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Ms. Crystal Richardson, Program Coordinator

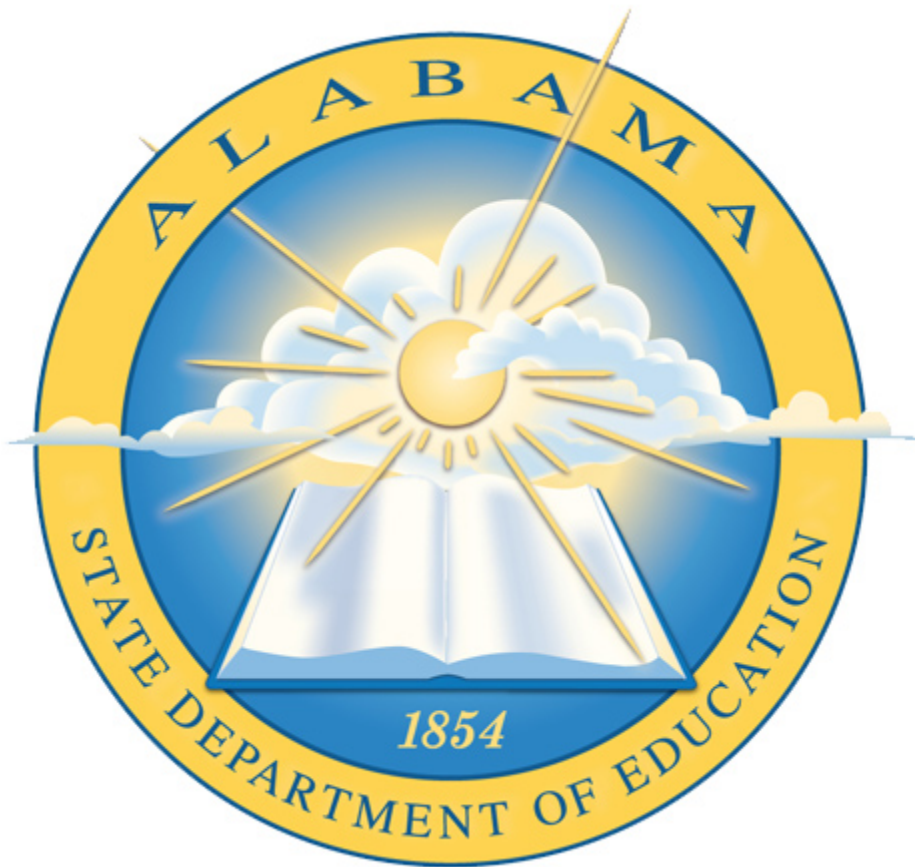


Alabama Alternate Achievement Standards



Science

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This document was developed by the 2017 Alabama Alternate Achievement Standards Science Committee. The committee was composed of both general education teachers, special education teachers, English Language Acquisition Teachers, Teachers of the Visually Impaired and Teachers of the Deaf.

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OVERVIEW

Introduction

The Science Alternate Achievement Standards are directly aligned to the Alabama Science Standards. The Science Alternate Achievement Standards in this document were developed by general and special education teachers in Alabama to guide and direct instruction for students with the most significant intellectual disabilities.

Students with Significant Intellectual Disabilities

In the United States, approximately 1% of school-aged children have an intellectual disability that is “characterized by significant limitations both in intellectual functioning and adaptive behavior as expressed in conceptual, social, and practical adaptive skills.” (U.S. Department of Education, 2002 and American Association of Intellectual and Developmental Disabilities, 2009) These students show evidence of cognitive functioning in the range of severe to profound and need extensive or pervasive support. In addition to significant intellectual disabilities, students may also have accompanying communication, motor, sensory, or other impairments.

