objects can absorb, reflect, and/or conduct energy.
- c. Demonstrate that electric circuits require a complete loop through which an electric current can pass.

SCI.4.3- Investigate to determine changes in energy resulting from increases or decreases in speed that occurs when objects collide.

SCI.4.4- Design, construct, and test a device that changes energy from one form to another (e.g., electric circuits converting electrical energy into motion, light, or sound energy; a passive solar heater converting light energy into heat energy).

SCI.4.5- Compile information to describe how the use of energy derived from natural renewable and nonrenewable resources affects the environment (e.g., constructing dams to harness energy from water, a renewable resource, while causing a loss of animal habitats; burning of fossil fuels, a nonrenewable resource, while causing an increase in air pollution; installing solar panels to harness energy from the sun, a renewable resource, while requiring specialized materials that necessitate mining).

Alternate Achievement Standards

SCI.AAS.4.1- Recognize that objects move at different speeds.

SCI.AAS.4.2--Recognize different sources of heat; Identify materials that are conductors of heat, such as metals.

SCI.AAS.4.3- Identify the effect of an opposing force on a moving object.

SCI.AAS.4.4- Identify common sources of energy used every day (e.g., electricity, gas, sun).

SCI.AAS.4.5- Identify common resources as renewable or nonrenewable.

Achievement Elements

Students need to recognize that objects move at different speeds, and an opposing force will have an effect on a moving object.

Students need to identify common sources of energy (electricity, gas, sun) used every day and identify common resources as renewable or nonrenewable.

Key Vocabulary

Speed, force, opposing, source, energy, electricity, gas, the sun, resources, renewable, nonrenewable

Teaching and Learning Progressions

- Recognize that objects move at different speeds.
- Describe/compare movement in terms of speed (fast, faster, slow, slower).
- Identify movement as fast or slow.
- Recognize that large objects in the environment move.
- Recognize that personal and classroom objects can be moved.
- Identify the effect of an opposing force on a moving object.
- Identify the effect of two objects colliding at a 90-degree angle.
- Identify the effect of two objects colliding head-on.
- Recognize that two objects can collide.
- Identify another object moving in another direction relative to a given moving object.
- Identify a stationary object in the path of a moving object.
- Recognize an object as moving.
- Identify materials/objects that are conductors of heat, such as metals.
- Recognize that an object that is hot can touch another object and make it warm/hot.
- Identify that objects are made of materials that become warm/hot at different rates.
- Recognize that a variety of objects can increase in temperature.
- Recognize different sources of heat.
- Identify *heat*.
- Identify *cold*.
- Identify electricity, gas, and the sun as common sources of energy in everyday life.
- Match common items with their energy sources.
- Recognize that common items need energy in order to work.

- Recognize that common items that need energy in order to work can be turned off and on.
- Recognize common items used in everyday life.
- Identify common resources as renewable or nonrenewable.
- Identify common nonrenewable resources.
- Identify common renewable resources.

Application of the Alternate Achievement Standards

- Demonstrate different speeds of a sports ball that is thrown during recess or physical education classes.
- Use classroom objects to demonstrate objects that use energy and what the source is for the energy.
- Demonstrate energy lighting up a small light bulb by constructing a simple circuit.

Levels of Standards

Level 4: Exceeds Standards	Level 3: Meets Standards	Level 2: Developing	Level 1: Emerging
Describe the movement of various objects in terms of speed and direction.	Recognize that objects move at different speeds.	Recognize that objects move.	Manipulate objects on a flat surface.
Differentiate between the effect of a force applied to a moving object from the opposite direction and a force applied at a 90-degree angle from the side.	Identify the effect of an opposing force on a moving object.	Identify an object moving in various directions.	Move objects using a push or pull.
Provide evidence that heat can be produced in many ways (e.g., rubbing hands together, burning leaves) and can move from one object to another.	Recognize different sources of heat and identify materials that are conductors of heat, such as metals.	Recognize different sources of heat.	Identify heat and cold.
Explain common energy transferrin everyday life (e.g., turning on a light, heating food).	Identify common sources of energy (e.g., the sun, electricity, gas) used in everyday life.	Identify common objects that use energy.	Recognize objects that can be turned off and on.
Describe common uses of renewable and nonrenewable resources for energy production.	Identify common resources as renewable or nonrenewable.	Identify common resources.	Recognize that resources are used in everyday life.

Grade: 4

Content Area: Science

Strand: Waves and Their Applications in Technologies for Information Transfer

General Education Standards

SCI.4.6- Develop a model of waves to describe patterns in terms of amplitude and wavelength, and including that waves can cause objects to move.

SCI.4.7- Develop and use models to show multiple solutions in which patterns are used to transfer information (e.g., using a grid of 1s and 0s representing black and white to send information about a picture, using drums to send coded information through sound waves, using Morse code to send a message).

SCI.4.8- Construct a model to explain that an object can be seen when light reflected from its surface enters the eyes.

Alternate Achievement Standards

SCI.AAS.4.6- Using given models, identify patterns found in waves.

SCI.AAS.4.7- Identify models that show ways in which patterns are used to transfer information (using drums to send coded information through sound waves, using Morse code to send a message).

SCI.AAS.4.8- Identify a model that shows the path of light reflected from the surface of an object to be seen by the eye.

Achievement Elements

Using models, students need to identify patterns found in waves.

Students need to identify models that show ways in which patterns are used to transfer information, including various types of codes and sound waves.

Students need to identify a model that shows the path of light reflected from an object in order to be seen by the human eye.

Key Vocabulary

model, pattern, waves, transfer, information, code, reflection, reflected, reflect, path, sound waves

Teaching and Learning Progressions

- Using models, identify patterns found in waves in various mediums.
- Recognize models of simple wave patterns.

- Interact with models of waves in other mediums.
- Recognize waves in water.
- Produce waves in water.
- Recognize waves as patterns.
- Identify sound waves as transferring information through patterns.
- Identify sound waves as patterns.
- Identify other visual and auditory models used to communicate (Morse code, drum beats, patterns of emergency notification sirens)
- Use simple visual and auditory patterns to communicate information. (e.g., clapping pattern means “pay attention;” one clap means _____, two claps mean _____; making up visual coded messages)
- Recognize and reproduce simple visual and auditory patterns.
- Identify a model showing the path of light reflected off an object in order to be seen by the eye.
- Identify that eyes see using light that is reflected off an object.
- Recognize that light can be reflected when it hits an object.
- Understand *reflection*, *reflected*, and *reflect*.
- Recognize light as a wave.

Application of the Alternate Achievement Standards

- Demonstrate simple wave patterns using water.
- Use video or other multimedia presentations to introduce light and sound waves.
- Have students, individually or in small groups, create visual and/or auditory codes to communicate simple wants and needs.

Levels of Standards

Level 4: Exceeds Standards	Level 3: Meets Standards	Level 2: Developing	Level 1: Emerging
Using models, compare wave patterns.	Using models, identify patterns found in waves.	Interact with models of waves in various mediums.	Create wave patterns using water.
Interpret models that show ways in which patterns are used to transfer information.	Identify models that show ways in which patterns are used to transfer information.	Decode a simple visual or auditory pattern.	Identify a simple visual pattern.
Describe the path of light being reflected from the surface of an object to be seen by the eye.	Identify a model that shows the path of light being reflected from the surface of an object to be seen by the eye.	Identify that objects can be seen more clearly in environments where there is bright light.	Identify that eyes are used to see objects.

Grade: 4

Content Area: Science

Strand: From Molecules to Organisms: Structures and Processes

General Education Standards

SCI.4.9- Examine evidence to support an argument that the internal and external structures of plants (e.g., thorns, leaves, stems, roots, colored petals, xylem, phloem) and animals (e.g., heart, stomach, lung, brain, skin) function to support survival, growth, behavior, and reproduction

SCI.4.10- Obtain and communicate information explaining that humans have systems that interact with one another for digestion, respiration, circulation, excretion, movement, control, coordination, and protection from disease.

SCI.4.11- Investigate different ways animals receive information through the senses, process that information, and respond to it in different ways (e.g., skunks lifting tails and spraying an odor when threatened, dogs moving ears when reacting to sound, snakes coiling or striking when sensing vibrations).

Alternate Achievement Standards

SCI.AAS.4.9- Identify basic parts of plants and animals.

SCI.AAS.4.10- Identify human systems (i.e. digestive, circulatory, and respiratory).

SCI.AAS.4.11- Identify the sense organs and the information they receive (eyes/sight, tongue/taste, ears/hearing, skin/touch, nose/smell).

Achievement Elements

Students need to be able to identify basic parts of plants: roots, stem, flower, and leaves.

Students need to be able to identify basic parts of animals: head, trunk, arms, legs, feet, hands, claws, beak, feathers, fur, tail, fins, wings, shell, eyes, ears, nose, mouth, tongue, teeth, skin.

Students need to be able to identify the digestive, circulatory, and respiratory systems in humans.

Students need to be able to identify the main sense organs and the information they receive (eyes/sight, tongue/taste, ears/hear, skin/touch, nose/smell).

Key Vocabulary

roots, stem, flower, leaves, head, trunk, arms, legs, feet, hands, claws, beak, feathers, fur, tail, fins, wings, shell, eyes, ears, nose, mouth, tongue, teeth, skin, sight, taste, hearing, hear, touch, smell, digestive system, stomach, intestines, circulatory system, heart, blood vessels,

respiratory system, lungs

Teaching and Learning Progressions

- Identify the main parts of a plant: roots, stem, flower, and leaves.
- Using a model, identify the roots of a plant.
- Using a model, identify the stem and leaves of a plant.
- Using a model, identify the flower of a plant.
- Using a model, identify a plant.
- Identify basic parts of animals: head, trunk, arms, legs, feet, hands, claws, beak, feathers, fur, tail, fins, wings, shell, eyes, ears, nose, mouth, tongue, teeth, skin.
- Identify basic body parts of birds and fish.
- Identify basic body parts of models of mammals.
- Identify basic body parts of models of human body.
- Identify basic body parts of oneself.
- Identify the main sense organs and the information they receive: eyes/sight, tongue/taste, ears/hear, skin/touch, nose/smell.

Application of the Alternate Achievement Standards

- Use songs, poems, and riddles to identify body parts on oneself and common animal models.
- Play a blindfold fruit-tasting game to reinforce the concepts of touching, smelling, and tasting.
- Use a human body model (from the science specialist or biology teacher or in the general education classroom) to investigate body organs related to body systems.

Levels of Standards

Level 4: Exceeds Standards	Level 3: Meets Standards	Level 2: Developing	Level 1: Emerging
Describe the basic parts of plants and their functions: roots, stem, flower, leaves, and seeds.	Identify basic parts of plants: roots, stem, flower, and leaves.	Identify the obvious stem and flower in plants.	Sort pictures into categories of plants and animals.
Given a common animal, describe its body parts and their functions.	Identify basic parts of animals: head, trunk (body), arms, legs, feet, hands, claws, beak, feathers, fur, tail, fins, wings, shell, eyes, ears, nose, mouth, tongue, teeth, skin	Identify head, legs, feet, arms, hands, eyes, ears, nose, mouth, tongue, teeth, and trunk (body) on a human model and a common mammal.	Sort pictures into categories of plants and animals.
Describe the function of the digestive, circulatory, respiratory, muscular, and skeletal systems in humans.	Identify the digestive, circulatory, and respiratory systems in humans.	Using models, identify the stomach, heart, and lungs in humans.	Recognize that people breathe, have a heart (pulse), and eat in order to live.
Describe ways that humans respond to information they receive through their eyes, tongue, ears, skin, and nose.	Identify the main sense organs and the information they receive (eyes/sight, tongue/taste, ears/hear, skin/touch, nose/smell).	Using models, identify the eyes, tongue, ears, skin, and nose in humans.	Point to the eyes, ears, nose, and tongue on oneself.

Grade: 4

Content Area: Science

Strand: Earth's Systems

General Education Standards

SCI.4.12- Construct explanations by citing evidence found in patterns of rock formations and fossils in rock layers that Earth changes over time through both slow and rapid processes (e.g., rock layers containing shell fossils appearing above rock layers containing plant fossils and no shells indicating a change from land to water over time, a canyon with different rock layers in the walls and a river in the bottom indicating that over time a river cut through the rock).

SCI.4.13- Plan and carry out investigations to examine properties of soils and soil types (e.g., color, texture, capacity to retain water, ability to support growth of plants).

SCI.4.14- Explore information to support the claim that landforms are the result of a combination of constructive forces, including crustal deformation, volcanic eruptions, and sediment deposition as well as a result of destructive forces, including erosion and weathering.

SCI.4.15- Analyze and interpret data (e.g., angle of slope in downhill movement of water, volume of water flow, cycles of freezing and thawing of water, cycles of heating and cooling of water, speed of wind, relative rate of soil deposition, amount of vegetation) to determine effects of weathering and rate of erosion by water, ice, wind, and vegetation using one single form of weathering or erosion at a time.

SCI.4.16- Describe patterns of Earth's features on land and in the ocean using data from maps (e.g., topographic maps of Earth's land and ocean floor; maps of locations of mountains, continental boundaries, volcanoes, and earthquakes).

SCI.4.17- Formulate and evaluate solutions to limit the effects of natural Earth processes on humans (e.g., designing earthquake, tornado, or hurricane-resistant buildings; improving monitoring of volcanic activity).

Alternate Achievement Standards

SCI.AAS.4.12- Identify patterns in rock formations and rock layers; explain how Earth changes over time.

SCI.AAS.4.13- Observe the properties of soils (e.g., color, texture, capacity to retain water, ability to support growth of plants); Identify different types of soil (e.g., silt, clay, sand).

SCI.AAS.4.14--Identify relationships between landforms and both constructive (volcanic eruptions and sediment deposition) and deconstructive (erosion and weathering) forces.

SCI.AAS.4.15--Identify the effects of weathering by water, ice, wind, or vegetation.

SCI.AAS.4.16- Use a map key to identify land and water features on a map.

SCI.AAS.4.17- Predict the best option for human safety in a given weather situation.

Achievement Elements

Students need to identify patterns in rock formations and rock layers and explain how Earth changes over time.

Students need to identify different types of soil (silt, clay, and sand) and observe the properties of soils (color, texture, water retention, and ability to support growth).

Students need to be able to identify relationships between landforms and both constructive forces (volcanic eruptions and sediment deposition) and deconstructive forces (erosion and weathering).

Students need to be able to identify the effects of weathering by water, ice, wind, or vegetation.

Students need to use a map key to identify land and water features on a map.

Students need to be able to predict the best option for human safety in a given weather situation.

Key Vocabulary

rock formations (gorge, peak, mesa), rock layers, soil, silt, clay, sand, color, texture, water retention, growth, weathering, map key, predict, safety, weather situations

Teaching and Learning Progressions

- Identify patterns in rock formations and rock layers.
- Recognize that rocks form over time (igneous, metamorphic, sedimentary).
- Identify rock formations such as a mountain, gorge, valley, peak, or mesa.
- Identify major geologic formations.
- Identify relationships between landforms and both constructive forces (volcanic eruptions and sediment deposition) and deconstructive forces (erosion and weathering).
- Recognize that when soil is moved it can form new land area and affect the contour of Earth.
- Recognize that volcanoes can erupt and change the land.
- Identify sediment deposits and what makes them occur.
- Identify erosion and what makes it occur.
- Recognize that soil on Earth can be moved by natural forces (wind and moving water, such as rivers and floods).
- Observe the properties of soils such as color, texture, water retention, and the ability to support growth.
- Identify different types of soil, including silt, clay, and sand.
- Identify soil on Earth's surface.
- Identify the effects of weathering by water, ice, wind, or vegetation.

- Recognize that root growth of plants can wear and break rocks.
- Recognize that seeds can lodge in the soil between rocks or in spaces on rocks and will grow.
- Recognize that soil can gather in between rocks and in spaces on rocks.
- Recognize that water will expand as it freezes.
- Recognize that water can gather in between rocks and within spaces in a rock.
- Recognize that wind can carry soil and sand from one place to another.
- Recognize that water can move soil and erode the surface of rocks.
- Recognize that Earth's surface changes over time.
- Identify Earth's surface.
- Identify practices that keep people safe during weather situations where they need protection.
- Recognize that people need to take action to stay safe during some weather.
- Identify weather situations that may represent some form of danger for humans and animals.
- Recognize pictures of a variety of weather situations (hot and sunny, cool, rainy, fog, windy, etc.).

Application of the Alternate Achievement Standards

- Use a map of the school grounds and its map key to demonstrate the use of symbols on a map.
- Use colored sand to demonstrate the formation of rock layers.
- Have students bring in a small amount of soil from their yards or from places in their neighborhood and have them compare and contrast the soils.
- Have students create soil paintings. They can use glue and their soil samples to create landscapes, abstract paintings, or even portraits. Encourage them to be creative.

Levels of Standards

Level 4: Exceed Standards	Level 3: Meets Standards	Level 2: Developing	Level 1: Emerging
Given a simple rock layer pattern, describe possible events that caused the pattern.	Identify patterns in rock formations and rock layers.	Identify two rock formations: gorge and peak.	Differentiate soil and rock.
Describe the importance of finding fossils embedded in rock layers.	Explain how Earth changes over time using rock formations and rock layers.	Identify two rock formations: gorge and peak.	Differentiate soil and rock.
Compare and contrast different types of soil: silt, clay, and sand.	Identify different types of soil: silt, clay, and sand.	Identify soil as the upper layer of Earth.	Differentiate soil and rock.
Explore information to support the claim that landforms are the result of a combination of constructive forces and destructive forces.	Identify relationships between landforms and both constructive forces (volcanic eruptions and sediment deposition) and deconstructive forces (erosion and weathering).	Identify volcanic eruptions, sediment deposition, erosion, and weathering.	Identify land and water features in pictures.
Given a description of changes in a given location, describe the events that caused the change.	Identify the effects of weathering by water, ice, wind, or vegetation.	Recognize that moving water and wind can change a given location by moving soil.	Identify water, ice, and wind.
Describe an area on a map using a map key.	Use a map key to identify land and water features on a map.	Identify a map as a representation of a geographical area.	Identify land and water features in pictures.
Using a weather prediction, predict options for human safety in that weather situation.	Predict the best option for human safety in a given weather situation.	Identify articles of clothing appropriate for various weather conditions.	Identify various daily weather conditions.

