Plant and Animal Requirements

Use observations to describe patterns of what plants and animals (including humans) need to survive.

ES

K-LS1-1

Weather Patterns

Use and share observations of local weather conditions to describe patterns over time.

ES

K-ESS2-1

Plant and Animal Environmental Change

Construct an argument supported by evidence for how plants and animals (including humans) can change the environment to meet their needs.

ES

K-ESS2-2

Plant and Animal Needs and Habitat

Use a model to represent the relationship between the needs of different plants and animals (including humans) and the places they live.

ES

K-ESS3-1

Weather Forecasting Severe Weather

Ask questions to obtain information about the purpose of weather forecasting to prepare for, and respond to, severe weather.

ES

K-ESS3-2

Solutions That Reduce Human Impact

Communicate solutions that will reduce the impact of humans on the land, water, air, and/or other living things in the local environment.

ES

K-ESS3-3

Pushes and Pulls Motion of an Object

Plan and conduct an investigation to compare the effects of different strengths or different directions of pushes and pulls on the motion of an object

ES

K-PS2-1

Design Solution to Change Motion of an Object

Analyze data to determine if a design solution works as intended to change the speed or direction of an object with a push or a pull.

ES

K-PS2-2

Clarification Statement: Examples of qualitative observations could include descriptions of the weather (such as sunny, cloudy, rainy, and warm); examples of quantitative observations could include numbers of sunny, windy, and rainy days in a month. Examples of patterns could include that it is usually cooler in the morning than in the afternoon and the number of sunny days versus cloudy days in different months.

K-LS1-1

Clarification Statement: Examples of patterns could include that animals need to take in food but plants do not; the different kinds of food needed by different types of animals; the requirement of plants to have light; and, that all living things need water.

K-ESS2-1

Clarification Statement: Examples of relationships could include that deer eat buds and leaves, therefore, they usually live in forested areas; and, grasses need sunlight so they often grow in meadows. Plants, animals, and their surroundings make up a system.

K-ESS2-2

Clarification Statement: Examples of plants and animals changing their environment could include a squirrel digs in the ground to hide its food and tree roots can break concrete.

K-ESS3-1

Clarification Statement: Examples of human impact on the land could include cutting trees to produce paper and using resources to produce bottles. Examples of solutions could include reusing paper and recycling cans and bottles.

K-ESS3-2

Clarification Statement: Emphasis is on local forms of severe weather.

K-ESS3-3

Clarification Statement: Examples of problems requiring a solution could include having a marble or other object move a certain distance, follow a particular path, and knock down other objects. Examples of solutions could include tools such as a ramp to increase the speed of the object and a structure that would cause an object such as a marble or ball to turn.

K-PS2-1

Clarification Statement: Examples of pushes or pulls could include a string attached to an object being pulled, a person pushing an object, a person stopping a rolling ball, and two objects colliding and pushing on each other.

K-PS2-2

Sunlight Effects Earth's Surface

Make observations to determine the effect of sunlight on Earth's surface.

ES

K-PS3-1

Design Solution to Reduce Warming Effect of Sunlight

Use tools and materials provided to design and build a structure that will reduce the warming effect of sunlight on an area.

ES

K-PS3-2

Design Solution Biomimicry

Use tools and materials to design a solution to a human problem by mimicking how plants and/or animals use their external parts to help them survive, grow, and meet their needs.

ES

1-LS1-1

Patterns in Behavior Parents and Offspring

Read grade appropriate texts and use media to determine patterns in behavior of parents and offspring that help offspring survive.

ES

1-LS1-2

Plant and Animal Offspring Similarities

Make observations to construct an evidence-based account that young plants and animals are like, but not exactly like, their parents.

ES

1-LS3-1

Sun Moon and Stars Predictable Patterns

Use observations of the sun, moon, and stars to describe patterns that can be predicted.

ES

1-ESS1-1

Seasonal Amount of Sunlight

Make observations at different times of year to relate the amount of daylight to the time of year.

ES

1-ESS1-2

Investigation of Sound and Vibrating Materials

Plan and conduct investigations to provide evidence that vibrating materials can make sound and that sound can make materials vibrate.

ES

1-PS4-1

Clarification Statement: Examples of structures could include umbrellas, canopies, and tents that minimize the warming effect of the sun.