Students with the most significant intellectual disabilities first gained mandated access to the general curriculum through the *Individuals with Disabilities Education Act Amendments of 1997* (PL 105-17), with further access guaranteed following the passage of the *No Child Left Behind Act* (NCLB) of 2001 (PL 107-110). Today, the *Every Student Succeeds Act* (ESSA) says a state may, through a documented and validated standards-setting process, adopt alternate academic achievement standards for students with the most significant cognitive disabilities, provided those standards—

- are aligned with the challenging State academic content standards;
- promote access to the general education curriculum, consistent with the *Individuals with Disabilities Education Act* (IDEA);
- reflect professional judgment as to the highest possible standards achievable by such students; are designated in the IEP developed under section 614(d)(3) of IDEA for each such student as the academic achievement standards that will be used for the student;
- and are aligned to ensure that a student who meets the alternate academic achievement standards is on track to pursue postsecondary education or employment, consistent with the purposes of the *Workforce Innovation and Opportunity Act* to maximize opportunities for individuals with significant disabilities for competitive integrated employment. (ESSA, Section 1111 (b)(1)(E))

Format of the Alternate Achievement Standards

The format of the Alabama Alternate Achievement Standards includes the grade, general education standard, alternate achievement standard, and the topic area.

ALABAMA ALTERNATE ACHIEVEMENT STANDARDS	
KINDERGARTEN Science	
General Education Standards	Alabama Alternate Achievement Standards
MOTION AND STABILITY: FORCES AND INTERACTIONS	
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.AAS.K.1- Investigate ways to move different objects to include pushing, pulling, and colliding objects.

Augmentative/Alternative Devices

The Alabama Alternate Achievement Standards are to be taught using the student's communication modality (e.g., voice, sign language, augmentative/alternative communication device). This does not mean an augmentative/alternative device should be programmed to do the cognition for the student.

Accommodations

Please be familiar with accommodations. Accommodations are available for students with disabilities to level the playing field and lessen the impact of their disability in the teaching/learning and testing environments. It is important that the accommodations in the student's IEP are being appropriately determined, documented, and implemented. An example of an appropriate accommodation for a student with a visual impairment who is working toward the Alabama Alternate Achievement Standards would be using a tactile representation in place of an illustration or picture. The augmentative/alternative communication devices discussed above are an appropriate accommodation for students with communication difficulties when a verbal response is desired or needed.

ALABAMA ALTERNATE ACHIEVEMENT STANDARDS

KINDERGARTEN Science

General Education Standards

Alabama Alternate Achievement Standards

MOTION AND STABILITY: FORCES AND INTERACTIONS

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

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. *

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

ECOSYSTEMS: INTERACTIONS, ENERGY AND DYNAMICS

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

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

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.AAS.K.5--Participate in the construction and/or care of a model habitat 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. *

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

EARTH'S SYSTEMS

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

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

SCI.AAS.K.8- Participate in the construction of a device 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).

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

EARTH AND HUMAN ACTIVITY

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

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).

ALABAMA ALTERNATE ACHIEVEMENT STANDARDS

GRADE 1 Science

General Education Standards

Alabama Alternate Achievement Standards

WAVES AND THEIR APPLICATIONS IN TECHNOLOGIES FOR INFORMATION TRANSFER

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

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

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). *

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

FROM MOLECULES TO ORGANISMS: STRUCTURES AND PROCESSES

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.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.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).

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

HEREDITY: INHERITANCE AND VARIATION OF TRAITS

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).

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

EARTH'S PLACE IN THE UNIVERSE

<p>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).</p>	<p>SCI.AAS.1.8- Identify major celestial objects (e.g., moon, sun, other stars) and when they can be seen in the sky.</p>
<p>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).</p>	<p>SCI.AAS.1.9- Identify the four seasons of the year in Alabama using common representations.</p>

ALABAMA ALTERNATE ACHIEVEMENT STANDARDS

GRADE 2 Science

General Education Standards

Alabama Alternate Achievement Standards

MATTER AND ITS INTERACTIONS

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

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

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).

ECOSYSTEMS: INTERACTIONS, ENERGY, AND DYNAMICS

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

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.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.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).

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

EARTH'S SYSTEMS

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.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.2.9- Create models to identify physical features of Earth (e.g., mountains, valleys, plains, deserts, lakes, rivers, oceans).	SCI.AAS.2.9- Identify physical features of Earth (e.g., mountain, valley, river, lake).
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).	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).
EARTH AND HUMAN ACTIVITY	
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). *	SCI.AAS.2.11- Participate in activities that model changes caused by Earth's events.