Grade: 5

Content Area: Science

Strand: Matter and Its Interactions

General Education Standards

SCI.5.1- Plan and carry out investigations (e.g., adding air to expand a basketball, compressing air in a syringe, dissolving sugar in water, evaporating salt water) to provide evidence that matter is made of particles too small to be seen.

SCI.5.2- Investigate matter to provide mathematical evidence, including graphs, to show that regardless of the type of reaction (e.g., new substance forming due to dissolving or mixing) or change (e.g., phase change) that occurs when heating, cooling, or mixing substances, the total weight of the matter is conserved.

SCI.5.3- Examine matter through observations and measurements to identify materials (e.g., powders, metals, minerals, liquids) based on their properties (e.g., color, hardness, reflectivity, electrical conductivity, thermal conductivity, response to magnetic forces, solubility, density).

SCI.5.4- Investigate whether the mixing of two or more substances results in new substances (e.g., mixing of baking soda and vinegar resulting in the formation of a new substance, gas; mixing of sand and water resulting in no new substance being formed).

SCI.5.5- Construct explanations from observations to determine how the density of an object affects whether the object sinks or floats when placed in a liquid.

Alternate Achievement Standards

SCI.AAS.5.1- Recognize that matter is made of particles too small to be seen.

SCI.AAS.5.2--Recognize that regardless of the type of reaction (e.g., new substance forming due to dissolving or mixing) or change (e.g., phase change) that occurs when heating, cooling, or mixing substances, the total weight of the matter is conserved.

SCI.AAS.5.3- Classify materials (e.g., powders, metals, minerals, liquids) based on their properties (e.g., color, hardness, reflectivity, electrical conductivity, thermal conductivity, response to magnetic forces, solubility, density).

SCI.AAS.5.4- Predict whether the mixing of two or more substances results in new substances (e.g., mixing of baking soda and vinegar resulting in the formation of a new substance, gas; mixing of sand and water resulting in no new substance being formed).

SCI.AAS.5.5- Observe how the density of an object affects whether the object sinks or floats when placed in a liquid; predict whether an object will float or sink in water.

Achievement Elements

Students need to recognize that matter is made of particles too small to be seen.

Students need to recognize the total weight of matter is conserved regardless of the reaction or change that occurs when heating, cooling, or mixing substances.

Students need to classify materials based on their properties.

Students need to predict whether the mixing of two or more substances results in a new substance.

Students need to be able to predict whether an object's density will float or sink in water.

Key Vocabulary

matter, substance, property, weight, mass, reaction, physical change, heating, cooling, mixing, powder, metal, mineral, liquid, color, hardness, reflectivity, electrical, conductivity, thermal, magnetic forces, solubility, density

Teaching and Learning Progressions

- Recognize that matter is made of particles too small to be seen by the unaided eye,
- Recognize that air inflating a ball or balloon indicates that there are particles too small to be seen by the unaided eye.
- Recognize that small particles can fill spaces between a group of larger objects placed in a container.
- Recognize that small amounts of a substance can be combined to make a larger amount of the substance.
- Recognize that the total weight of matter is conserved throughout a reaction or change when heating, cooling, or mixing substances.
- Recognize that substances can be heated or cooled.
- Identify that mixtures have mass/weight.
- Identify the mixing of two substances.
- Identify the weight of a substance.
- Identify that substances have mass/weight.
- Classify powders, metals, minerals, and liquids based on their properties (color, hardness, reflectivity, electrical conductivity, thermal conductivity, response to magnetic forces, solubility, density).
- Sort substances by color, response to magnetic forces, and solubility.
- Recognize that substances have different colors, respond to magnetic forces differently, and have different solubility.
- Recognize that some substances dissolve in liquids while others do not (solubility).
- Explore what happens when a variety of substances are combined with water.
- Sort items into metals and nonmetals based on their response to magnetic forces.
- Recognize that nonmetals do not respond to magnetic forces.

- Recognize that metal substances are attracted to magnetic forces.

Application of the Alternate Achievement Standards

- Make simple mixtures of substances that have measurable weights (e.g., sand and water) to demonstrate that the total weight of a mixture is the same as the weights of the substances combined to make the mixture.
- Demonstrate the difference between a mixture formed when two substances are combined (sand and water) and a new substance formed when two substances are combined (vinegar and baking soda).
- Demonstrate classifying a variety of materials/objects as metals based on whether or not they are attracted to a magnet.

Levels of Standards

Level 4: Exceeds Standards	Level 3: Meets Standards	Level 2: Developing	Level 1: Emerging
Describe the states of matter: solid, liquid, gas.	Recognize that matter is made of particles too small to be seen by the unaided eye.	Recognize that matter is anything that has mass and takes up space.	Identify substances in the environment (e.g., water, soil, metal, powder).
Interpret given data to conclude that the total weight of matter is conserved during reactions that occur when heating, cooling, or mixing substances.	Recognize the total weight of matter is conserved regardless of the reaction or change that occurs when heating, cooling, or mixing substances.	Recognize that given quantities of substances have a determined weight.	Recognize that objects can be weighed.
Use measurements of properties to classify powders, metals, minerals, and liquids.	Classify powders, metals, minerals, and liquids based on their properties (color, hardness, reflectivity, electrical conductivity, thermal conductivity, response to magnetic forces, solubility, density).	Sort substances by color, response to magnetic forces, and solubility.	Sort items into metals and nonmetals based on their response to magnetic forces.
Design an investigation to show the mixing of two substances can result in a mixture or a new substance.	Predict whether the mixing of two or more substances results in a new substance or not.	Recognize that a mixture can be separated into its original substances.	Recognize a mixture as a combination of two substances.
Describe the density of a given object based on whether it floats or sinks.	Predict whether an object's density will cause it to float or sink.	Given two objects of different densities that are dropped into water, describe what happens as floating or sinking.	Recognize that when objects of different densities are dropped into water, some will float and others will sink.

Grade: 5

Content Area: Science

Strand: Motion and Stability: Forces and Interactions

General Education Standards

SCI.5.6- Construct an explanation from evidence to illustrate that the gravitational force exerted by Earth on objects is directed downward towards the center of Earth.

SCI.5.7- Design and conduct a test to modify the speed of a falling object due to gravity (e.g., constructing a parachute to keep an attached object from breaking).

Alternate Achievement Standards

SCI.AAS.5.6- Identify examples of objects being affected by Earth’s downward gravitational force.

SCI.AAS.5.7- Identify solutions designed to reduce the effects of a falling object due to gravity (e.g., a parachute to keep an attached object from breaking).

Achievement Elements

Students need to identify examples of objects that are affected by Earth’s gravitational force.

Students need to identify solutions designed to reduce the effects of a falling object due to gravity.

Key Vocabulary

gravity, gravitational force, effects, reduce

Teaching and Learning Progressions

- Identify solutions designed to reduce the effects of a falling object due to gravity, such as parachutes and safety nets.
- Recognize that solutions can be created to reduce the effects of gravity and keep people and objects safe.
- Recognize that objects being affected by Earth’s downward gravitational force can be harmful.
- Identify examples of objects being affected by Earth’s downward gravitational force.
- Recognize that larger objects in the environment fall down due to gravity.
- Recognize that objects in the classroom that are dropped or not supported will fall downward until they meet a surface.

Application of the Alternate Achievement Standards

- Demonstrate the effect of Earth’s downward gravitational force by dropping objects, throwing a ball upward and tracing its path downward, or jumping up and down.
- Drop two objects at the same time to demonstrate that gravity affects all objects that are not supported.
- Have small groups of students cooperatively design a device to slow or cushion a falling object.

Levels of Standards

Level 4: Exceeds Standards	Level 3: Meets Standards	Level 2: Developing	Level 1: Emerging
Make predictions about what will happen when various objects are dropped at the same time: pencils, erasers, or any items that are safe to drop.	Identify examples of objects being affected by Earth’s downward gravitational force.	Recognize that objects thrown up into the air will fall to Earth.	Recognize that held objects will fall to Earth when released.
Describe a reason why a solution will reduce the effect of a falling object.	Identify solutions designed to reduce the effects of a falling object due to gravity	Recognize that some objects that fall to Earth may be damaged.	Recognize that some objects break.

Grade: 5

Content Area: Science

Strand: Ecosystems: Interactions, Energy, and Dynamics

General Education Standards

SCI.5.8- Defend the position that plants obtain materials needed for growth primarily from air and water.

SCI.5.9- Construct an illustration to explain how plants use light energy to convert carbon dioxide and water into a storable fuel, carbohydrates, and a waste product, oxygen, during the process of photosynthesis.

SCI.5.10- Construct and interpret models (e.g., diagrams, flow charts) to explain that energy in animals' food is used for body repair, growth, motion, and maintenance of body warmth and was once energy from the sun.

SCI.5.11- Create a model to illustrate the transfer of matter among producers; consumers, including scavengers and decomposers; and the environment.

Alternate Achievement Standards

SCI.AAS.5.8- Recognize that plants obtain materials needed for growth primarily from air and water.

SCI.AAS.5.9- Using a given model, recognize that plants use light energy to make their own food during the process of photosynthesis

SCI.AAS.5.10- Identify that animals get their energy to grow and move from food (plants and animals); recognize that this energy was once from the sun.

SCI.AAS.5.11- Using a given model, identify a missing part of a simple food chain.

Achievement Elements

Students need to recognize that plants obtain materials needed for growth primarily from air and water.

Students need to recognize that plants use light energy to make their own food during photosynthesis by using a model.

Students need to identify that animals get their energy to grow and move from food and recognize that this energy originally came from the sun.

Students need to identify a missing part of a simple food chain when given a model.

Key Vocabulary

plants, materials, growth, air, water, light energy, process, photosynthesis, animals, food chain

Teaching and Learning Progressions

- Identify the missing part of a given food chain when given a model.
- Identify the parts of a simple food chain using a model.
- Recognize simple food chains.
- Recognize that animals use plants and other animals as sources for food.
- Recognize that animals do not make their own food.
- Recognize that animals get their energy from food.
- Identify that plants need light energy to make their own food.
- Identify that light energy comes from the sun.
- Recognize that plants obtain materials needed for growth primarily from air and water.
- Recognize that air and water contain carbon and hydrogen.
- Identify that plants need carbon and hydrogen in order to make their own food.
- Recognize that plants make their own food.
- Identify plants.

Application of the Alternate Achievement Standards

- Demonstrate the process of photosynthesis using age-appropriate audiovisual resources.
- Create models of simple food chains using a variety of plant and animal examples.
- Use classroom plants and student task charts to create opportunities for students to recognize that plants need air and water in order to live.

Levels of Standards

Level 4: Exceeds Standards	Level 3: Meets Standards	Level 2: Developing	Level 1: Emerging
Recognize that plants need water, nutrients, air, water, light, temperature, space, and time in order to survive.	Recognize that plants obtain materials needed for growth primarily from air and water.	Identify that plants need nutrients, air, and water in order to grow.	Recognize that plants grow over time.
Using a model, recognize that plants use light energy and carbon dioxide to make their own food during photosynthesis.	Using a model, recognize that plants use light energy to make their own food during photosynthesis.	Identify that light energy is essential to plant growth.	Recognize that plants grow over time.
Using a model, trace the light energy from the sun through a simple food chain.	Recognize that the light energy used during photosynthesis originally came from the sun.	Identify that light energy is essential to plant growth.	Recognize that the Sun provides heat and light to Earth.
Identify producers and consumers in a given food chain.	Identify the missing part of a given food chain when given a model.	Recognize a simple food chain.	Recognize that plants and animals need food in order to survive.

Grade: 5

Content Area: Science

Strand: Earth's Place in the Universe

General Education Standards

SCI.5.12- Defend the claim that one factor determining the apparent brightness of the sun compared to other stars is the relative distance from Earth.

SCI.5.13- Analyze data and represent with graphs to reveal patterns of daily changes in length and direction of shadows, day and night, and the seasonal appearance of some stars in the night sky (e.g., shadows and the position and motion of Earth with respect to the sun, visibility of select stars only in particular months).

Alternate Achievement Standards

SCI.AAS.5.12- Using a model, identify that distance affects the brightness of stars.

SCI.AAS.5.13- Identify patterns of change caused by the position and/or motion of the Earth.

Achievement Elements

Students need to identify that distance affects the observed brightness of stars when given a model.

Students will identify patterns of change caused by the position and/or motion of the Earth such as day and night and the seasons.

Key Vocabulary

brightness, observed, stars, distance, patterns, change, position, motion, axis, tilt, rotation, orbit

Teaching and Learning Progressions

- Identify that distance affects the observed brightness of stars when given a model.
- Recognize that stars are distributed at different distances from the Earth.
- Recognize that stars appear to have different brightness.
- Recognize stars produce light.
- Identify patterns of change (day/night, seasons) caused by the position and/or motion of the Earth.

- Recognize that the position and/or motion of the Earth result in day/night and seasons.
- Recognize that the revolution of the Earth around the Sun results in seasons.
- Recognize that the rotation of the Earth results in day/night.
- Identify that the Earth revolves around the sun.
- Identify that the Earth rotates on an axis.
- Identify day/night and the four seasons of the year.

Application of the Alternate Achievement Standards

- Demonstrate day/night and seasons using models of the Earth and the sun and a light source. For example, use a paper plate and draw the sun in the middle. Add cutouts of the Earth at angles corresponding to the four seasons at clock positions of 12, 3, 6, and 9. Have students rotate and revolve as they move around a classroom object during music time.
- Demonstrate how the perception of a light source changes as you approach and move away, using a flashlight placed at the end of a dim or darkened hallway.

Levels of Standards

Level 4: Exceeds Standards	Level 3: Meets Standards	Level 2: Developing	Level 1: Emerging
Describe two possible reasons two stars appear to have different observed brightness.	Given a model, identify that distance affects the observed brightness of stars.	Recognize that stars are distributed at different distances from the Earth.	Recognize that stars produce light.
Compare the seasons in the Northern and Southern Hemispheres considering a given position or motion of the Earth.	Identify patterns of change (day/night, seasons) caused by the position and/or motion of the Earth.	Recognize that the position and/or motion of the Earth results in day/night and seasons.	Identify day/night and the four seasons of the year.

Grade: 5

Content Area: Science

Strand: Earth's Systems

General Education Standards

SCI.5.14- Use a model to represent how any two systems, specifically the atmosphere, biosphere, geosphere, and/or hydrosphere, interact and support life (e.g., influence of the ocean on ecosystems, landform shape, and climate; influence of the atmosphere on landforms and ecosystems through weather and climate; influence of mountain ranges on winds and clouds in the atmosphere).

SCI.5.15- Identify the distribution of freshwater and salt water on Earth (e.g., oceans, lakes, rivers, glaciers, ground water, polar ice caps) and construct a graphical representation depicting the amounts and percentages found in different reservoirs.

Alternate Achievement Standards

SCI.AAS.5.14- Identify how the atmosphere and hydrosphere interact to support life (e.g. air, water).

SCI.AAS.5.15- Identify the distribution of freshwater and salt water on Earth (e.g., oceans, lakes, rivers, glaciers, ground water, polar ice caps).

Essential Elements

Students need to identify how the hydrosphere and atmosphere interact to support life.

Students need to identify the distribution of freshwater and salt water on Earth in the forms of oceans, lakes, rivers, glaciers, ground water, and polar ice caps.

Key Vocabulary

weather, climate, wind, clouds, oceans, lakes, rivers, glaciers, ground water, polar ice caps, atmosphere, hydrosphere, evaporation

Teaching and Learning Progressions

- Identify ways in which the hydrosphere (water) and atmosphere (air) interact to support life.
- Identify parts of a simple water cycle.
- Recognize that air and water interact through condensation and evaporation.
- Identify sources of water on Earth.
- Recognize that air and water support life.
- Identify the distribution of freshwater and salt water on Earth in the forms of oceans, lakes, rivers, glaciers, ground water, and polar

ice caps.

- Recognize that water on Earth can be freshwater or salt water.
- Identify oceans, lakes, rivers, glaciers, ground water, and polar ice caps.
- Recognize common bodies of water such as oceans, lakes, and rivers.

Application of the Alternate Achievement Standards

- Demonstrate examples of freshwater and salt water using geographical maps. Have students identify local or familiar places where freshwater and/or saltwater is found.
- Demonstrate a simple water cycle using audiovisual resources to show the effect of weather patterns on the distribution of moisture.
- Use stories and art projects to identify and differentiate between places that have freshwater and salt water and the unique life forms and events that occur in each place.

Levels of Standards

Level 4: Exceeds Standards	Level 3: Meets Standards	Level 2: Developing	Level 1: Emerging
Describe a model that represents the interaction of the atmosphere and hydrosphere in supporting life in an ecosystem.	Identify ways in which the hydrosphere (water) and atmosphere (air) interact to support life.	Recognize the atmosphere and the hydrosphere.	Recognize common bodies of water (oceans, lakes, rivers) and clouds.
Interpret a pie graph showing data about the distribution of freshwater and salt water on Earth in the forms of oceans, lakes, rivers, glaciers, ground water, and polar ice caps.	Identify the distribution of freshwater and salt water on Earth in the forms of oceans, lakes, river, glaciers, ground water, and polar ice caps.	Identify oceans, lakes, rivers, glaciers, and polar ice caps.	Recognize common bodies of water (oceans, lakes, rivers).

Grade: 5

Content Area: Science

Strand: Earth and Human Activity

General Education Standards

SCI.5.16- Collect and organize scientific ideas that individuals and communities can use to protect Earth’s natural resources and its environment (e.g., terracing land to prevent soil erosion, utilizing no-till farming to improve soil fertility, regulating emissions from factories and automobiles to reduce air pollution, recycling to reduce overuse of landfill areas).