K-PS3-2

Clarification Statement: Examples of Earth's surface could include sand, soil, rocks, and water

K-PS3-1

Clarification Statement: Examples of patterns of behaviors could include the signals that offspring make (such as crying, cheeping, and other vocalizations) and the responses of the parents (such as feeding, comforting, and protecting the offspring).

1-LS1-2

Clarification Statement: Examples of human problems that can be solved by mimicking plant or animal solutions could include designing clothing or equipment to protect bicyclists by mimicking turtle shells, acorn shells, and animal scales; stabilizing structures by mimicking animal tails and roots on plants; keeping out intruders by mimicking thorns on branches and animal quills; and, detecting intruders by mimicking eyes and ears.

1-LS1-1

Clarification Statement: Examples of patterns could include that the sun and moon appear to rise in one part of the sky, move across the sky, and set; and stars other than our sun are visible at night but not during the day.

1-ESS1-1

Clarification Statement: Examples of patterns could include features plants or animals share. Examples of observations could include leaves from the same kind of plant are the same shape but can differ in size; and, a particular breed of dog looks like its parents but is not exactly the same.

1-LS3-1

Clarification Statement: Examples of vibrating materials that make sound could include tuning forks and plucking a stretched string. Examples of how sound can make matter vibrate could include holding a piece of paper near a speaker making sound and holding an object near a vibrating tuning fork.

1-PS4-1

Clarification Statement: Emphasis is on relative comparisons of the amount of daylight in the winter to the amount in the spring or fall.

1-ESS1-2

Illuminated Objects in Darkness

Make observations to construct an evidence-based account that objects in darkness can be seen only when illuminated.

ES

1-PS4-2

Investigation of Material in the Path of Light

Plan and conduct investigations to determine the effect of placing objects made with different materials in the path of a beam of light.

ES

1-PS4-3

Design a Device to Communicate Over a Distance

Use tools and materials to design and build a device that uses light or sound to solve the problem of communicating over a distance.

ES

1-PS4-4

Investigation on Plants Sunlight and Water

Plan and conduct an investigation to determine if plants need sunlight and water to grow.

ES

2-LS2-1

Model of Seed Dispersal or Plant Pollination

Develop a simple model that mimics the function of an animal in dispersing seeds or pollinating plants.

ES

2-LS2-2

Diversity of Life in Different Habitats

Make observations of plants and animals to compare the diversity of life in different habitats.

ES

2-LS4-1

Evidence of Earth Events Quickly or Slowly

Use information from several sources to provide evidence that Earth events can occur quickly or slowly.

ES

2-ESS1-1

Solutions to Wind and Water Change

Compare multiple solutions designed to slow or prevent wind or water from changing the shape of the land.

ES

2-ESS2-1

Clarification Statement: Examples of materials could include those that are transparent (such as clear plastic), translucent (such as wax paper), opaque (such as cardboard), and reflective (such as a mirror).

1-PS4-3

Clarification Statement: Examples of observations could include those made in a completely dark room, a pinhole box, and a video of a cave explorer with a flashlight. Illumination could be from an external light source or by an object giving off its own light.

1-PS4-2

Clarification Statement: Emphasis is on testing one variable at a time during investigations.

2-LS2-1

Clarification Statement: Examples of devices could include a light source to send signals, paper cup and string “telephones,” and a pattern of drum beats.

1-PS4-4

Clarification Statement: Emphasis is on the diversity of living things in each of a variety of different habitats.

2-LS4-1

Clarification Statement: Students could use the model to describe: (1) How the structure of the model gives rise to its function. (2) Structure-function relationships in the natural world that allow some animals to disperse seeds or pollinate plants.

2-LS2-2

Clarification Statement: Examples of solutions could include different designs of dikes and windbreaks to hold back wind and water, and different designs for using shrubs, grass, and trees to hold back the land.

2-ESS2-1

Clarification Statement: Examples of events and timescales could include volcanic explosions and earthquakes, which happen quickly and erosion of rocks, which occurs slowly.

2-ESS1-1

Model of Landforms and Bodies of Water

Develop a model to represent the shapes and kinds of land and bodies of water in an area.

ES

2-ESS2-2

Information on Water Availability

Obtain information to identify where water is found on Earth and that it can be solid or liquid.

ES

2-ESS2-3

Investigation of Properties of Materials

Plan and conduct an investigation to describe and classify different kinds of materials by their observable properties.