ALABAMA ALTERNATE ACHIEVEMENT STANDARDS

GRADE 3 Science

General Education Standards

Alabama Alternate Achievement Standards

MOTION AND STABILITY: FORCES AND INTERACTIONS

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

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

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

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). *

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)

FROM MOLECULES TO ORGANISMS: STRUCTURES AND PROCESSES

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.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.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.

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).

HEREDITY: INHERITANCE AND VARIATION OF TRAITS

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

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

UNITY AND DIVERSITY

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

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

<p>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).</p> <ol style="list-style-type: none"> Construct explanations that forming groups helps some organisms survive. Create models that illustrate how organisms and their habitats make up a system in which the parts depend on each other. 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). 	<p>SCI.AAS.3.11- Match common plants and animals with their best environment for growth and survival.</p>
<p>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 oaks in coastal areas due to destruction by hurricanes, creating property development restrictions in vacation areas to reduce displacement and loss of native animal populations). *</p>	<p>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).</p>
<p>EARTH’S SYSTEMS</p>	
<p>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).</p>	<p>SCI.AAS.3.13- Use a graph or pictograph to answer questions about weather.</p>
<p>SCI.3.14- Collect information from a variety of sources to describe climates in different regions of the world.</p>	<p>SCI.AAS.3.14- Identify differences in climate regions (e.g., desert, oceans).</p>
<p>EARTH AND HUMAN ACTIVITY</p>	
<p>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. *</p>	<p>SCI.AAS.3.15- Identify practices that keep people safe during severe weather.</p>

ALABAMA ALTERNATE ACHIEVEMENT STANDARDS

GRADE 4 Science

General Education Standards

Alabama Alternate Achievement Standards

ENERGY

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

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

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

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

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

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

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).

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

WAVES AND THEIR APPLICATIONS IN TECHNOLOGIES FOR INFORMATION TRANSFER

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.AAS.4.6- Using given models, identify patterns found in waves.
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.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.4.8- Construct a model to explain that an object can be seen when light reflected from its surface enters the eyes.	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.
FROM MOLECULES TO ORGANISMS: STRUCTURES AND PROCESSES	
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.AAS.4.9- Identify basic parts of plants and animals.
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.AAS.4.10- Identify human systems (i.e. digestive, circulatory, and respiratory).
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).	SCI.AAS.4.11- Identify the sense organs and the information they receive (eyes/sight, tongue/taste, ears/hearing, skin/touch, nose/smell).
EARTH'S SYSTEMS	
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.AAS.4.12- Identify patterns in rock formations and rock layers; explain how Earth changes over time.

<p>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).</p>	<p>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).</p>
<p>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.</p>	<p>SCI.AAS.4.14--Identify relationships between landforms and both constructive (volcanic eruptions and sediment deposition) and deconstructive (erosion and weathering) forces</p>
<p>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.</p>	<p>SCI.AAS.4.15--Identify the effects of weathering by water, ice, wind, or vegetation.</p>
<p>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).</p>	<p>SCI.AAS.4.16- Use a map key to identify land and water features on a map.</p>
<p>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). *</p>	<p>SCI.AAS.4.17- Predict the best option for human safety in a given weather situation.</p>

ALABAMA ALTERNATE ACHIEVEMENT STANDARDS

GRADE 5 Science

General Education Standards

Alabama Alternate Achievement Standards

MATTER AND ITS INTERACTIONS

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.AAS.5.1- Recognize 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.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.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.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.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.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.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.

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.

MOTION AND STABILITY: FORCES AND INTERACTIONS

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

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). *

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).

ECOSYSTEMS: INTERACTIONS, ENERGY, AND DYNAMICS

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

SCI.AAS.5.8- Recognize 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.AAS.5.9- Using a given model, recognize that plants use light energy to make their own food 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.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.5.11- Create a model to illustrate the transfer of matter among producers; consumers, including scavengers and decomposers; and the environment.

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

EARTH'S PLACE IN THE UNIVERSE

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

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).

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

EARTH'S SYSTEMS

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

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.

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).

EARTH AND HUMAN ACTIVITY

<p>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).</p>	<p>SCI.AAS.5.16- Identify a human action that can help the environment.</p>
<p>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). *</p>	<p>SCI.AAS.5.17- Identify a way humans can prevent or reverse pollution of the environment.</p>

ALABAMA ALTERNATE ACHIEVEMENT STANDARDS

GRADE 6 Science

General Education Standards

Alabama Alternate Achievement Standards

EARTH'S PLACE IN THE UNIVERSE

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

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).