SCI.5.17- Design solutions, test, and revise a process for cleaning a polluted environment (e.g., simulating an oil spill in the ocean or a flood in a city and creating a solution for containment and/or cleanup).

Alternate Achievement Standards

SCI.AAS.5.16- Identify a human action that can help the environment.

SCI.AAS.5.17- Identify a way humans can prevent or reverse pollution of the environment.

Essential Elements

Students need to identify human actions that help the environment.

Students need to identify ways humans can prevent or reverse pollution of the environment.

Key Vocabulary

environment, pollute, pollution, reverse, recycle, emissions, erosion, no-till farming

Teaching and Learning Progressions

- Identify a solution to a pollution problem.
- Identify ways the pollution can be prevented or reversed in a given environment.
- Identify whether the pollution can be prevented or reversed in a given environment.
- Given a visual scenario, recognize the source of pollution in an environment.
- Given a visual scenario, recognize pollution in an environment.

- Identify ways the pollution can be prevented or reversed in a given environment.
- Identify whether the pollution can be prevented or reversed in a given environment.
- Recognize the source of pollution in a given environment.
- Recognize pollution in a given environment.
- Identify human actions that help the environment.
- Identify human actions that affect the environment during the course of daily life.
- Recognize that human actions can have an effect on the environment.
- Identify human actions that help other humans and/or animals.
- Recognize that human actions affect other humans and/or animals.
- Identify human actions that affect oneself during the course of daily life.
- Identify human actions that take place during the course of daily life.
- Recognize real-life actions of humans.

Application of the Alternate Achievement Standards

- Demonstrate a variety of human activities that take place during a school day by having students generate a list throughout the day.
- Sort pictures of a variety of human activities into helpful, harmful, and neutral effects on the environment.
- Create opportunities for students to explore examples of how human activities in the school affect the environment and how the disposal of trash throughout the day is handled. Interview janitorial staff, maintenance, classroom teachers, or food service employees.

Levels of Standards

Level 4: Exceed Standards	Level 3: Meets Standards	Level 2: Developing	Level 1: Emerging
Given a scenario, describe the human actions that are helpful and harmful to the environment.	Identify human actions that help the environment.	Recognize common human actions that affect the environment.	Recognize common human actions in real life.
Create a solution for cleaning up an identified situation where there is pollution.	Identify ways humans can prevent or reverse pollution of the environment.	Identify examples of pollution in their environment.	Recognize an example of pollution in their environment.

Grade: 6

Content Area: Science

Strand: Earth's Place in the Universe

General Education Standards

SCI.6.1- Create and manipulate models (e.g., physical, graphical, conceptual) to explain the occurrences of day/night cycles, length of year, seasons, tides, eclipses, and lunar phases based on patterns of the observed motions of celestial bodies.

SCI.6.2- Construct models and use simulations (e.g., diagrams of the relationship between Earth and man-made satellites, rocket launch, International Space Station, elliptical orbits, black holes, life cycles of stars, orbital periods of objects within the solar system, astronomical units and light years) to explain the role of gravity in affecting the motions of celestial bodies (e.g., planets, moons, comets, asteroids, meteors) within galaxies and the solar system.

SCI.6.3- Develop and use models to determine scale properties of objects in the solar system (e.g., scale model representing sizes and distances of the sun, Earth, moon system based on a one-meter diameter sun).

Alternate Achievement Standards

SCI.AAS.6.1- Use a model to show that Earth's moon moves around Earth, and Earth and its moon move around the sun; recognize the movements responsible for day/night and the length of a year.

SCI.AAS.6.2--Recognize that gravity is responsible for the moon's orbit around Earth, and Earth's orbit around the sun.

SCI.AAS.6.3- Use a model to compare the relative sizes of objects in the solar system (e.g., sun, Earth, moon).

Essential Elements

Students need to use a model to show that Earth's moon moves around Earth and that Earth and its moon move around the sun.

Students need to recognize that movements of Earth and its moon are responsible for day and night and the length of the year.

Students need to recognize that gravity is responsible for the moon's orbit around Earth and Earth's orbit around the sun.

Students need to be able to use a model to compare the relative sizes of the sun, Earth, and moon in the solar system.

Key Vocabulary

orbit, rotation, revolution, gravity, relative

Teaching and Learning Progressions

- When observing models of the movement of Earth (rotation and revolution around the sun), identify seasons for a given location on Earth as it orbits the sun.
- When observing models of the movement of Earth (rotation and revolution around the sun), identify day and night for a given location on Earth as it rotates.
- Recognize that Earth rotates on its axis.
- Identify that gravity is responsible for Earth's orbit around the sun and the moon's orbit around Earth.
- Recognize that the moon moves around Earth in an orbit.
- Recognize that Earth moves around the sun in an orbit.
- Recognize that the amount of gravity is related to the size of an object.
- Identify that objects are attracted to Earth and other objects by the force of gravity.
- Use a model to compare the relative sizes of objects in the solar system (e.g., sun, Earth, moon).
- Recognize that Earth is smaller than our sun.
- Identify that the sun is at the center of our solar system.
- Recognize that Earth is part of a solar system.
- Identify that Earth's moon is smaller than Earth.
- Identify that Earth has a moon
- Identify that Earth is a planet.

Application of the Alternate Achievement Standards

- Use models to demonstrate the movement of the moon around Earth and Earth and the moon around the sun.
- Using computer simulations, have students manipulate the movement of the moon around Earth and Earth around the sun.
- Use art and craft projects to demonstrate the relative size of Earth, the moon, and the sun.

Levels of Standards

Level 4: Exceeds Standards	Level 3: Meets Standards	Level 2: Developing	Level 1: Emerging
Use models to compare the movements and positions of Earth, the moon, and sun during day and night and the seasons.	Use models to identify movements of Earth, the moon, and the sun and how the movements are responsible for day and night and the length of a year.	Use models to identify that the moon revolves around Earth and Earth and the moon revolve around the sun.	Use models to recognize the sun, Earth, and the moon.
Describe the path of Earth around the sun and the moon around Earth in terms of shape.	Recognize that gravity is responsible for the moon's orbit around Earth and Earth's orbit around the sun.	Recognize that gravity is the force that causes objects to fall to Earth and attracts one object to another.	Recognize that objects fall to Earth when dropped.
Use a model to compare and describe the relative sizes of objects in the solar system (e.g., sun, Earth, moon).	Use a model to compare the relative sizes of objects in the solar system (e.g., sun, Earth, moon).	Identify the sun, Earth, and the moon.	Recognize comparative vocabulary for size (small/smaller, big/bigger).

Grade: 6

Content Area: Science

Strand: Earth's Systems

General Education Standards

SCI.6.4- Construct explanations from geologic evidence (e.g., change or extinction of particular living organisms; field evidence or representations, including models of geologic cross-sections; sedimentary layering) to identify patterns of Earth's major historical events (e.g., formation of mountain chains and ocean basins, significant volcanic eruptions, fossilization, folding, faulting, igneous intrusion, erosion).

SCI.6.5- Use evidence to explain how different geologic processes shape Earth's history over widely varying scales of space and time (e.g., chemical and physical erosion; tectonic plate processes; volcanic eruptions; meteor impacts; regional geographical features, including Alabama fault lines, Rickwood Caverns, and Wetumpka Impact Crater).

SCI.6.6- Provide evidence from data of the distribution of fossils and rocks, continental shapes, and seafloor structures to explain past plate motions.

SCI.6.7- Use models to construct explanations of the various biogeochemical cycles of Earth (e.g., water, carbon, nitrogen) and the flow of energy that drives these processes.

SCI.6.8- Plan and carry out investigations that demonstrate the chemical and physical processes that form rocks and cycle Earth's materials (e.g., processes of crystallization, heating and cooling, weathering, deformation, and sedimentation).

SCI.6.9- Use models to explain how the flow of Earth's internal energy drives a cycling of matter between Earth's surface and deep interior causing plate movements (e.g., mid-ocean ridges, ocean trenches, volcanoes, earthquakes, mountains, rift valleys, volcanic islands).

SCI.6.11- Develop and use models of Earth's interior composition to illustrate the resulting magnetic field (e.g., magnetic poles) and to explain its measurable effects (e.g., protection from cosmic radiation).

SCI.6.12- Integrate qualitative scientific and technical information (e.g., weather maps; diagrams; other visualizations, including radar and computer simulations) to support the claim that motions and complex interactions of air masses result in changes in weather conditions.

- a. Use various instruments (e.g., thermometers, barometers, anemometers, wet bulbs) to monitor local weather and examine weather patterns to predict various weather events, especially the impact of severe weather (e.g., fronts, hurricanes, tornados, blizzards, ice storms, droughts).

SCI.6.13- Use models (e.g., diagrams, maps, globes, digital representations) to explain how the rotation of Earth and unequal heating of its surface create patterns of atmospheric and oceanic circulation that determine regional climates.

- a. Use experiments to investigate how energy from the sun is distributed between Earth's surface and its atmosphere by

convection and radiation (e.g., warmer water in a pan rising as cooler water sinks, warming one's hands by a campfire).

SCI.6.14- Analyze and interpret data (e.g., tables, graphs, maps of global and regional temperatures; atmospheric levels of gases such as carbon dioxide and methane; rates of human activities) to describe how various human activities (e.g., use of fossil fuels, creation of urban heat islands, agricultural practices) and natural processes (e.g., solar radiation, greenhouse effect, volcanic activity) may cause changes in local and global temperatures over time.

Alternate Achievement Standards

SCI.AAS.6.4- Identify sedimentary layering in Earth as evidence of the formation of mountains.

SCI.AAS.6.5- Recognize that changes in Earth's features are brought on by slow processes such as mountain building and fast processes such as volcanic eruptions; identify erosion as a process that changes Earth's surface.

SCI.AAS.6.6- Recognize that the distribution of specific fossils and rocks as well as the shapes of the continents provide evidence of tectonic plate movement.

SCI.AAS.6.7- Use a model to explain the water cycle, including evaporation, condensation, and precipitation; recognize that the sun provides the energy, which drives the water cycle.

SCI.AAS.6.8- Identify the physical process (sedimentation, heat and pressure, weathering, cooling) that results in the formation of rocks; use a model to demonstrate the rock cycle.

SCI.AAS.6.9- Recognize that volcanic action, earthquakes, and mountain building are caused by the flow of matter beneath Earth's surface.

SCI.AAS.6.11- Illustrate the layers of the interior of Earth; recognize that Earth has a magnetic field which protects us from some harmful effects of the sun.

SCI.AAS.6.12- Recognize interactions of air masses as the cause of changes in weather.

SCI.AAS.6.12a- Distinguish which scientific instrument would be used to measure weather conditions (i.e., temperature, wind speed, and air pressure); identify weather conditions including sunshine, clouds, rain, ice storms, and blizzards.

SCI.AAS.6.13- Use models to investigate how energy from the sun impacts Earth's surface; recognize that uneven heating of Earth's surface causes patterns in weather and climate.

SCI.AAS.6.13a- Recognize that the sun's thermal energy is distributed throughout Earth's atmosphere by convection and radiation.

SCI.AAS.6.14- Interpret data (e.g., tables, graphs) to determine changes in local and global temperatures over time; identify human activities (e.g. the use of fossil fuels) and natural processes (e.g. volcanic activity) as causes of these changes in temperatures.

Achievement Elements

Students need to identify sedimentary layering as one way mountains were formed.

Students need to recognize slow processes such as mountain building, fast processes such as volcanic eruptions, and erosion as processes that change Earth's surface.

Students need to recognize the distribution of specific fossils and rocks and the shapes of the continents as evidence of tectonic plate movement.

Students need to explain a simple water cycle, including evaporation, condensation, and precipitation and recognize that the sun provides the energy that drives the water cycle.

Students need to identify the processes of sedimentation, heat and pressure, weathering, and cooling that result in the formation of rocks and use a model to demonstrate the rock cycle.

Students need to recognize that volcanic action, earthquakes, and mountain building are caused by the flow of matter beneath Earth's surface.

Students need to illustrate the layers of the interior of Earth and recognize that Earth has a magnetic field that protects us from some harmful effects of the sun.

Students need to recognize that changes in weather are caused by interactions of air masses.

Students need to know which scientific instrument is used to measure air temperature, wind speed, and air pressure and identify weather conditions including sunshine, clouds, rain, ice storms, and blizzards.

Using models, students need to investigate how energy from the sun impacts Earth's surface and recognize that uneven heating of Earth's surface causes patterns in weather and climate.

Students need to recognize convection and radiation as ways the sun's thermal energy is distributed throughout Earth's atmosphere.

Students need to determine changes in local and global temperatures over time by interpreting data in tables and graphs and identify human activities (e.g., the use of fossil fuels) and natural processes (e.g., volcanic activity) as causes of these changes in temperatures.

Key Vocabulary

sedimentary, mountain building, eruptions, erosion, fossils, continents, tectonic plates, water cycle, evaporation, condensation, precipitation, weathering, formation, rock cycle, interior, magnetic field, air masses, convection, radiation, thermal energy, atmosphere

Teaching and Learning Progressions

- Identify sedimentary layering in Earth as evidence of the formation of mountains.
- Recognize that sedimentary layers forced into another orientation form mountains.
- Recognize that when sedimentary layers appear in an orientation other than flat (horizontal), they have been pushed into that position by tremendous force.
- Understand that layers were deposited in flat (horizontal) positions.
- Recognize sedimentary rocks as having layers.

- Use a model to demonstrate the rock cycle.
- Identify the physical process (sedimentation, heat and pressure, weathering, cooling) that results in the formation of rocks.
- Identify that some rocks (igneous) are formed when melted rock cools and solidifies.
- Identify that many layers of soil and other materials undergo extreme pressure so that rock is formed.
- Identify that some rocks (sedimentary) are formed when soil and other materials on the surface are eroded and then settle.
- Identify that some rocks (metamorphic) are rocks that have been changed by extreme heat and pressure.
- Recognize that mountain building changes Earth's features very slowly.
- Recognize the mountain building process.
- Recognize that volcanic eruptions change Earth's features very quickly.
- Recognize volcanoes and volcanic eruptions.
- Identify erosion as a process that changes Earth's surface.
- Recognize that when soil is moved it can form new land area and the contour of Earth.
- Recognize that natural forces such as wind and water can move soil on Earth.
- Identify soil on Earth's surface.
- Recognize that Earth's surface changes over time.
- Recognize the surface of Earth.
- Recognize that the distribution of specific fossils and rocks as well as the shapes of the continents provide evidence of tectonic plate movement.
- Recognize that continents have moved over time.
- Observe that the shapes of continents connect in a way similar to puzzle pieces.
- Recognize that the distribution of fossils and rocks forms patterns over Earth's crust.
- Use a model to explain the water cycle, including evaporation, condensation, and precipitation.
- Identify the sun as providing the energy for a water cycle.
- Identify parts of a water cycle.
- Recognize that air and water interact through condensation, evaporation, and precipitation.
- Recognize that air and water support life.
- Recognize that the sun provides energy for life on Earth.
- Recognize that volcanic action, earthquakes, and mountain building are caused by the flow of matter beneath Earth's surface.
- Recognize that volcanoes and earthquakes can form mountains.
- Recognize that some earthquakes are caused by volcanic action.

- Recognize that when magma is pushed to the surface, it causes a volcanic eruption.
- Recognize that part of the mantle may melt (magma) and be pushed to the surface.
- Recognize that Earth's mantle is between its core and surface.
- Recognize that Earth's core has a solid inner core covered by a liquid outer core that is very hot.
- Recognize that Earth's ozone layer protects us from harmful effects of the sun.
- Recognize that Earth's magnetic field protects the ozone layer of the atmosphere.
- Recognize that Earth has a magnetic field because of iron in its core.
- Illustrate the layers of the interior of Earth.
- Identify that Earth has a center (core).
- Identify that Earth has a middle layer (mantle.)
- Identify that Earth has a solid surface (crust).
- Recognize that Earth is a sphere.
- Identify human activities (e.g., the use of fossil fuels) and natural processes (e.g., volcanic activity) as causes of changes in local and global temperatures over time.
- Interpret data (e.g., tables, graphs) to determine changes in local and global temperatures over time.
- Recognize that temperature data over time can be displayed in a table or graph.
- Recognize that temperature data is shared among scientists.
- Recognize that scientists all over the world measure temperatures over time.
- Recognize interactions of air masses as the cause of changes in weather.
- Recognize that air masses can collide.
- Recognize that air masses can move in different directions.
- Recognize that the atmosphere contains large air masses that move because of winds.
- Recognize that weather is the day-by-day variation of the atmosphere's condition in an area.
- Distinguish which scientific instrument would be used to measure weather conditions (e.g., temperature, wind speed, and air pressure).
- Recognize an anemometer.
- Recognize a barometer.
- Recognize that a thermometer used to measure outdoor temperature.
- Recognize that scientists measure weather conditions all over the world.
- Identify weather conditions including sunshine, clouds, rain, ice storms, and blizzards.
- Use models to investigate how energy from the sun impacts Earth's surface.

- Recognize that uneven heating of Earth’s surface causes patterns in weather and climate.
- Recognize that energy from the sun generates our weather patterns
- Recognize that energy from the sun gives energy to the growing green plants that provide the food and oxygen for life on Earth.
- Recognize that the sun’s thermal energy is distributed throughout Earth’s atmosphere by convection and radiation.
- Observe that the sun warms the oceans on Earth and Earth’s atmosphere.
- Recognize that energy (light, heat) is emitted from the sun and travels in waves to Earth.

Application of the Alternate Achievement Standards

- Demonstrate sedimentary layering, using hands-on activities with colored sand and rocks.
- Demonstrate tectonic plate movement, using computer simulations or tectonic plate puzzles.
- Explore the interactions of air masses, using the daily weather broadcast weather maps.