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

EARTH'S SYSTEMS

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

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

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.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.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.

<p>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).</p>	<p>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.</p>
<p>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).</p>	<p>SCI.AAS.6.9- Recognize that volcanic action, earthquakes, and mountain building are caused by the flow of matter beneath Earth’s surface.</p>
<p>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).</p>	<p>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.</p>
<p>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.</p> <p>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).</p>	<p>SCI.AAS.6.12- Recognize interactions of air masses as the cause of changes in weather.</p> <p>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.</p>
<p>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.</p> <p>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).</p>	<p>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.</p> <p>SCI.AAS.6.13a – Recognize that the sun’s thermal energy is distributed throughout Earth’s atmosphere by convection and radiation.</p>
<p>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.</p>	<p>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.</p>

EARTH AND HUMAN ACTIVITY

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

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). *

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.

ALABAMA ALTERNATE ACHIEVEMENT STANDARDS

GRADE 7 Science

General Education Standards

Alabama Alternate Achievement Standards

FROM MOLECULES TO ORGANISMS: STRUCTURES AND PROCESSES

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

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.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.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.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.

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).

ECOSYSTEMS: INTERACTIONS, ENERGY, AND DYNAMICS

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

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.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.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.AAS.7.8- Identify relationships among organisms as competitive, mutually beneficial, parasitic, or neutral.
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.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.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).	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.
HEREDITY: INHERITANCE AND VARIATION OF TRAITS	
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.	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.
UNITY AND DIVERSITY	
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.AAS.7.15- Identify patterns that indicate a change in a species over time.
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.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.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.	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.

ALABAMA ALTERNATE ACHIEVEMENT STANDARDS

GRADE 8 Science

General Education Standards

Alabama Alternate Achievement Standards

MATTER AND ITS INTERACTIONS

<p>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.</p>	<p>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.</p>
<p>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.</p>	<p>SCI.AAS.8.2- Identify characteristics that distinguish one pure substance from another (e.g., color, hardness, flammability).</p>
<p>SCI.8.3- Construct explanations based on evidence from investigations to differentiate among compounds, mixtures, and solutions.</p> <p>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.</p>	<p>SCI.AAS.8.3- Differentiate between compounds and mixtures.</p> <p>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.</p>
<p>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.</p>	<p>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.</p>
<p>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.</p>	<p>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).</p>
<p>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). *</p>	<p>SCI.AAS.8.7- Critique objects or materials used to minimize or maximize thermal energy transfer (e.g., gloves, insulated hot pad, foam cup).</p>

MOTION AND STABILITY: FORCES AND INTERACTIONS

<p>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).</p>	<p>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.</p>
<p>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).</p>	<p>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).</p>
<p>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). *</p>	<p>SCI.AAS.8.10- Describe the motion of two colliding objects before and after the collision.</p>
<p>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.</p>	<p>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.</p>
ENERGY	
<p>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).</p>	<p>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).</p>
<p>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).</p>	<p>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).</p>
WAVES AND THEIR APPLICATIONS IN TECHNOLOGIES FOR INFORMATION TRANSFER	
<p>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.</p>	<p>SCI.AAS.8.17- Use a model to investigate ways to change the properties of a simple wave (frequency, amplitude, wavelength).</p>
<p>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.</p>	<p>SCI.AAS.8.18- Investigate and describe how light and sound waves travel through a variety of media.</p>
<p>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.</p>	<p>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.</p>

ALABAMA ALTERNATE ACHIEVEMENT STANDARDS

Grade 9 Physical Science

General Education Standards	Alabama Alternate Achievement Standards
PHYSICAL SCIENCE	
Matter and Its Interactions	
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.AAS.PS.HS.1- Using physical properties, differentiate between metals and nonmetals.
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.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.PS.HS.3- Analyze and interpret data from a simple chemical reaction or combustion reaction involving main group elements.	SCI.AAS.PS.HS.3- Differentiate between reactants and products in a simple chemical reaction
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.	SCI.AAS.PS.HS.4- Identify common acids and bases and their uses.
Motion and Stability: Forces and Interactions	
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.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.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.	SCI.AAS.PS.HS.10- Using an illustration, identify the differences between a simple series circuit and a parallel circuit.
Energy	
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.	SCI.AAS.PS.HS.11- Identify the transformation of potential energy to kinetic energy as an object moves.