Levels of Standards

Level 4: Exceeds Standards	Level 3: Meets Standards	Level 2: Developing	Level 1: Emerging
Identify and describe sedimentary layering in Earth as evidence of the formation of some mountains.	Identify sedimentary layering in Earth as evidence of the formation of some mountains.	Recognize sedimentary layering in models.	Identify various types of soil.
Recognize and describe Earth’s surface is changed by slow processes such as mountain building, fast processes such as volcanic eruptions, and erosion.	Recognize Earth’s surface is changed by slow processes such as mountain building, fast processes such as volcanic eruptions, and erosion.	Identify the processes of volcanic eruptions and erosion in various locations on Earth’s surface.	Recognize that volcanoes erupt.
Recognize and explain that the distribution of specific fossils and rocks as well as the shapes of the continents provide evidence of tectonic plate movement.	Recognize that the distribution of specific fossils and rocks as well as the shapes of the continents provide evidence of tectonic plate movement.	Recognize fossils and some types of rocks.	Recognize fossils as skeletons of once-living things.

Describe the water cycle, including evaporation, condensation, and precipitation; recognize that the sun provides the energy, which drives the water cycle.	Use a model to explain the water cycle, including evaporation, condensation, and precipitation; recognize that the sun provides the energy, which drives the water cycle.	Understand evaporation, condensation, and precipitation.	Recognize a simple cycle in real life.
Demonstrate the physical processes that form rocks and cycle Earth's materials (e.g., processes of crystallization, heating and cooling, weathering, deformation, and sedimentation).	Identify the physical process (sedimentation, heat and pressure, weathering, cooling) that results in the formation of rocks; use a model to demonstrate the rock cycle.	Recognize that rocks form over time and can wear away over time (weathering) due to wind and water.	Recognize that there are a variety of types of rocks with different physical characteristics.
Describe how volcanic action, earthquakes, and mountain building are caused by the flow of matter beneath Earth's surface.	Recognize that volcanic action, earthquakes, and mountain building are caused by the flow of matter beneath Earth's surface.	Identify a volcanic eruption, an earthquake, and mountain building.	Identify a volcanic eruption and an earthquake.
Develop and use models of Earth's interior composition to illustrate the resulting magnetic field (e.g., magnetic poles).	Illustrate the layers of the interior of Earth; recognize that Earth has a magnetic field that protects us from some harmful effects of the sun.	Identify the layers of Earth using a model.	Recognize that Earth has a core and layers.
Identify interactions of air masses as the cause of changes in weather.	Recognize interactions of air masses as the cause of changes in weather.	Recognize that weather changes at various rates at various times.	Identify various types of weather.
Use various instruments (e.g.,	Distinguish which scientific	Identify scientific instruments	Identify daily weather

thermometers, barometers, anemometers, wet bulbs) to monitor local weather and examine weather patterns to predict various weather events.	instrument would be used to measure weather conditions (i.e., temperature, wind speed, and air pressure); identify weather conditions including sunshine, clouds, rain, ice storms, and blizzards.	used to measure weather conditions including temperature and wind speed; identify local daily weather conditions.	conditions.
Use models to investigate and explain how energy from the sun impacts Earth's surface; recognize that uneven heating of Earth's surface causes patterns in weather and climate.	Use models to investigate how energy from the sun impacts Earth's surface; recognize that uneven heating of Earth's surface causes patterns in weather and climate.	Recognize that energy from the sun (heat and light) affects Earth's surface.	Recognize that the sun gives off energy (heat and light) that reaches Earth.
Explain that the sun's thermal energy is distributed throughout Earth's atmosphere by convection and radiation.	Recognize that the sun's thermal energy is distributed throughout Earth's atmosphere by convection and radiation.	Identify that energy from the sun travels through space and Earth's atmosphere before reaching Earth's surface.	Recognize the sun, space, Earth's atmosphere, and Earth's surface.
Analyze and interpret data (e.g., tables, graphs) to determine changes in local and global temperatures over time; identify human activities (e.g., the use of fossil fuels) and natural processes (e.g., volcanic activity) as causes of these changes in temperatures.	Interpret data (e.g., tables, graphs) to determine changes in local and global temperatures over time; identify human activities (e.g., the use of fossil fuels) and natural processes (e.g., volcanic activity) as causes of these changes in temperatures.	Use data from tables and graphs to determine local and/or global temperatures for a given time. Identify human activities that affect the environment.	Locate given information in a graph or table. Identify various human activities.

Grade: 6

Content Area: Science

Strand: Earth and Human Activity

General Education Standards

SCI.6.15- Analyze evidence (e.g., databases on human populations, rates of consumption of food and other natural resources) to explain how changes in human population, per capita consumption of natural resources, and other human activities (e.g., land use, resource development, water and air pollution, urbanization) affect Earth's systems.

SCI.6.16- Implement scientific principles to design processes for monitoring and minimizing human impact on the environment (e.g., water usage, including withdrawal of water from streams and aquifers or construction of dams and levees; land usage, including urban development, agriculture, or removal of wetlands; pollution of air, water, and land).

Alternate Achievement Standards

SCI.AAS.6.15- Compare the relationship between human population and food consumption, water use, and land use.

SCI.AAS.6.16- Assess how human behaviors impact the environment (e.g., recycling, conservation, pollution); suggest processes to minimize human impact on the environment.

Achievement Elements

Students need to compare relationships between the size of the human population and food consumption, water use, and land use.

Students need to assess how human behaviors impact the environment and suggest processes to minimize those impacts.

Key Vocabulary

recycling, conservation, pollution, consumption, assess, population, consumption

Teaching and Learning Progressions

- Compare the relationship between the size of human populations and food consumption, water use, and land use.
- Recognize that a larger human population will use more food, water, and land.
- Know that human populations use land and water for a variety of purposes.
- Know that food consumption is the amount of food that a human being eats and the amount of food a population eats.
- Know that human population refers to the number of human beings.

- Suggest processes that minimize a given impact on the environment.
- Recognize processes that minimize impacts to the environment.
- Assess human behaviors in terms of their impact on the environment.
- Recognize the relationship between human behavior and pollution.
- Recognize pollution as a harmful environmental issue.
- Recognize conservation in terms of the environment.
- Identify human behaviors that are harmful to the environment.
- Identify human behaviors that help the environment.
- Identify human behaviors that affect the environment during the course of daily life.
- Recognize that human behaviors can have an effect on the environment.
- Identify human behaviors that help other humans and/or animals.
- Recognize that human behaviors affect other humans and/or animals.
- Identify behaviors of humans that affect oneself during the course of daily life.
- Identify behaviors of humans that take place during the course of daily life.
- Recognize behaviors of humans.

Application of the Alternate Achievement Standards

- Demonstrate the relationship between pet animal populations (dogs, cats, hamsters) and consumption of food.
- Create visual displays of ways that humans help and harm the environment.
- Have students create poems, songs, and/or stories about cleaning up the environment.

Levels of Standards

Level 4: Exceeds Standards	Level 3: Meets Standards	Level 2: Developing	Level 1: Emerging
Predict how a change in the size of the human population in an area will affect food consumption, water use, and land use in that area.	Compare the relationship between the size of human population and food consumption, water use, and land use.	Recognize human population, food consumption, water use, and land use.	Recognize that humans need food and water in order to live.
Predict the impact of a novel human behavior on the environment and develop a plan to minimize that impact.	Assess how human behaviors impact the environment and suggest processes to minimize those impacts.	Recognize human behaviors that impact the environment. Know that various resources can be recycled.	Engage in recycling projects that minimize the impact of disposal of recyclable products.

Grade: 7

Content Area: Science

Strand: From Molecules to Organisms: Structures and Processes

General Education Standards

SCI.7.1- Engage in argument from evidence to support claims of the cell theory.

SCI.7.3- Construct an explanation of the function (e.g., mitochondria releasing energy during cellular respiration) of specific cell structures (i.e., nucleus, cell membrane, cell wall, ribosomes, mitochondria, chloroplasts, and vacuoles) for maintaining a stable environment

SCI.7.4- Construct models and representations of organ systems (e.g., circulatory, digestive, respiratory, muscular, skeletal, nervous) to demonstrate how multiple interacting organs and systems work together to accomplish specific functions.

Alternate Achievement Standards

SCI.AAS.7.1- Recognize that cells are the basic units of life; identify the ability to see cells in living tissue using a microscope as evidence that living things are made of cells.

SCI.AAS.7.3- Label the nucleus of a cell in a cell diagram; distinguish at least one structural difference between plant and animal cells (e.g., cell wall, chloroplasts); match specific cell structures (e.g., nucleus, cell wall, cell membrane) with their functions

SCI.AAS.7.4- Label major organs of the human body (e.g., heart, lungs, diaphragm, bones, muscles, stomach, brain, intestines); use a model to demonstrate how organs are connected in an organ system; recognize how organ systems support the survival of humans (e.g., circulatory, respiratory, skeletal, muscular, digestive).

Essential Elements

Students need to recognize that cells are the basic unit of life and identify that cells can be seen in living tissue using a microscope.

Students need to identify common cell parts (nucleus, cell wall, cell membrane) in a cell diagram and match them with their functions.

Students need to distinguish at least one structural difference between plant and animal cells.

Students need to be able to label major organs of the body, including the heart, lungs, diaphragm, bones, muscles, stomach, brain, and intestines.

Students need to be able to demonstrate how organs are connected in an organ system, using a model.

Students need to recognize the function of the circulatory, respiratory, skeletal, muscular, and digestive systems.

Key Vocabulary

cells, nucleus, cell wall, cell membrane, chloroplasts, distinguish, structure, organs, heart, lungs, diaphragm, bones, muscles, stomach, brain, intestines, organ systems, circulatory, respiratory, skeletal, muscular, digestive systems

Teaching and Learning Progressions

- Recognize the function of the circulatory, respiratory, skeletal, muscular, and digestive systems.
- Recognize that there are multiple organ systems in the body.
- Using a model, demonstrate how organs are connected in an organ system.
- Recognize that some organs are connected to form an organ system.
- Label major organs of the body on a diagram: heart, lungs, diaphragm, bones, muscles, stomach, brain, and intestines.
- Recognize that some of the organs of the human body include the heart, lungs, diaphragm, bones, muscles, stomach, brain, and intestines.
- Understand that the human body contains organs that are necessary in order to live.
- Identify common cell parts (nucleus, cell wall, cell membrane, chloroplasts) in a cell diagram and match them with their function.
- Recognize the function of the cell wall and chloroplasts in a plant cell.
- Identify the cell wall and chloroplasts of a plant cell.
- Recognize the function of the nucleus and cell membrane of a cell.
- Identify the nucleus and cell membrane of a cell, using a drawing.
- Recognize the drawing of a plant or an animal cell.
- Identify a cell in a picture or drawing.
- Recognize that cells are the basic unit of life and identify that cells can be seen in living tissue using a microscope.
- Recognize that a microscope is used to see things that otherwise cannot be seen.
- Recognize the drawing of a plant or an animal cell.
- Recognize that living things are made up of cells.
- Identify living and nonliving things.

Application of the Alternate Achievement Standards

- Create models of cells by using food or cooking ingredients such as gelatin or candies.
- Demonstrate organs and organ systems by making life-size cutouts of students and/or staff. Show where organs and organs system

are in the body by either drawing them on the cutouts or using pictures.

- Use models of human organs and organ systems to allow students to manipulate parts into correct placement.

Levels of Standards

Level 4: Exceeds Standards	Level 3: Meets Standards	Level 2: Developing	Level 1: Emerging
Recognize that there are a variety of cells throughout the human body that have various functions (muscle, heart, brain).	Recognize that cells are the basic unit of life and identify that cells can be seen in living tissue, using a microscope.	Recognize that a microscope is used to see things that otherwise cannot be seen. Recognize the drawing of a plant or an animal cell.	Identify living and nonliving things.
Identify cell parts (nucleus, cell wall, cell membrane) and identify their function.	Identify common cell parts (nucleus, cell wall, cell membrane in a cell diagram and match them with their function.	Identify the nucleus and cell membrane of a cell, using a drawing.	Identify a cell in a picture or drawing.
Describe the function of a distinguishing feature between a plant cell and an animal cell.	Distinguish at least one structural difference between plant and animal cells.	Recognize a plant cell and an animal cell.	Identify a cell in a picture or drawing.
Using a diagram or a model, describe the functions of the major organs of the body: heart, lungs, diaphragm, bones, muscles, stomach, brain, and intestines.	Label major organs of the body on a diagram; heart, lungs, diaphragm, bones, muscles, stomach, brain, and intestines.	Using a model, recognize some major organs of the body; heart, lungs, stomach, brain.	Using a model, recognize the heart and lungs of a human.
Using a model, demonstrate how the circulatory and respiratory systems are connected.	Using a model, demonstrate how organs are connected in an organ system.	Identify that the heart and blood are part of the circulatory system. Identify that the mouth, stomach, and intestines are part	Match the circulatory system with heart and lungs. Match the digestive system with mouth and stomach.

		of the digestive system.	
Describe how the skeletal and muscular systems work together.	Recognize the function of the circulatory, respiratory, skeletal, muscular, and digestive systems.	Know that muscles help humans and animals move and that the mouth, stomach, and intestines help humans and animals use food.	Recognize that a heart beats and that humans breathe, move, and eat.

Grade: 7

Content Area: Science

Strand: Ecosystems: Interactions, Energy, and Dynamics

General Education Standards

SCI.7.5- Examine the cycling of matter between abiotic and biotic parts of ecosystems to explain the flow of energy and the conservation of matter.

- a. Obtain, evaluate, and communicate information about how food is broken down through chemical reactions to create new molecules that support growth and/or release energy as it moves through an organism.
- b. Generate a scientific explanation based on evidence for the role of photosynthesis and cellular respiration in the cycling of matter and flow of energy into and out of organisms.

SCI.7.6- Analyze and interpret data to provide evidence regarding how resource availability impacts individual organisms as well as populations of organisms within an ecosystem.

SCI.7.7- Use empirical evidence from patterns and data to demonstrate how changes to physical or biological components of an ecosystem (e.g., deforestation, succession, drought, fire, disease, human activities, invasive species) can lead to shifts in populations.

SCI.7.8- Construct an explanation to predict patterns of interactions in different ecosystems in terms of the relationships between and among organisms (e.g., competition, predation, mutualism, commensalism, parasitism).

SCI.7.9- Engage in argument to defend the effectiveness of a design solution that maintains biodiversity and ecosystem services (e.g., using scientific, economic, and social considerations regarding purifying water, recycling nutrients, preventing soil erosion).

SCI.7.11- Analyze and interpret data to predict how environmental conditions (e.g., weather, availability of nutrients, location) and genetic factors (e.g., selective breeding of cattle or crops) influence the growth of organisms (e.g., drought decreasing plant growth, adequate supply of nutrients for maintaining normal plant growth, identical plant seeds growing at different rates in different weather conditions, fish growing larger in large ponds than in small ponds).

Alternate Achievement Standards

SCI.AAS.7.5- Distinguish between abiotic and biotic parts of an ecosystem.

SCI.AAS.7.5a- Recognize that food is broken down through chemical reactions to provide energy needed for the growth of organisms.

SCI.AAS.7.5b- Recognize that plants and animals depend on one another for the exchange of carbon dioxide and oxygen; identify photosynthesis as the process by which plants transfer energy from the sun into materials needed for growth.

SCI.AAS.7.6- Use data as evidence that the availability of natural resources (e.g., food, light, water) influences the growth of organisms.

SCI.AAS.7.7- Interpret data to see how changes in an ecosystem (e.g., drought, forest fires) affect the animal population in an area.

SCI.AAS.7.8- Identify relationships among organisms as competitive, mutually beneficial, parasitic, or neutral.

SCI.AAS.7.9- Identify human behaviors that are harmful to the environment; compare the effectiveness of various solutions to these problems (e.g. recycling, preventing soil erosion, organic gardening).

SCI.AAS.7.11- Predict how various environmental conditions affect our food supply; recognize that farmers use selective breeding of plants and animals to influence the growth and other factors of those plants and animals.

Achievement Elements

Students need to know the difference between abiotic and biotic parts of an ecosystem.

Students need to recognize that food is broken down by chemical reactions in order to provide the energy a living organism needs.

Students need to recognize that plants and animals depend on each other for carbon dioxide and oxygen.

Students need to identify photosynthesis as the process by which plants use energy from the sun to produce food.

Students need to use data as evidence that the availability of natural resources influences the growth of organisms.

Students need to interpret data to determine how drought and forest fires affect the animal population in an area.

Students need to identify relationships among organisms as competitive, mutually beneficial, parasitic, or neutral.

Students need to identify human behaviors that are harmful to the environment and compare the effectiveness of various solutions to these problems.

Students need to predict how various environmental conditions affect our food supply.

Students need to recognize that farmers use selective breeding of plants and animals to influence the growth and other factors of those plants and animals.

Key Vocabulary

biotic, abiotic, chemical reactions, photosynthesis, process, evidence, natural resources, organisms, drought, forest fires, population, relationships, competitive, mutually beneficial, parasitic, neutral, effective(ness), environmental, selective breeding, influence

Teaching and Learning Progressions

- Identify relationships among organisms as competitive, mutually beneficial, parasitic, or neutral.
- Recognize that organisms in an ecosystem may interact with no effect on each other.
- Identify parasitic relationships in an ecosystem.
- Recognize that the parasite harms the host and may cause its death.
- Recognize that organisms in an ecosystem may interact in ways in which one organism lives off another organism (host).

- Identify mutually beneficial relationships in an ecosystem (mutualism).
- Recognize that organisms in an ecosystem may interact in ways in which both organisms benefit.
- Identify competitive relationships within an ecosystem.
- Recognize that plants and animals in an ecosystem may compete with each other for food, space, or other needed resources.
- Understand that organisms within an ecosystem interact with each other.
- Interpret data to see how changes in an ecosystem (e.g., drought, forest fires) affect the animal population in an area.
- Recognize that changes in the biotic and abiotic parts of the ecosystem will affect the animal population in an area.
- Understand that organisms in an ecosystem interact with the biotic and abiotic parts of the ecosystem.
- Distinguish between abiotic and biotic parts of an ecosystem.
- Know that the living communities are called biotic.
- Know that the physical, nonliving parts of an ecosystem are called abiotic.
- Understand that an ecosystem is a community of organisms that live and interact with the living and nonliving parts of their environment.
- Differentiate between living and nonliving parts of the environment.
- Use data as evidence that the availability of natural resources (e.g., food, light, water) influences the growth of organisms.
- Identify photosynthesis as the process by which plants transfer energy from the sun into materials needed for growth.
- Recognize that plants and animals depend on one another for the exchange of carbon dioxide and oxygen;
- Know that plants depend on air, water, and minerals in the soil and light to grow.
- Recognize that food is broken down through chemical reactions to provide energy that organisms need to grow.
- Know that animals depend on their surroundings to obtain food, water, shelter, and an acceptable temperature in order to live.
- Compare the effectiveness of various solutions to human behaviors that are harmful to the environment (e.g., recycling, preventing soil erosion, organic gardening).
- Identify solutions to human behaviors that are harmful to the environment.
- Identify human actions that help the environment.
- Identify human behaviors that are harmful to the environment.
- Identify human actions that affect the environment during the course of daily life.
- Recognize that human actions can have an effect on the environment.
- Identify human actions that help other humans and/or animals.
- Identify human actions that take place during the course of daily life.
- Recognize that farmers use selective breeding of plants and animals to influence the growth and other factors of those plants and

animals.

- Recognize that farmers cross-pollinate plants that have the most desirable traits (produce more seeds, disease resistant) to produce more plants and seeds with those traits.
- Recognize that farmers breed animals with the most desirable traits to produce more animals with those traits.
- Understand that plants and animals that we eat are grown on farms.
- Predict how various environmental conditions affect our food supply.
- Identify environmental conditions that affect our food supply.
- Recognize that environmental conditions (drought, severe weather, floods) affect our food supply.
- Recognize a variety of sources for our food.
- Understand that *food supply* is the variety of food available for humans and other animals to eat.

Application of the Alternate Achievement Standards

- Use an interactive simulation to demonstrate the effects of changes in an ecosystem.
- Create partner or small group activities to investigate relationships among organisms as competitive, mutually beneficial, parasitic, or neutral and match organisms that coexist.
- Demonstrate photosynthesis through simple classroom experiments such as covering up a leaf on a plant or placing a cut leaf in a small bowl of water and watching for the oxygen bubbles to develop.

Levels of Standards

Level 4: Exceeds Standards	Level 3: Meets Standards	Level 2: Developing	Level 1: Emerging
Describe a given ecosystem including abiotic and biotic parts.	Demonstrate knowing the difference between abiotic and biotic parts of an ecosystem.	Recognize an ecosystem.	Identify living and nonliving things in the environment.
Communicate information about how food is broken down through chemical reactions to create new molecules that support growth and/or release energy as it	Recognize that food is broken down by chemical reactions in order to provide the energy a living organism needs.	Identify food as the source for energy in the body that supports life and growth.	Identify that living things need energy in order to live.

moves through an organism.			
Use a diagram to explain a simple carbon cycle.	Recognize that plants and animals depend on each other for carbon dioxide and oxygen and identify photosynthesis as the process by which plants use energy from the Sun to produce food.	Recognize that animals use oxygen and release carbon dioxide and that plants use carbon dioxide and release oxygen during life processes.	Recognize that animals need oxygen in order to live and that plants need carbon dioxide in order to live.
Analyze and interpret data to show how resource availability impacts individual organisms as well as populations of organisms within an ecosystem.	Use data as evidence that the availability of natural resources influences the growth of organisms.	Identify natural resources that are needed for organisms living in an area.	Recognize that organisms live and grow in a given area.
Use evidence from patterns and data to demonstrate how changes to physical or biological components of an ecosystem (drought, fire, human activities) can lead to shifts in populations.	Interpret data to determine how the changes brought about by drought and forest fires affect the animal population in an area.	Recognize that drought and forest fires affect the animal population in an area.	Recognize that drought and forest fires cause physical changes in an area.
Predict patterns of interactions in at least two ecosystems in terms of the relationships between and among organisms (e.g., competition, predation, mutualism, commensalism, parasitism).	Identify relationships among organisms as competitive, mutually beneficial, parasitic, or neutral.	Identify organisms that compete for the same food source.	Identify simple food chains.

Identify and explain human behaviors that are harmful to the environment and compare the effectiveness of various solutions to these problems.	Identify human behaviors that are harmful to the environment and compare the effectiveness of various solutions to these problems.	Identify problems that are harmful to the environment.	Identify helpful and harmful human behaviors.
Analyze and interpret data to predict how environmental conditions (e.g., weather, availability of nutrients, location) and genetic factors (e.g., selective breeding of cattle or crops) influence the growth of organisms	Predict how various environmental conditions affect our food supply and recognize that farmers use selective breeding of plants and animals to influence the growth and other factors of those plants and animals.	Identify environmental conditions that affect our food supply.	Identify the sources of our food supply.

Grade: 7

Content Area: Science

Strand: Heredity: Inheritance and Variation of Traits

General Education Standards

SCI.7.12 Construct and use models (e.g., monohybrid crosses using Punnett squares, diagrams, simulations) to explain that genetic variations between parent and offspring (e.g., different alleles, mutations) occur as a result of genetic differences in randomly inherited genes located on chromosomes and that additional variations may arise from alteration of genetic information.

Alternate Achievement Standards

SCI.AAS.7.12- Compare and contrast traits of animal parents and their offspring (e.g., eye color, hair/fur color, size); recognize that variations between parents and offspring are the result of randomly inherited genes; recognize that genes are located on chromosomes which are found in the cells of living things.

Achievement Elements

Students need to compare and contrast traits of animal parents and their offspring.

Students need to recognize that variations between parents and offspring are the result of randomly inherited genes.

Students need to recognize that genes are located on chromosomes in the cells of living things.

Key Vocabulary

traits, parents, offspring, variations, random, inherited, genes, chromosomes

Teaching and Learning Progressions

- Compare and contrast traits of animal parents and their offspring.
- Recognize that animals have physical characteristics that can be described and identified.
- Recognize that variations between parents and offspring are the result of randomly inherited genes.
- Recognize that which genes are passed along to the offspring from each biologic parent is random.
- Recognize that half of the genetic code comes from one biological parent and half from the other biological parent.
- Recognize that offspring inherit genetic information from both biological parents.
- Recognize that genes are located on chromosomes in the cells of living things.

- Understand that all cells contain genetic information in genes.
- Understand that within cells, specialized structures have particular functions.
- Understand that all living things are made of cells.

Application of the Alternate Achievement Standards

- Engage students in creating cell art projects including chromosomes as one of the cell parts.
- Demonstrate variations between parents and offspring using common pets and their offspring; dogs, cats, rabbits.
- Using small group or partner projects, engage students in compare and contrast activities of sibling offspring of two animal parents.

Levels of Standards

Level 4: Exceeds Standards	Level 3: Meets Standards	Level 2: Developing	Level 1: Emerging
Compare and contrast inherited and learned traits of animal parents and their offspring.	Compare and contrast traits of animal parents and their offspring	Recognize traits of animal parents and their offspring.	Match animal parents and their offspring.
Describe variations between parents and offspring in terms of randomly inherited genes and/or mutations.	Recognize that variations between parents and offspring are the result of randomly inherited genes.	Recognize that parents and offspring do not have the exact same physical traits.	Match animal parents and their offspring
Recognize that genes are located on chromosomes in the cells of living things and carry the information for inherited traits.	Recognize that genes are located on chromosomes in the cells of living things.	Recognize that offspring inherit physical traits of both parents	Match animal parents and their offspring

Grade: 7

Content Area: Science

Strand: Unity and Diversity

General Education Standards

SCI.7.15- Analyze and interpret data for patterns of change in anatomical structures of organisms using the fossil record and the chronological order of fossil appearance in rock layers.

SCI.7.17- Obtain and evaluate pictorial data to compare patterns in the embryological development across multiple species to identify relationships not evident in the adult anatomy.

SCI.7.18- Construct an explanation from evidence that natural selection acting over generations may lead to the predominance of certain traits that support successful survival and reproduction of a population and to the suppression of other traits.

Alternate Achievement Standards

SCI.AAS.7.15- Identify patterns that indicate a change in a species over time.

SCI.AAS.7.17- Compare pictorial data of embryological development in multiple species; identify relationships in embryos of different species that are not evident in the adults of those species.

SCI.AAS.7.18- Recognize that healthy specimens of organisms live longer and reproduce in larger numbers than unhealthy specimens; recognize that natural selection may lead to the successful survival of a population by supporting certain traits and suppressing others.

Essential Elements

Students need to identify patterns that indicate a change in a species over time.

Students need to compare pictorial data of embryo development in multiple species and identify characteristics that are the same across species that are not present in the adults of each species.

Students need to recognize that healthy organisms live longer and reproduce in larger numbers than unhealthy organisms.

Students need to recognize that natural selection may lead to the survival of a population by supporting some traits and suppressing others.

Key Vocabulary

species, embryo, natural selection, survival, suppress

Teaching and Learning Progressions

- Identify relationships in embryos of different species that are not evident in the adults of those species.
- Recognize that comparisons of embryo development across species show similarities that are not evident in adult anatomy.
- Compare pictorial data of embryological development in multiple species.
- Recognize the similarities and differences in embryo development of organisms in the fossil record help connect organisms to each other.
- Identify patterns that indicate a change in a species over time.
- Recognize the similarities and differences in the anatomy of organisms in the fossil record help connect organisms to each other.
- Recognize that the fossil record documents the existence and change of many life forms over Earth's history.
- Recognize that fossils can be compared to one another and living organisms according to their similarities and differences.
- Understand that fossils preserve remains or traces of organisms that lived in the past.
- Understand that new plants and animals are living on Earth today and are different from those long ago.
- Understand that some kinds of plants and animals that once lived on Earth are no longer living.
- Recognize that natural selection may lead to the successful survival of a population by supporting certain traits and suppressing others.
- Understand that natural selection is the process where individuals with particular traits may be more likely than others to survive and produce offspring.
- Recognize that characteristics that allow a species to survive and reproduce will become more common in the population of that species.
- Recognize that healthy specimens of organisms live longer and reproduce in larger numbers than unhealthy specimens.
- Understand that sometimes differences in characteristics between individuals of the same species provide advantages in surviving and reproducing.

Application of the Alternate Achievement Standards

- Use video presentations and animation to demonstrate that living things change over time.
- Use matching activities to identify similarities in embryos of various species.
- Assign small group or partner projects investigating traits that have changed over time for a specific animal.

Levels of Standards

Level 4: Exceeds Standards	Level 3: Meets Standards	Level 2: Developing	Level 1: Emerging
Using fossil records, describe the change in a given species over time.	Identify patterns that indicate a change in a species over time.	Recognize that a species of plants or animals may change over time.	Identify a simple pictorial pattern of a species.
Compare patterns in embryo development across species to identify relationships between those species.	Compare pictorial data of embryo development in multiple species and identify characteristics that are the same across species that are not present in the adults of each species.	Recognize the process of embryo development in a variety of species.	Identify simple stages of life of common animals, including humans.
Describe the relationship between health and survival of organisms.	Recognize that healthy organisms live longer and reproduce in larger numbers than unhealthy organisms.	Distinguish between healthy and unhealthy organisms.	Identify being healthy and sick in oneself.
Given a population, describe traits that help them survive and traits that may not be helpful to the organism over time.	Recognize that natural selection may lead to the survival of a population by supporting some traits and suppressing others.	Recognize that organisms have traits that help them survive.	Identify simple traits of common plants and animals.

Grade: 8

Content Area: Science

Strand: Matter and Its Interactions

General Education Standards

SCI.8.1- Analyze patterns within the periodic table to construct models (e.g., molecular-level models, including drawings; computer representations) that illustrate the structure, composition, and characteristics of atoms and molecules.

SCI.8.2- Plan and carry out investigations to generate evidence supporting the claim that one pure substance can be distinguished from another based on characteristic properties.

SCI.8.3- Construct explanations based on evidence from investigations to differentiate among compounds, mixtures, and solutions.

a. Collect and analyze information to illustrate how synthetic materials (e.g., medicine, food additives, alternative fuels, plastics) are derived from natural resources and how they impact society.

SCI.8.4- Design and conduct an experiment to determine changes in particle motion, temperature, and state of a pure substance when thermal energy is added to or removed from a system.

SCI.8.5- Observe and analyze characteristic properties of substances (e.g., odor, density, solubility, flammability, melting point, boiling point) before and after the substances combine to determine if a chemical reaction has occurred.

SCI.8.7- Design, construct, and test a device (e.g., glow stick, hand warmer, hot or cold pack, thermal wrap) that either releases or absorbs thermal energy by chemical reactions (e.g., dissolving ammonium chloride or calcium chloride in water) and modify the device as needed based on criteria (e.g., amount/concentration, time, temperature).

Alternate Achievement Standards

SCI.AAS.8.1- Identify parts of an atom (i.e. protons, neutrons, electrons); recognize that the periodic table is organized to show patterns of common traits of elements; locate metals and nonmetals on the periodic table.

SCI.AAS.8.2- Identify characteristics that distinguish one pure substance from another (e.g., color, hardness, flammability).

SCI.AAS.8.3- Differentiate between compounds and mixtures.

SCI.AAS.8.3a- Recognize that synthetic materials are made from natural resources; identify a synthetic material and the natural resource from which it is derived.

SCI.AAS.8.4- Recognize that changes in temperature can cause changes in the state of matter of a substance; recognize that these changes are a result of changes in particle motion.

SCI.AAS.8.5- Compare the properties of substances (color, texture, odor, state of matter) before and after chemical changes have occurred

(e.g. burning sugar, burning steel wool, rust, effervescent tablets).

SCI.AAS.8.7- Critique objects or materials used to minimize or maximize thermal energy transfer (e.g., gloves, insulated hot pad, foam cup).

Essential Elements

Students need to identify proton, neutron, and electron in an atom.

Students need to recognize that the periodic table is organized to show patterns of common traits of elements.

Students need to locate metals and nonmetals on the periodic table.

Students need to identify that color, hardness, and flammability are characteristics that distinguish one pure substance from another.

Students need to differentiate between compounds and mixtures.

Students need to identify a synthetic material and the natural resource from which it is derived.

Students need to recognize that synthetic materials are made from natural resources.

Students need to recognize that changes in temperature can cause changes in the particle motion within the matter and therefore change the state of the matter.

Students need to be able to compare the properties (color, texture, odor, state of matter) before and after chemical changes have occurred.

Students need to critique objects or materials used to minimize or maximize thermal energy transfer (e.g., gloves, insulated hot pad, foam cup).

Key Vocabulary

atom, proton, neutron, electron, periodic table, organize, traits, metals, nonmetals, flammability, distinguish, compounds, mixtures, synthetic, natural resources, particle motion, matter, texture, odor, states of matter, critique, minimize, maximize, thermal energy, transfer

Teaching and Learning Progressions

- Identify a synthetic material and the natural resource from which it is derived.
- Recognize that synthetic materials are made from natural resources that can be processed and changed chemically to form a new substance.
- Recognize that there are natural materials and synthetic materials.
- Locate metals and nonmetals on the periodic table.
- Recognize that the periodic table is organized to show patterns of common traits of elements.
- Use physical properties to differentiate between metals and nonmetals.
- Recognize that substances can be classified as metals and nonmetals.

- Compare the properties of substances (color, texture, odor, state of matter) before and after chemical changes have occurred (e.g., burning sugar, burning steel wool, rust, effervescent tablets).
- Recognize that substances reacting chemically result in a chemical change to the original substances.
- Recognize that many substances react chemically with other substances to form new substances.
- Identify characteristics that distinguish one pure substance from another (e.g., color, hardness, flammability).
- Recognize that pure substances have very obvious physical properties (e.g., color, hardness).
- Understand that a pure substance is a substance that is made of only one type of atom or only one type of molecule.
- Recognize that mixtures can usually be separated back into the original substances.
- Recognize that combining two or more elements or substances in a way that no chemical reaction occurs makes a mixture.
- Recognize that substances may be combined with other substances.
- Recognize that compounds cannot usually be separated back into the original elements.
- Recognize that when two or more elements are chemically bonded together, the result is a compound.
- Recognize that elements may be combined with other elements.
- Identify characteristics that distinguish one pure substance from another (e.g., color, hardness, flammability).
- Understand that a pure substance is a substance that is made of only one type of atom or only one type of molecule.
- Recognize that changes of state are a result of changes in particle motion.
- Recognize that changes in temperature can cause changes in the state of matter of a substance.
- Recognize that as atoms/molecules move slower and closer together, a change of state of matter may occur.
- Recognize that a decrease in temperature can cause the atoms or molecules in matter to move slower and closer together.
- Recognize that as atoms/molecules move faster and farther apart, a change of state of matter may occur.
- Recognize that an increase in temperature can cause the atoms or molecules in matter to move faster and farther apart.
- Recognize that matter (solids, gases, and liquids) is made of atoms or molecules.
- Identify the parts of an atom (protons, neutrons, electrons).
- Know that atoms are extremely small and made up of smaller particles.
- Know that matter is made up of basic building blocks called atoms.
- Critique objects or materials used to minimize or maximize thermal energy transfer (e.g., gloves, insulated hot pad, foam cup).
- Recognize a variety of ways that high heat transfer can be minimized.
- Recognize that the transfer of high heat energy can be harmful by causing burns.
- Recognize ways that high heat transfer can be maximized.
- Recognize that transfer of high heat energy can be useful (cooking, baking, ceramics).
- Recognize that when objects come into contact, heat energy from one object can be transferred to change the temperature of another object.

Application of the Alternate Achievement Standards

- Demonstrate man-made materials by having students collect samples of materials and make a collage for display.
- Have students construct charts of common compounds and mixtures in real life and the general education science classroom.
- Using common metals and nonmetals, play “Element Bingo” with a partially completed periodic table.