Waves and Their Applications in Technologies for Information Transfer

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.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.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.

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

ALABAMA ALTERNATE ACHIEVEMENT STANDARDS

Grade 10 Biology

General Education Standards	Alabama Alternate Achievement Standards
BIOLOGY	
From Molecules to Organisms: Structures and Processes	
<p>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).</p>	<p>SCI.AAS.B.HS.2- Recognize organelles (e.g., mitochondria, ribosomes, chloroplasts) and their functions within plant and animal cells.</p>
<p>SCI.B.HS.3- Formulate an evidence-based explanation regarding how the composition of deoxyribonucleic acid (DNA) determines the structural organization of proteins.</p> <ol style="list-style-type: none"> 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. 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. Obtain information to identify errors that occur during DNA replication (e.g., deletion, insertion, translocation, substitution, inversion, frame-shift, point mutations). 	<p>SCI.AAS.B.HS.3- Recognize the structure of DNA which determines the characteristics of living organisms.</p>
<p>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).</p>	<p>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).</p>
<p>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.</p> <ol style="list-style-type: none"> 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. 	<p>SCI.AAS.B.HS.5- Recognize feedback mechanisms (e.g., sweating and shivering) that maintain homeostasis.</p>
<p>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.</p>	<p>SCI.AAS.B.HS.6- Recognize the components necessary for plants to produce their own food and oxygen (e.g., water, sunlight, carbon dioxide).</p>

<p>a. Plan and carry out investigations to explain the interactions among pigments, absorption of light, and reflection of light.</p>	
Ecosystems: Interactions, Energy, and Dynamics	
<p>SCI.B.HS.7- Develop and use models to illustrate examples of ecological hierarchy levels, including biosphere, biome, ecosystem, community, population, and organism.</p>	<p>SCI.AAS.B.HS.7- Use models to recognize an organism, a population, and an ecosystem.</p>
<p>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.</p>	<p>SCI.AAS.B.HS.8- Identify living and nonliving components in an ecosystem; identify the flow of energy within a common food chain.</p>
<p>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).</p>	<p>SCI.AAS.B.HS.9—Recognize the relationship between population size and available resources for food and shelter from a graphical representation.</p>
Heredity: Inheritance and Variation of Traits	
<p>SCI.B.HS.11- Analyze and interpret data collected from probability calculations to explain the variation of expressed traits within a population.</p> <ol style="list-style-type: none"> 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. 	<p>SCI.AAS.B.HS.11- Recognize that parents and offspring may have different traits.</p>
Unity and Diversity	
<p>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).</p> <ol style="list-style-type: none"> a. Engage in argument to justify the grouping of viruses in a category separate from living things. 	<p>SCI.AAS.B.HS.13- Classify organisms into similar groups based on physical characteristics.</p>

SCI.B.HS.16- Analyze scientific evidence (e.g., DNA, fossil records, cladograms, biogeography) to support hypotheses of common ancestry and biological evolution.	SCI.AAS.B.HS.16- Using fossil evidence, recognize that humans have changed in appearance over a very long period of time.
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ALABAMA ALTERNATE ACHIEVEMENT STANDARDS

Grade 11 Earth and Space Science

General Education Standards

Alabama Alternate Achievement Standards

EARTH AND SPACE SCIENCE

Earth’s Place in the Universe

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

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

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.

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.

Earth Systems

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

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.

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

ALABAMA ALTERNATE ACHIEVEMENT STANDARDS

Grade 12 Environmental Science

General Education Standards

Alabama Alternate Achievement Standards

ENVIRONMENTAL SCIENCE

Earth and Human Activity

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

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.AAS.ES.HS.4- Recognize changes within ecosystems that affect the number and types of organisms in that 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.AAS.ES.HS.6- Describe human activities that may affect ecosystems in positive and negative ways.

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.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.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).

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.

SCIENCE

Alabama Alternate Achievement Standards