Levels of Standards

Level 4: Exceeds Standards	Level 3: Meets Standards	Level 2: Developing	Level 1: Emerging
Describe the movement of protons, neutrons, and electrons in an atom.	Identify proton, neutron, and electron in an atom.	Recognize that matter is made up of atoms.	Recognize that objects are made up of a variety of matter.
Given its position on the periodic table, describe an element in terms of the common traits of elements.	Recognize that the periodic table is organized to show patterns of common traits of elements.	Identify common metals and nonmetals.	Recognize common metals.
Differentiate between metals and nonmetals on the periodic table.	Locate metals and nonmetals on the periodic table.	Identify common metals and nonmetals.	Recognize common metals.
Describe common substances using characteristics of color, hardness, and flammability.	Identify that color, hardness, and flammability are characteristics that distinguish one pure substance from another.	Recognize that some materials are pure substances.	Engage with materials that vary in color and hardness.
Differentiate between compounds, mixtures, and solutions.	Differentiate between compounds and mixtures.	Describe a simple mixture.	Engage with mixing substances.
Describe how synthetic	Recognize that synthetic	Describe physical characteristics	Engage with a variety of

materials are made and used in real life.	materials are made from natural resources; identify a synthetic material and the natural resource from which it is derived.	of a variety of materials.	materials.
Compare the states of matter in terms of temperature and particle motion.	Recognize that changes in temperature can cause changes in the particle motion within the matter and therefore change the state of the matter.	Identify the three states of matter.	Identify liquid and solid.
Describe a chemical change using the properties of color, texture, odor, and state of matter.	Compare the properties (color, texture, odor, state of matter) before and after chemical changes have occurred.	Identify color, texture, and odor of substances.	Recognize color and odor of common substances.
Recognize that chemical reactions can absorb or release heat energy.	Critique objects or materials used to minimize or maximize thermal energy transfer.	Recognize that materials can be used to protect against high heat.	Recognize that high heat is harmful to skin.

Grade: 8

Content Area: Science

Strand: Motion and Stability: Forces and Interactions

General Education Standards

SCI.8.8- Use Newton's first law to demonstrate and explain that an object is either at rest or moves at a constant velocity unless acted upon by an external force (e.g., model car on a table remaining at rest until pushed).

SCI.8.9- Use Newton's second law to demonstrate and explain how changes in an object's motion depend on the sum of the external forces on the object and the mass of the object (e.g., billiard balls moving when hit with a cue stick).

SCI.8.10- Use Newton's third law to design a model to demonstrate and explain the resulting motion of two colliding objects (e.g., two cars bumping into each other, a hammer hitting a nail).

SCI.8.11- Plan and carry out investigations to evaluate how various factors (e.g., electric force produced between two charged objects at various positions; magnetic force produced by an electromagnet with varying number of wire turns, varying number or size of dry cells, and varying size of iron core) affect the strength of electric and magnetic forces.

Alternate Achievement Standards

SCI.AAS.8.8- Compare an object at rest and an object in motion; recognize that an object at rest remains at rest if not acted on by an outside force; demonstrate a method to change an object's motion; identify forces that cause an object in motion to slow down or stop moving.

SCI.AAS.8.9- Investigate and identify ways to change the motion of an object (e.g., change an incline's slope, change the mass of the object).

SCI.AAS.8.10- Describe the motion of two colliding objects before and after the collision.

SCI.AAS.8.11- Investigate the effect of distance on the magnetic force of two magnets; use a simple electromagnet to pick up paper clips; investigate the effect of increasing the number of wire turns in the electromagnet on its strength.

Achievement Elements

Students need to compare an object at rest and an object in motion; recognize that an object at rest remains at rest if not acted on by an outside force; demonstrate a method to change an object's motion; and identify forces that cause an object in motion to slow down or stop moving.

Students need to investigate and identify ways to change the motion of an object (e.g., change an incline's slope, change the mass of the object).

Students need to describe the motion of two colliding objects before and after the collision.

Students need to investigate the effect of distance on the magnetic force of two magnets; use a simple electromagnet to pick up paper clips; and investigate the effect of increasing the number of wire turns in the electromagnet on its strength.

Key Vocabulary

motion, propelled, friction, surface, incline, mass, electromagnet

Teaching and Learning Progressions

- Identify forces that cause an object in motion to slow down or stop.
- Recognize that air resistance is a type of friction and opposes movement through the air.
- Identify that when objects are moved or propelled through the air, there is resistance to that movement.
- Understand that friction is a force that can cause objects to slow down.
- Recognize that friction is a force that opposes motion.
- Identify that when objects are pushed or pulled across a surface, there is resistance to that movement.
- Demonstrate a method to change an object's motion.
- Recognize that a force can be applied to change an object's motion.
- Recognize that objects in motion travel in a generally straight path.
- Compare an object at rest and an object in motion.
- Identify objects in motion.
- Recognize that an object at rest remains at rest if not acted on by an outside force.
- Identify objects at rest.

Application of the Alternate Achievement Standards

- Using marbles of the same size that have been rolled in finger paint, trace the paths of two marbles before and after they collide. Create artwork that results from multiple collisions.
- Using marbles of different sizes that have been rolled in finger paint, examine whether mass is a factor in the paths after the two marbles collide.
- Allow students to manipulate two magnets to explore the effects they have on each other, using guided exploration to have them consider distance as a variable.

Levels of Standards

Level 4: Exceeds Standards	Level 3: Meets Standards	Level 2: Developing	Level 1: Emerging
Describe that objects move in a variety of ways (direction, speed).	Compare an object at rest and an object in motion.	Recognize objects that are moving and not moving.	Engage with objects using movement.
Recognize that a moving object will continue to move unless an outside force including friction acts upon it.	Recognize that an object at rest remains at rest if not acted on by an outside force.	Recognize that pushing or pulling can move objects.	Engage with objects using movement.
Compare and contrast the ways mass and incline affect an objects speed.	Identify and demonstrate ways to change an object's motion.	Recognize that objects are moved by an outside action/force.	Engage with objects using movement.
Considering the motion of two objects before they collide, predict their motion after a collision.	Describe the motion of two colliding objects before and after the collision.	Identify two objects colliding.	Engage with objects using movement.
Describe real-life situations that show forces cause objects to slow down or stop moving.	Identify forces that cause an object in motion to slow down or stop moving.	Recognize that moving objects can travel at various speeds and stop.	Push or pull and stop objects in play.
Recognize real-life situations where magnetic force is used.	Investigate the effect of distance on the magnetic force of two magnets.	Recognize that the opposite poles of two magnets are attracted to each other.	Identify a magnet.
Describe how a basic electromagnet works.	Investigate how the strength of an electromagnet is affected when the number of turns in its wire are increased.	Identify an electromagnet and use it to pick up paper clips.	Engage with magnets, including an electromagnet.

Grade: 8

Content Area: Science

Strand: Energy

General Education Standards

SCI.8.13- Create and analyze graphical displays of data to illustrate the relationships of kinetic energy to the mass and speed of an object (e.g., riding a bicycle at different speeds, hitting a table tennis ball versus a golf ball, rolling similar toy cars with different masses down an incline).

SCI.8.16- Apply the law of conservation of energy to develop arguments supporting the claim that when the kinetic energy of an object changes, energy is transferred to or from the object (e.g., bowling ball hitting pins, brakes being applied to a car).

Alternate Achievement Standards

SCI.AAS.8.13- Investigate how the mass of an object affects the speed at which it travels (e.g., toy car traveling down an incline).

SCI.AAS.8.16- Make observations about energy transfers in common everyday occurrences (e.g., bowling ball hitting pins, brakes being applied to a bicycle or car).

Essential Elements

Students need to investigate how the mass of an object affects the speed at which it travels.

Students need to make observations about energy transfers in everyday occurrences.

Key Vocabulary

mass, speed, energy transfer

Teaching and Learning Progressions

- Recognize that a larger force causes a larger change in motion.
- Recognize that the greater the mass of an object, the greater the force needed to achieve the same change in motion.
- Understand that the more mass an object has, the greater potential energy it possesses.
- Understand that the mass of an object is a measure of the amount of matter in the object.

- Understand that mass and weight are comparable.
- Make observations about energy transfers in common everyday occurrences.
- Recognize that when objects come into contact or collide, the motion energy of one object can be transferred to change the motion of the second object.
- Recognize that electric currents can transfer energy from one place to another.
- Recognize that heating/cooling transfers energy from one place to another.

Application of the Alternate Achievement Standards

- Use graphs or data charts to gather information about toy cars of different mass traveling down a ramp and draw a conclusion.
- Demonstrate energy transfer by using pictures or audiovisuals to show what happens after a bowling ball strikes bowling pins.
- Describe the potential and kinetic energy points while shooting a rubber band.

Levels of Standards

Level 4: Exceeds Standards	Level 3: Meets Standards	Level 2: Developing	Level 1: Emerging
Describe how the mass of an object affects the speed at which it travels.	Investigate how the mass of an object affects the speed at which it travels	Use comparative terms to identify the mass of moving objects.	Know <i>heavy, light, heavier, lighter, heaviest, lightest</i> .
Identify common energy transfers in real life.	Make observations about energy transfers in everyday occurrences.	Describe situations that involve energy transfer in real life.	Engage with situations that involve energy transfer in real life.

Grade: 8

Content Area: Science

Strand: Waves and Their Applications in Technologies for Information Transfer

General Education Standards

SCI.8.17- Create and manipulate a model of a simple wave to predict and describe the relationships between wave properties (e.g., frequency, amplitude, wavelength) and energy.

SCI.8.18- Use models to demonstrate how light and sound waves differ in how they are absorbed, reflected, and transmitted through different types of media.

SCI.8.19- Integrate qualitative information to explain that common communication devices (e.g., cellular telephones, radios, remote controls, Wi-Fi components, global positioning systems [GPS], wireless technology components) use electromagnetic waves to encode and transmit information.

Alternate Achievement Standards

SCI.AAS.8.17- Use a model to investigate ways to change the properties of a simple wave (frequency, amplitude, wavelength).

SCI.AAS.8.18- Investigate and describe how light and sound waves travel through a variety of media.

SCI.AAS.8.19- Recognize that common communication devices use electromagnetic waves to transmit information, and that these electromagnetic waves are invisible to the human eye.

Achievement Elements

Students need to investigate ways to change the properties (frequency, amplitude, wavelength) of a simple wave, using models.

Students need to investigate and describe how light and sound waves travel through a variety of media.

Students need to recognize that common communication devices use electromagnetic waves, which are invisible, to transmit information.

Key Vocabulary

frequency, amplitude, wavelength, light waves, sound waves, media/medium, electromagnetic waves, transmit

Teaching and Learning Progressions

- Identify transmitting and receiving devices such as cellular telephones, medical imaging technology, wireless Internet, scanners, and sonar as examples of technology that use light or sound to transmit information.
- Identify different types of waves and the media through which they travel.
- Identify that a medium for sound can be a solid, liquid, or gas.
- Identify that sound waves need a medium to be transmitted.
- Identify that sound can make matter vibrate in a repeating pattern, and vibrating matter can make sound.
- Recognize that light waves can travel through air and through a vacuum.
- Identify that light waves do not need a medium to be transmitted.
- Recognize light as part of the electromagnetic spectrum.
- Recognize models that show that the wavelength, frequency, and amplitude of a wave can be changed.
- Identify that a simple wave has a repeating pattern with a specific frequency, amplitude, and wavelength.
- Identify that waves are a regular pattern of motion.

Application of the Alternate Achievement Standards

- Using a jump rope or piece of clothesline, demonstrate and have students explore creating waves with various amplitudes and wavelengths.
- Demonstrate sound wave transmission by making paper tube “telephones.”
- Have students engage in physics demonstrations and experiments relating to electromagnetic waves in the general education classroom.

Levels of Standards

Level 4: Exceeds Standards	Level 3: Meets Standards	Level 2: Developing	Level 1: Emerging
Describe the result of a change in the frequency, amplitude, or wavelength of a simple sound or light wave.	Investigate ways to change the properties (frequency, amplitude, wavelength) of a simple wave, using models.	Recognize the properties of frequency, amplitude, and wavelength in a simple wave.	Identify a simple wave.
Predict how a light or sound wave will travel through a given	Investigate and describe how light and sound waves travel	Recognize that light and sound waves travel through space and	Recognize that light and sound are waves.

medium.	through a variety of media.	the atmosphere.	
Describe the path of transmission of information electromagnetically in using a cell phone.	Recognize that common communication devices use electromagnetic waves (which are invisible) to transmit information.	Identify common communication devices that transmit information.	Identify a cell phone as a communication device.

Grade: 9

Content Area: Physical Science

Strand: Matter and Its Interactions

General Education Standards

SCI.PS.HS.1- Use the periodic table as a model to predict the relative properties and trends (e.g., reactivity of metals; types of bonds formed, including ionic, covalent, and polar covalent; numbers of bonds formed; reactions with oxygen) of main group elements based on the patterns of valence electrons in atoms.

SCI.PS.HS.2- Plan and carry out investigations (e.g., squeezing a balloon, placing a balloon on ice) to identify the relationships that exist among the pressure, volume, density, and temperature of a confined gas.

SCI.PS.HS.3- Analyze and interpret data from a simple chemical reaction or combustion reaction involving main group elements.

SCI.PS.HS.4- Analyze and interpret data using acid-base indicators (e.g., color-changing markers, pH paper) to distinguish between acids and bases, including comparisons between strong and weak acids and bases.

Alternate Achievement Standards

SCI.AAS.PS.HS.1- Using physical properties differentiate between metals and nonmetals.

SCI.AAS.PS.HS.2- Recognize that temperature affects pressure and volume of a confined gas (e.g. placing a balloon on ice, reduced tire pressure on a cold day).

SCI.AAS.PS.HS.3- Differentiate between reactants and products in a simple chemical reaction.

SCI.AAS.PS.HS.4- Identify common acids and bases and their uses.

Achievement Elements

Students need to differentiate between metals and nonmetals, using physical properties.

Students need to recognize that temperature affects pressure and volume of a confined gas.

Students need to differentiate between reactants and products in a simple chemical reaction.

Students need to identify common acids and bases and their uses.

Key Vocabulary

acid, base, pressure, volume, reactant, product

Teaching and Learning Progressions

- Using physical properties, differentiate between metals and nonmetals.
- Identify physical properties of nonmetals: brittle, dull sound when hit with a hammer, poor conductors of electricity, poor conductors of heat, low density.
- Identify physical properties of metals: strong, produce a deep or ringing sound when hit with a hammer, good conductors of electricity, good conductors of heat, shiny when polished, high density.
- Recognize that substances can be classified as metals and nonmetals.
- Recognize that temperature affects pressure and volume of a confined gas (e.g., placing a balloon on ice, reduced tire pressure on a cold day).
- Recognize that if a gas is confined, as the limit of elasticity is reached the pressure inside the confined area will increase.
- Recognize that if a gas is confined, the molecules or atoms will attempt to move apart and push against the boundary in which it is confined.
- Recognize that as temperature increases, the rate of movement of the molecules or atoms increases and they move apart.
- Recognize that increases in temperature can cause a change of state in matter from liquid to gas.
- Recognize that gases and liquids are made of molecules or atoms that are moving about.
- Differentiate between reactants and products in a simple chemical reaction.
- Understand that the product(s) of a chemical reaction have different properties than those of the reactants.
- Recognize that the new substance(s) in chemical reactions are called the product(s).
- Recognize that the original substances in chemical reactions are called reactants.
- Recognize in a chemical process the atoms of the original substances are regrouped and combined into different molecules.
- Recognize that many substances react chemically with other substances to form new substances.
- Recognize when two or more substances are mixed, a new substance may be formed depending on the substances and the temperature.
- Know that some changes are reversible and some are not.
- Know that heating or cooling a substance may cause changes that can be observed.
- Identify common acids and bases and their uses.
- Identify the uses of common household bases.
- Identify common household products that contain bases: ammonia, drain cleaner, baking soda, chalk, toothpaste, bleach, detergent, shampoo, egg white.
- Identify bases that produce hydroxide ions in water solutions.
- Recognize that a base in a water solution is slippery to the touch and tastes bitter.

- Recognize that a base in a water solution changes red litmus paper to blue.
- Identify the uses of acids found in common food stuffs and household acids.
- Identify acids found in common food stuffs and household products: vinegar, lemon juice, apples, pineapples, and batteries.
- Identify an acid as a substance that releases a positively charged hydrogen ion when in a water solution.
- Recognize that an acid in a water solution tastes sour.
- Recognize that an acid in a water solution turns blue litmus paper to red.
- Recognize that an acid in a water solution reacts with metals.

Application of the Alternate Achievement Standards

- Demonstrate metals and nonmetals by using magnets.
- Demonstrate the effect of temperature on pressure and volume by blowing up balloons, recording the circumferences of the balloons, placing them in a freezer, and then recording the new circumferences of the balloons.
- Demonstrate simple chemical reactions using household reactants. Direct student attention to chemical reactions in the general education classroom.

Levels of Standards

Level 4: Exceeds Standards	Level 3: Meets Standards	Level 2: Developing	Level 1: Emerging
Describe metals and nonmetals, using physical properties.	Differentiate between metals and nonmetals, using physical properties.	Identify metals and nonmetals.	Sort common metals and nonmetals.
Describe the effect of a temperature change on a confined gas.	Recognize that temperature affects pressure and volume of a confined gas.	Recognize that heat can cause the expansion of a confined gas and that cooling can cause the contraction of a confined gas.	Recognize steam as the gaseous state of water.
Recognize that the mass of the reactants in a simple chemical reaction are the same as the mass of the product.	Differentiate between reactants and products in a simple chemical reaction.	Recognize that when two substances are combined, a reaction may take place.	Recognize a mixture.
Describe common acids and bases and their uses.	Identify common acids and bases and their uses.	Identify at least two common acids and bases found in household products.	Identify substances as solid or liquid.

Grade: 9

Content Area: Physical Science

Strand: Motion and Stability: Forces and Interactions

General Education Standards

SCI.PS.HS.8- Apply Newton's laws to predict the resulting motion of a system by constructing force diagrams that identify the external forces acting on the system, including friction (e.g., a book on a table, an object being pushed across a floor, an accelerating car).

SCI.PS.HS.10- Construct simple series and parallel circuits containing resistors and batteries and apply Ohm's law to solve typical problems demonstrating the effect of changing values of resistors and voltages.

Alternate Achievement Standards

SCI.AAS.PS.HS.8- Predict the resulting motion of a system after applying external forces on the system, including friction (e.g. book on a table, an object being pushed across a floor, an accelerating car).

SCI.AAS.PS.HS.10- Using an illustration, identify the differences between a simple series circuit and a parallel circuit.

Essential Elements

Students need to predict the result of external forces, including friction, acting on a system/object.

Students need to identify the differences between a simple series circuit and a parallel circuit using an illustration.

Key Vocabulary

external, series circuit, parallel circuit

Teaching and Learning Progressions

- Predict the resulting motion of a system after applying external forces on the system, including friction (e.g. book on a table, an object being pushed across a floor, an accelerating car).
- Recognize that a greater force will result in a greater change when applied.
- Recognize that the greater the mass of the object, the greater the force required to achieve the same change in motion.
- Recognize that external force applied to an object will change the motion, orientation, or shape of the object.

- Recognize that forces on a moving object can change the object's speed and direction.
- Recognize that an object sliding on a surface experiences a pull due to friction on the object because of the surface opposes the object's motion.
- Recognize that pushes and pulls on an object can change the speed and direction of its motion, or start and stop it.
- Using an illustration, identify the differences between a simple series circuit and a parallel circuit.
- Recognize differences in the features and benefits of series and parallel circuits.
- Investigate simple circuits in series and in parallel.
- Recognize an open/closed circuit.
- Recognize a conductor of electricity and an insulator of electricity.
- Recognize a battery as a chemical generator of electricity.

Application of the Alternate Achievement Standards

- Partner with general education students to build a simple series circuit and parallel circuit in the general education classroom.
- Have students explore the force needed to overcome friction by moving the same object across a variety of surfaces (sand paper, foil, fabric, oiled paper, etc.).
- Have students explore the forces needed to overcome friction by moving a variety of objects across the same surface.

Levels of Standards

Level 4: Exceeds Standards	Level 3: Meets Standards	Level 2: Developing	Level 1: Emerging
Using arrows to identify forces applied to a moving object, diagram the result of external forces acting on an object before and, as it is moving.	Predict the result of external forces, including friction, acting on a system/object.	Recognize that an external force is needed to move a stationary object.	Recognize that objects move when pushed or pulled.
Construct a simple series circuit and a simple parallel circuit.	Identify the differences between a simple series circuit and a parallel circuit when given an illustration.	Identify a simple series circuit in a diagram.	Engage with activities involving completing a simple series circuit.

Grade: 9

Content Area: Physical Science

Strand: Energy

General Education Standards

SCI.PS.HS.11- Design and conduct investigations to verify the law of conservation of energy, including transformations of potential energy, kinetic energy, thermal energy, and the effect of any work performed on or by the system.

Alternate Achievement Standards

SCI.AAS.PS.HS.11- Identify the transformation of potential energy to kinetic energy as an object moves.

Achievement Elements

Students need to identify the transformation of potential energy to kinetic energy as a given object moves.

Key Vocabulary

potential energy, kinetic energy, transformation

Teaching and Learning Progressions

- Identify the transformation of potential energy to kinetic energy as a given object moves.
- Identify kinetic and potential energy in objects that are not moving, being moved by an external force (being lifted), or moving.
- Know that the potential energy of an object can be changed into kinetic energy when the object moves.
- Know that kinetic energy is energy that results from an objects motion.
- Know that objects have potential energy as the result of work that is done (a person lifting an object off of the ground) or by virtue of their position (sitting at the top of a ramp).
- Know that potential energy is the energy stored in an object.
- Recognize that the faster an object is moving; the more energy it possesses.
- Recognize that sound, light, electric currents or moving objects can move energy from place to place.
- Identify that there are many different types of energy.

Application of the Alternate Achievement Standards

- Demonstrate potential and kinetic energy using a rolling object (cart, grocery cart, basketball, etc.)
- Demonstrate the change from potential to kinetic to potential to kinetic to potential energy by throwing a tennis ball into the air and catching it.
- Challenge students to track the energy transformations of a common classroom/school object during the day.

Levels of Standards

Level 4: Exceeds Standards	Level 3: Meets Standards	Level 2: Developing	Level 1: Emerging
Describe the points of potential energy and transformation to kinetic energy in the path of a moving object such as a bouncing ball.	Identify the transformation of potential energy to kinetic energy as a given object moves.	Differentiate between potential and kinetic energy in a still and moving object.	Know that objects contain energy.

Grade: 9

Content Area: Physical Science

Strand: Waves and their Applications in Technologies for Information Transfer

General Education Standards

SCI.PS.HS.13- Use mathematical representations to demonstrate the relationships among wavelength, frequency, and speed of waves (e.g., the relation $v = \lambda f$) traveling in various media (e.g., electromagnetic radiation traveling in a vacuum and glass, sound waves traveling through air and water, seismic waves traveling through Earth).

SCI.PS.HS.15- Obtain and communicate information from published materials to explain how transmitting and receiving devices (e.g., cellular telephones, medical- imaging technology, solar cells, wireless Internet, scanners, **Sound Navigation and Ranging [SONAR]**) use the principles of wave behavior and wave interactions with matter to transmit and capture information and energy.

Alternate Achievement Standards

SCI.AAS.PS.HS.13- Identify different types of waves and the media through which they travel (sound waves traveling through air and water, seismic waves traveling through Earth).

SCI.AAS.PS.HS.15- Identify common devices that use light or sound waves to transmit information.

Achievement Elements

Students need to identify waves and the media through which they travel.

Students need to identify common devices that use light or sound waves to transmit information.

Key Vocabulary

waves, sound, light, seismic, transmit

Teaching and Learning Progressions

- Identify transmitting and receiving devices such as cellular telephones, medical imaging technology, wireless Internet, scanners, and sonar as examples of technology that use light or sound to transmit information.
- Identify different types of waves and the media through which they travel.

- Identify that geologists study seismic waves to investigate deep in the planet.
- Recognize that earthquakes cause waves of motion in Earth’s crust (seismic waves).
- Identify that a medium for sound can be a solid, liquid, or gas.
- Identify that sound waves need a medium to be transmitted.
- Identify that sound can make matter vibrate in a repeating pattern, and vibrating matter can make sound.
- Recognize that light waves can travel through air and through a vacuum.
- Identify that light waves do not need a medium to be transmitted.
- Recognize light as part of the electromagnetic spectrum.
- Identify that a simple wave has a repeating pattern with a specific wavelength, frequency, and amplitude.
- Identify that waves are a regular pattern of motion.

Application of the Alternate Achievement Standards

- Create Venn diagrams to compare and contrast waves and the media through which they travel.
- Have students create an art project depicting common ways that light or sound are used to transmit information.
- Demonstrate light and sound being used to transmit information through interacting with presentations in the general education science/physics classroom.

Levels of Standards

Level 4: Exceeds Standards	Level 3: Meets Standards	Level 2: Developing	Level 1: Emerging
Compare light and sound waves in terms of frequency and wavelength.	Identify waves (sound, light, seismic) and the media through which they travel.	Identify sound and light waves and the media through which they travel.	Identify sound and light waves.
Construct a model explaining the path of information from one cell phone to another.	Identify common devices that use light or sound waves to transmit information.	Identify cell telephones and solar cells as common devices that transmit information via waves.	Recognize that cell phones transmit information.

Grade: 10

Content Area: Biology

Strand: From Molecules to Organisms: Structures and Processes

General Education Standards

SCI.B.HS.2- Obtain, evaluate, and communicate information to describe the function and diversity of organelles and structures in various types of cells (e.g., muscle cells having a large amount of mitochondria, plasmids in bacteria, chloroplasts in plant cells).

SCI.B.HS.3- Formulate an evidence-based explanation regarding how the composition of deoxyribonucleic acid (DNA) determines the structural organization of proteins.

- a. Obtain and evaluate experiments of major scientists and communicate their contributions to the development of the structure of DNA and to the development of the central dogma of molecular biology.
- b. Obtain, evaluate, and communicate information that explains how advancements in genetic technology (e.g., Human Genome Project, **Encyclopedia of DNA Elements** [ENCODE] project, 1000 Genomes Project) have contributed to the understanding as to how a genetic change at the DNA level may affect proteins and, in turn, influence the appearance of traits.
- c. Obtain information to identify errors that occur during DNA replication (e.g., deletion, insertion, translocation, substitution, inversion, frame-shift, point mutations).

SCI.B.HS.4- Develop and use models to explain the role of the cell cycle during growth and maintenance in multicellular organisms (e.g., normal growth and/or uncontrolled growth resulting in tumors).

SCI.B.HS.5- Plan and carry out investigations to explain feedback mechanisms (e.g., sweating and shivering) and cellular processes (e.g., active and passive transport) that maintain homeostasis.

- a. Plan and carry out investigations to explain how the unique properties of water (e.g., polarity, cohesion, adhesion) are vital to maintaining homeostasis in organisms.

SCI.B.HS.6- Analyze and interpret data from investigations to explain the role of products and reactants of photosynthesis and cellular respiration in the cycling of matter and the flow of energy.

- a. Plan and carry out investigations to explain the interactions among pigments, absorption of light, and reflection of light.

Alternate Achievement Standards

SCI.AAS.B.HS.2- Recognize organelles (e.g., mitochondria, ribosomes, chloroplasts) and their functions within plant and animal cells.

SCI.AAS.B.HS.3- Recognize the structure of DNA, which determines the characteristics of living organisms.

SCI.AAS.B.HS.4- Use a model to illustrate how growth occurs when cells multiply and recognize that uncontrolled growth can lead to

the development of tumors (e.g. cancer).

SCI.AAS.B.HS.5- Recognize feedback mechanisms (e.g. sweating and shivering) that maintain homeostasis.

SCI.AAS.B.HS.6- Recognize the components necessary for plants to produce their own food and oxygen (e.g., water, sunlight, carbon dioxide).

Achievement Elements

Students need to recognize organelles and their function within plant and animal cells.

Students need to be able to recognize the structure of DNA.

Students need to be able to use a model to illustrate how growth occurs when cells multiply and show that uncontrolled growth can lead to the development of tumors.

Students need to recognize the feedback mechanisms of sweating and shivering in maintaining homeostasis.

Students need to recognize the components necessary for plants to produce their own food and oxygen.

Key Vocabulary

organelles, DNA, uncontrolled, tumor, feedback, sweating, shivering, homeostasis, components

Teaching and Learning Progressions

- Recognize mitochondria, ribosomes, chloroplasts, and their function within plant and animal cells.
- Recognize the function of mitochondria in plant and animal cells.
- Identify mitochondria in a plant and an animal cell.
- Recognize the function of the cell wall and chloroplasts in a plant cell.
- Identify the cell wall and chloroplasts of a plant cell.
- Recognize the function of the nucleus and cell membrane of a cell.
- Identify the nucleus and cell membrane of a cell, using a drawing.
- Recognize a drawing of a plant or an animal cell.
- Recognize that living things are made up of cells.
- Recognize the structure of DNA, which determines the characteristics of living organisms.
- Recognize that DNA molecules are long chains of protein sequences that code genetic information.
- Recognize that DNA has a distinctive double-helix shape.
- Understand that a cell makes a protein molecule (DNA).
- Understand that the function of a protein depends on its shape.

- Understand that a cell makes proteins to carry out the work it does.
- Recognize that uncontrolled growth can lead to the development of tumors (e.g., cancer).
- Recognize that environmental factors within a cell may change the way it divides.
- Use a model to illustrate how growth occurs when cells multiply.
- Understand that many cell divisions produce many cells that are identical to the original cell.
- Understand that cell division (mitosis) is the process of a cell dividing in two.
- Understand that living things develop and grow by cells dividing and multiplying.
- Understand that all living things are made of cells.
- Recognize feedback mechanisms (e.g., sweating and shivering) that maintain homeostasis.
- Recognize that cooling is achieved when sweat evaporates from the surface of the skin.
- Recognize sweating as the response of sweat glands to a message from the brain that the body is too warm.
- Recognize that the automatic response to a high core temperature is a reflex called *sweating*.
- Understand why the human body may become hot and its core temperature may become higher than normal (fever, working out).
- Recognize that the movement in skeletal muscles creates warmth from using energy.
- Recognize shivering as skeletal muscles beginning to shake in small movements.
- Recognize that the automatic response to a low core temperature is a reflex called *shivering*.
- Understand that the body may become cold and its core temperature may become lower than normal.
- Know that homeostasis is the state of a stable and relatively constant internal environment.
- Recognize that the body tries to maintain a stable and relatively constant internal environment (e.g., temperature, glucose level).
- Recognize that sense receptors respond to different input and transmit them as signals that travel across nerve cells to the brain.
- Recognize that some responses to information are automatic (instinctive) so people do not have to think about how to respond.
- Understand that animals have body parts that sense and send to the brain different kinds of information needed for growth and survival.
- Understand that plants obtain their material for growth mainly from air and water.
- Understand that plants need minerals and light to live and grow.
- Understand that plants need water and light to live and grow.

Application of the Alternate Achievement Standards

- Demonstrate feedback mechanisms through short stories or acting out situations where sweating and shivering occur.
- Have students participate in experiments that limit one component of plants producing their own food and recording their results over time.
- Use video or computer simulations to demonstrate growth through normal cell division and uncontrolled growth.

Levels of Standards

Level 4: Exceeds Standards	Level 3: Meets Standards	Level 2: Developing	Level 1: Emerging
Describe the interrelationship of at least two organelles in a plant or an animal cell.	Recognize organelles and their function within plant and animal cells (mitochondria, ribosomes, chloroplasts).	Recognize a mitochondria and its function within a cell.	Recognize cell parts.
Describe the role of DNA in inheritance.	Recognize the structure of DNA.	Identify that chromosomes/ genes carry information about inherited traits.	Recognize that parents and their offspring share some physical traits.
Describe the cell cycle in normal cell growth.	Use a model to illustrate how growth occurs when cells multiply and show that uncontrolled growth can lead to the development of tumors.	Identify that cells grow and multiply as an organism matures.	Recognize that cells are the basic unit of living things.
Recognize the role of water in maintaining homeostasis.	Recognize the feedback mechanisms of sweating and shivering in maintaining homeostasis.	Identify sweating and shivering as helping the body to cool off or get warm.	Match sweating with being hot and shivering with being cold.
Describe the relationship between photosynthesis and cellular respiration.	Recognize the components necessary for plants to produce	Recognize that plants produce their own food for energy.	Recognize that plants grow.

	their own food and oxygen.		
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Grade: 10

Content Area: Biology

Strand: Ecosystems: Interactions, Energy, and Dynamics

General Education Standards

SCI.B.HS.7- Develop and use models to illustrate examples of ecological hierarchy levels, including biosphere, biome, ecosystem, community, population, and organism.

SCI.B.HS.8- Develop and use models to describe the cycling of matter (e.g., carbon, nitrogen, water) and flow of energy (e.g., food chains, food webs, biomass pyramids, ten percent law) between abiotic and biotic factors in ecosystems.

SCI.B.HS.9- Use mathematical comparisons and visual representations to support or refute explanations of factors that affect population growth (e.g., exponential, linear, logistic).

Alternate Achievement Standards

SCI.AAS.B.HS.7- Use models to recognize an organism, a population, and an ecosystem.

SCI.AAS.B.HS.8- Identify living and nonliving components in an ecosystem; identify the flow of energy within a common food chain.

SCI.AAS.B.HS.9--Recognize the relationship between population size and available resources for food and shelter from a graphical representation.

Essential Elements

Students need to be able to use models to recognize an organism, a population, and an ecosystem.

Students need to be able to identify living and nonliving components in an ecosystem and identify the flow of energy within a common food chain.

Students need to be able to recognize the relationship between population size and available resources for food and shelter from a graphical representation.

Key Vocabulary

organism, population, ecosystem, food chain, population, resources

Teaching and Learning Progressions

- Use models to recognize an organism, a population, and an ecosystem.
- Identify living and nonliving components in an ecosystem.
- Understand an ecosystem as a community of interacting organisms and their physical environment in an area.
- Understand a population as a group of plants or animals that live in an area.
- Understand an organism as an individual plant or animal.
- Identify the flow of energy within a common food chain.
- Understand that energy is passed along to consumers in a food chain, although some is lost to the environment along the way.
- Recognize that a food chain is composed of a series of plants and animals that depend on each other as a source of food.
- Understand that all living things depend on energy in order to live.
- Recognize the relationship between population size and available resources for food and shelter from a graphical representation.
- Recognize how population size is represented in a graph.
- Recognize how available food and shelter are represented in a graph.
- Understand that a graph represents numerical information.
- Recognize ways that available shelter can influence population size.
- Recognize ways that available food can influence population size.
- Identify resources for shelter in an ecosystem for a given organism.
- Identify resources for food in an ecosystem for a given organism.
- Understand that population size is the total number of a given organism within an area.

Application of the Alternate Achievement Standards

- Have students create and present models of a chosen ecosystem, including living and nonliving things and how they interact.
- Use colored beads representing each generation to illustrate population growth of a species within an ecosystem.
- Construct models of ecological hierarchy, beginning with a common organism.

Levels of Standards

Level 4: Exceeds Standards	Level 3: Meets Standards	Level 2: Developing	Level 1: Emerging
Describe an organism, a population, and an ecosystem.	Recognize an organism, a population, and an ecosystem.	Recognize an ecosystem.	Identify that a group of the same organism is a population.
Describe how living and nonliving components in an ecosystem interact.	Identify living and nonliving components in an ecosystem.	Identify an ecosystem.	Identify living and nonliving things.
Construct a model of a water cycle or energy cycle (food chain or food web).	Identify the flow of energy within a common food chain.	Identify a missing component in a given food chain.	Recognize a food chain.
Determine if population growth is exponential or linear.	Recognize the relationship between population size and available resources for food and shelter from a graphical representation.	Identify the population growth of an organism using a model.	Recognize a factor that affects population growth.

Grade: 10

Content Area: Biology

Strand: Heredity: Inheritance and Variation of Traits

General Education Standards

SCI.B.HS.11- Analyze and interpret data collected from probability calculations to explain the variation of expressed traits within a population.

- a. Use mathematics and computation to predict phenotypic and genotypic ratios and percentages by constructing Punnett squares, including using both homozygous and heterozygous allele pairs.
- b. Develop and use models to demonstrate codominance, incomplete dominance, and Mendel's laws of segregation and independent assortment.
- c. Analyze and interpret data (e.g., pedigree charts, family and population studies) regarding Mendelian and complex genetic disorders (e.g., sickle-cell anemia, cystic fibrosis, type 2 diabetes) to determine patterns of genetic inheritance and disease risks from both genetic and environmental factors.

Alternate Achievement Standards

SCI.AAS.B.HS.11- Recognize that parents and offspring may have different traits.

Essential Elements

Students need to recognize that parents and offspring may have different traits.

Key Vocabulary

offspring, traits

Teaching and Learning Progressions

- Recognize that parents and offspring may have different traits.
- Recognize that parents and offspring may have common traits but are not identical.
- Identify traits that can be inherited from parent plants/animals.
- Recognize that offspring inherit physical characteristics from both of their biological parents.

- Understand traits as characteristics that are inherited from parents in both plants and animals.
- Understand that the term “parent” is used in both plants and animals.

Application of the Alternate Achievement Standards

- Demonstrate differences in parents and offspring in animals by visiting local farms, a zoo, or other animal exhibit where there are parents and offspring. Have students use cameras to record their observations and then compare the results.
- Explore differences in generations of flowering plants, using pictures of generations of flowers.

Levels of Standards

Level 4: Exceeds Standards	Level 3: Meets Standards	Level 2: Developing	Level 1: Emerging
Recognize that variations between parents and offspring are the result of randomly inherited genes.	Recognize that parents and offspring may have different traits.	Recognize common physical traits of humans.	Differentiate between humans and other species using physical traits.

Grade: 10

Content Area: Biology

Strand: Unity and Diversity

General Education Standards

SCI.B.HS.13- Obtain, evaluate, and communicate information to explain how organisms are classified by physical characteristics, organized into levels of taxonomy, and identified by binomial nomenclature (e.g., taxonomic classification, dichotomous keys).

- a. Engage in argument to justify the grouping of viruses in a category separate from living things

SCI.B.HS.16- Analyze scientific evidence (e.g., DNA, fossil records, cladograms, biogeography) to support hypotheses of common ancestry and biological evolution.

Alternate Achievement Standards

SCI.AAS.B.HS.13- Classify organisms into similar groups based on physical characteristics.

SCI.AAS.B.HS.16- Using fossil evidence, recognize that humans have changed in appearance over a very long period of time.

Essential Elements

Students need to be able to classify organisms into groups based on physical characteristics.

Students need to use fossil evidence to recognize that humans have changed over time.

Key Vocabulary

classification, physical characteristics, fossil evidence

Teaching and Learning Progressions

- Classify organisms into similar groups based on physical characteristics.
- Recognize physical characteristics or organisms that are the same/different (e.g., shape of ears, number of toes, type of body hair/fur).
- Sort a group of objects or organisms into two groups based on a given characteristic (e.g., color, shape).
- Identify physical characteristics in objects and organisms.
- Understand that physical characteristics are features of an object or organism that can be seen.

- Use fossil evidence to recognize that humans have changed in appearance over a very long period of time.
- Recognize pictures/drawings of fossils of humans.
- Recognize pictures/drawings of fossils of various organisms.
- Understand that fossils take a very long time to form.
- Understand that fossils are the remains or impressions of organisms preserved in rock.

Application of the Alternate Achievement Standards

- Demonstrate that humans have changed over a very long time by constructing a timeline of human development, using fossil evidence.
- Use animal picture cards to have students sort animals into similar groups based on physical characteristics.
- Have students create art that illustrates the variety among one species.

Levels of Standards

Level 4: Exceeds Standards	Level 3: Meets Standards	Level 2: Developing	Level 1: Emerging
Use a dichotomous key to classify a group of 10 organisms.	Classify organisms into groups based on physical characteristics.	Sort organisms into at least three groups based on two physical characteristics.	Sort pictures of people and objects into living and nonliving groups.
Using fossil evidence, describe ways that humans have changed over time.	Use fossil evidence to recognize that humans have changed over time.	Identify human fossils.	Recognize a fossil.

Grade: 11

Content Area: Earth and Space Science

Strand: Earth's Place in the Universe

General Education Standards

SCI.ESS.HS.1- Develop and use models to illustrate the lifespan of the sun, including energy released during nuclear fusion that eventually reaches Earth through radiation.

SCI.ESS.HS.4- Apply mathematics and computational thinking in reference to Kepler's laws, Newton's laws of motion, and Newton's gravitational laws to predict the orbital motion of natural and man-made objects in the solar system.

SCI.ESS.HS.5- Use mathematics to explain the relationship of the seasons to the tilt of Earth's axis (e.g., zenith angle, solar angle, surface area) and its revolution about the sun, addressing intensity and distribution of sunlight on Earth's surface.

Alternate Achievement Standards

SCI.AAS.ESS.HS.1- Describe observable effects of the sun on Earth, such as changes in light and temperature.

SCI.AAS.ESS.HS.4- Identify the main components of the solar system; recognize that planets move in orbits.

SCI.AAS.ESS.HS.5- Use a model of the Earth and the sun to recognize how Earth's tilt and orbit around the sun corresponds with the four seasons.

Achievement Elements

Students need to be able to describe the effects of the sun on the Earth.

Students need to be able to identify the main components of the solar system and recognize that planets move in orbits.

Using a model, students need to be able to connect the tilt of the Earth and its orbit to the four seasons.

Key Vocabulary

planets, orbits, solar system

Teaching and Learning Progressions

- Describe observable effects of the sun on the Earth, such as changes in light and temperature.
- Identify that when materials on the surface of the Earth absorb energy from the sun, the surface will warm.
- Identify that energy from the sun can be absorbed by materials on Earth.
- Identify that energy from the sun can be transmitted through the atmosphere or reflected by things in the atmosphere.
- Identify that the sun gives off light and heat energy.
- Recognize that asteroids and comets orbit the sun but may have unusual orbits.
- Recognize that other planets move in orbits around the sun.
- Recognize that there are comets and asteroids in the solar system.
- Recognize that there are other planets in the solar system.
- When observing models of the movement of Earth (rotation and revolution around the sun), identify seasons as Earth orbits the sun, for a given location on the Earth.
- Recognize that the Earth rotates on its axis.
- Recognize that the moon moves around the Earth in an orbit.
- Recognize that the Earth moves around the sun in an orbit.
- Identify that the sun is at the center of our solar system.
- Recognize that the Earth is part of a solar system.
- Identify that the Earth has a moon.
- Identify that the Earth is a planet.

Application of the Alternate Achievement Standards

- Demonstrate the revolution and rotation of the Earth using models, video presentations, or simulations.
- Compose short stories, poems, or songs about how the sun affects the Earth.
- Create art projects that illustrate the main components of the solar system.

Levels of Standards

Level 4: Exceeds Standards	Level 3: Meets Standards	Level 2: Developing	Level 1: Emerging
Recognize that the sun creates energy through nuclear fusion.	Describe observable effects of the sun on the Earth, such as changes in light and temperature.	Recognize that the Earth rotates on an axis and revolves around the sun.	Identify that the sun provides light and heat to the Earth.
Predict the orbital motion of natural and man-made objects in the solar system.	Identify the main components of the solar system and recognize that planets move in orbits.	Identify the sun, the Earth, and moon as parts of the solar system.	Identify the sun, the Earth, and moon.
Describe the distribution of light on the Earth's surface.	Use a model of the Earth and the sun to recognize how the Earth's tilt and orbit around the sun corresponds with the four seasons.	Recognize that the Earth revolves around the sun and the Earth rotates on an axis that is tilted.	Recognize that the Earth rotates on its axis.

Grade: 11

Content Area: Earth and Space Science

Strand: Earth Systems

General Education Standards

SCI.ESS.HS.11- Obtain and communicate information about significant geologic characteristics (e.g., types of rocks and geologic ages, earthquake zones, sinkholes, caves, abundant fossil fauna, mineral and energy resources) that impact life in Alabama and the southeastern United States.

SCI.ESS.HS.12- Develop a model of Earth's layers using available evidence to explain the role of thermal convection in the movement of Earth's materials (e.g., seismic waves, movement of tectonic plates).

SCI.ESS.HS.15- Obtain, evaluate, and communicate information to verify that weather (e.g., temperature, relative humidity, air pressure, dew point, adiabatic cooling, condensation, precipitation, winds, ocean currents, barometric pressure, wind velocity) is influenced by energy transfer within and among the atmosphere, lithosphere, biosphere, and hydrosphere.

- a. Analyze patterns in weather data to predict various systems, including fronts and severe storms.
- b. Use maps and other visualizations to analyze large data sets that illustrate the frequency, magnitude, and resulting damage from severe weather events in order to predict the likelihood and severity of future events.

Alternate Achievement Standards

SCI.AAS.ESS.HS.11- Identify significant geologic characteristics of Alabama and the southeastern United States (e.g., types of rocks, mineral and energy resources).

SCI.AAS.ESS.HS.12- Using a model, identify Earth's layers.

SCI.AAS.ESS.HS.15--Identify weather conditions, including temperature, wind speed, humidity, and severe weather events (e.g. tornadoes, hurricanes, floods).

Essential Elements

Students need to identify geologic characteristics of Alabama and the southeastern United States.

Using models, students need to identify Earth's layers.

Students need to be able to identify weather conditions (temperature, wind speed, humidity) and severe weather events.

Key Vocabulary

geology, rocks, minerals, resources, Earth's core, mantle, temperature, wind speed, humidity, tornadoes, hurricanes, floods

Teaching and Learning Progressions

- Identify geologic characteristics (types of rock, minerals, energy resources) of Alabama and the southeastern United States.
- Know common minerals found in Alabama and the southeastern United States.
- Know basic rock types found in Alabama and the southeastern United States.
- Recognize that geologic formations are made of different types of rocks and minerals.
- Recognize geologic formations familiar to Alabama and the southeastern United States.
- Understand geologic characteristics include any physical feature of Earth's surface.
- Using a model, identify Earth's layers.
- Using a model, recognize and identify that Earth's middle layer is the mantle (mantle and upper mantle).
- Using a model, recognize and identify that Earth's innermost layer is the core (inner and outer).
- Recognize that Earth is composed of various layers underneath the crust.
- Identify the surface of Earth as the crust.
- Identify characteristics of the surface of Earth.
- Recognize that Earth is a sphere.
- Identify severe weather events.
- Recognize severe thunderstorms, tornadoes, and hurricanes as severe weather events.
- Identify weather conditions (temperature, wind speed, humidity).
- Understand that humidity is the amount of water vapor in the air.
- Equate the gaseous state of water with water vapor.
- Understand that water can be solid, liquid, or gas.
- Understand that wind speed is a factor in weather and can be measured.
- Understand weather as the day-to-day temperature and precipitation activity.

Application of the Alternate Achievement Standards

- Demonstrate the variety of geologic characteristics of Alabama and the southeastern United States by placing rock and mineral samples on corresponding locations on a large map.
- Using a solid foam ball, have students model a solid Earth with a cut-out illustrating the layers of Earth.
- Demonstrate humidity by creating various small, enclosed environments with a variety of amounts of water.

Levels of Standards

Level 4: Exceeds Standards	Level 3: Meets Standards	Level 2: Developing	Level 1: Emerging
Describe how geologic characteristics impact life in Alabama and the southeastern United States.	Identify geologic characteristics (types of rock, minerals, energy resources) of Alabama and the southeastern United States.	Recognize types of rocks and energy resources in Alabama.	Recognize geologic formations in Alabama.
Describe Earth's layers in composition and temperature.	Identify Earth's layers, using models.	Recognize that Earth is composed of layers.	Recognize the shape and form of Earth.
Describe and compare weather conditions relative to temperature, wind speed, and humidity.	Identify weather conditions (temperature, wind speed, humidity) and severe weather events.	Recognize that weather consists of a variety of conditions at different times.	Identify daily weather descriptions.

Grade: 12

Content Area: Environmental Science

Strand: Earth and Human Activity

General Education Standards

SCI.ES.HS.1- Investigate and analyze the use of nonrenewable energy sources (e.g., fossil fuels, nuclear, natural gas) and renewable energy sources (e.g., solar, wind, hydroelectric, geothermal) and propose solutions for their impact on the environment.

SCI.ES.HS.4- Engage in argument from evidence to evaluate how biological or physical changes within ecosystems (e.g., ecological succession, seasonal flooding, volcanic eruptions) affect the number and types of organisms, and that changing conditions may result in a new or altered ecosystem.

SCI.ES.HS.6- Obtain, evaluate, and communicate information to describe how human activity may affect biodiversity and genetic variation of organisms, including threatened and endangered species.

SCI.ES.HS.10- Design solutions for protection of natural water resources (e.g., bioassessment, methods of water treatment and conservation) considering properties, uses, and pollutants (e.g., eutrophication, industrial effluents, agricultural runoffs, point and nonpoint pollution resources).

SCI.ES.HS.13- Obtain, evaluate, and communicate information based on evidence to explain how key natural resources (e.g., water sources, fertile soils, concentrations of minerals and fossil fuels), natural hazards, and climate changes influence human activity (e.g., mass migrations).

Alternate Achievement Standards

SCI.AAS.ES.HS.1- Distinguish between common renewable (e.g. solar, wind, hydroelectric, geothermal) and nonrenewable (fossil fuels, nuclear, natural gas) energy sources.

SCI.AAS.ES.HS.4- Recognize changes within ecosystems that affect the number and types of organisms in that ecosystem.

SCI.AAS.ES.HS.6- Describe human activities that may affect ecosystems in positive and negative ways.

SCI.AAS.ES.HS.10- Recognize factors that affect natural water sources (e.g. pollution, agricultural runoffs) and identify ways humans can protect them (e.g. methods of water treatment and conservation).

SCI.AAS.ES.HS.13- Recognize natural resources (e.g. water sources, fertile soil) and natural hazards (e.g. volcanoes, erosion) that influence human activity.

Achievement Elements

Students need to distinguish between renewable and nonrenewable energy sources.

Students need to be able to recognize changes within an ecosystem that affect the number and types of organisms there.

Students need to recognize factors that affect natural water sources and identify ways humans can protect them.

Students need to recognize natural resources and hazards that influence human activity.

Key Vocabulary

renewable, nonrenewable, resources, ecosystem, organisms, hazards

Teaching and Learning Progressions

- Distinguish between renewable and nonrenewable energy sources.
- Recognize that renewable resources used to produce energy include solar, wind, hydroelectric, and geothermal.
- Recognize that nonrenewable resources used to produce energy include crude oil, natural gas, coal, and uranium.
- Understand renewable as resources that do not run out.
- Understand nonrenewable as resources.
- Understand energy as power derived from using physical or chemical resources to provide light and heat or to work machines.
- Recognize changes within an ecosystem that affect the number and types of organisms there.
- Understand that a change in one element within an ecosystem may affect another element within the ecosystem.
- Identify possible changes in living and nonliving things within an ecosystem.
- Recognize that living and nonliving things can change.
- Identify living and nonliving things in an ecosystem.
- Understand an ecosystem as all of the living things (plants, animals, and organisms) in an area interacting with each other, along with the nonliving things in their environment (weather, sun, soil, climate, and atmosphere).
- Understand that living things need nonliving things in order to live (food, water, air).
- Recognize factors that affect natural water sources and identify ways humans can protect them.
- Recognize that humans can change behaviors or create solutions to problems.
- For a given factor, identify at least one effect it has on natural water sources.
- Identify factors that are near natural water resources (people live nearby, industry, agriculture, recreation).
- Identify natural water sources.
- Recognize natural resources and hazards that influence human activity.

- Recognize ways that natural hazards can affect human activity.
- Recognize water sources, fertile soil, forests, and mineral deposits as natural resources.
- Recognize ways that natural hazards can affect human activity.
- Identify volcanoes, floods, severe storms, and erosion as natural hazards.
- Identify various human activities that occur in the course of daily living, work, and leisure.

Application of the Alternate Achievement Standards

- Demonstrate the availability in the community of renewable resources such as solar, wind, hydroelectric, and geothermal.
- Demonstrate factors that affect natural water sources by investigating local activities and businesses (e.g., farms and factories).
- Invite a person involved in agriculture to share illustrations of ways they use and preserve their land.

Levels of Standards

Level 4: Exceeds Standards	Level 3: Meets Standards	Level 2: Developing	Level 1: Emerging
Describe how energy production using renewable and nonrenewable energy sources affects the environment.	Distinguish between renewable and nonrenewable energy sources.	Know that energy is generated using a variety of resources.	Recognize common renewable and nonrenewable resources.
Describe changes in an ecosystem that affect the number and types of organisms there.	Recognize changes within an ecosystem that affect the number and types of organisms there.	Recognize parts of an ecosystem that can change.	Recognize ecosystems and the types of organisms that live there.
Evaluate factors that affect natural water sources in cities and rural areas and identify ways those sources can be protected.	Recognize factors that affect natural water sources and identify ways humans can protect them.	Recognize factors that affect natural water sources.	Identify natural water sources.
Describe the effect of natural resources and natural hazards on human activities.	Recognize natural resources and natural hazards that influence human activity.	Identify natural resources and natural hazards.	Recognize natural resources.