ES

2-PS1–1

Analysis of Testing Data Properties of Materials

Analyze data obtained from testing different materials to determine which materials have the properties that are best suited for an intended purpose.

ES

2-PS1-2

Account of Disassembled Pieces and New Objects

Make observations to construct an evidence-based account of how an object made of a small set of pieces can be disassembled and made into a new object.

ES

2-PS1-3

Evidence of Chemical and Physical Changes

Construct an argument with evidence that some changes caused by heating or cooling can be reversed and some cannot.

ES

2-PS1-4

Develop Models of Life Cycles

Develop models to describe that organisms have unique and diverse life cycles but all have in common birth, growth, reproduction, and death.

ES

3-LS1-1

Animal Groups as a Survival Mechanisms

Construct an argument that some animals form groups that help members survive.

ES

3-LS2-1

Clarification Statement: Students use reliable sources to identify the patterns of where water is found and its natural form (solid or liquid). Examples of how water can be found on Earth as water or ice could include a frozen pond, a liquid pond, a frozen lake, or a liquid lake.

2-ESS2-3

Clarification Statement: Models do not have to be to scale.

2-ESS2-2

Clarification Statement: Examples of properties could include strength, flexibility, hardness, texture, or absorbency.

2-PS1-2

Clarification Statement: Observations could include color, texture, hardness, and flexibility. Patterns could include the similar properties that different materials share.

2-PS1-1

Clarification Statement: Demonstrations of reversible changes could include materials such as water, butter or crayons at different temperatures. Demonstrations of irreversible changes could include cooking an egg, freezing a plant leaf, or heating paper.

2-PS1-4

Clarification Statement: Examples of pieces could include blocks, building bricks, or other assorted small objects.

2-PS1-3

Clarification Statement: Arguments could include examples of group behavior such as division of labor in a bee colony, flocks of birds staying together to confuse or intimidate predators, or wolves hunting in packs to more efficiently catch and kill prey.

3-LS2-1

Clarification Statement: Changes organisms go through during their life form a pattern.

3-LS1-1

Analysis of Variation in Inherited Traits

Analyze and interpret data to provide evidence that plants and animals have traits inherited from parents and that variation of these traits exists in a group of similar organisms.

ES

3-LS3-1

Evidence of Environmental Influence

Use evidence to support the explanation that traits can be influenced by the environment..

ES

3-LS3-2

Fossil Evidence Organisms and Environment

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

ES

3-LS4-1

Advantage of Variation in Survival of Species

Use evidence to construct an explanation for how the variations in characteristics among individuals of the same species may provide advantages in surviving, finding mates, and reproducing.

ES

3-LS4-2

Habitat and Evidence of Organism Survival

Construct an argument with evidence that in a particular habitat some organisms can survive well, some survive less well, and some cannot survive at all.

ES

3-LS4-3

Environmental Change Merit of Solution

Make a claim about the merit of a solution to a problem caused when the environment changes and the types of plants and animals that live there may change.

ES

3-LS4-4

Representation of Seasonal Weather Conditions

Represent data in tables and graphical displays to describe typical weather conditions expected during a particular season

ES

3-ESS2-1

Description of World Climates

Obtain and combine information to describe climates in different regions of the world.

ES

3-ESS2-2

Clarification Statement: Examples of the environment affecting a trait could include normally tall plants grown with insufficient water are stunted; and, a pet dog that is given too much food and little exercise may become overweight.

3-LS3-2

Clarification Statement: Patterns are the similarities and differences in traits shared between offspring and their parents, or among siblings. Emphasis is on organisms other than humans.

3-LS3-1

Clarification Statement: Examples of cause and effect relationships could be plants that have larger thorns than other plants may be less likely to be eaten by predators; and, animals that have better camouflage coloration than other animals may be more likely to survive and therefore more likely to leave offspring..

3-LS4-2

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

3-LS4-1

Clarification Statement: Examples of environmental changes could include changes in land characteristics, water distribution, temperature, food, and other organisms.

3-LS4-4

Clarification Statement: Examples of evidence could include needs and characteristics of the organisms and habitats involved. The organisms and their habitat make up a system in which the parts depend on each other.

3-LS4-3

Clarification Statement: Information could include rainfall and temperature data.

3-ESS2-2

Clarification Statement: Examples of data could include average temperature, precipitation, and wind direction.

3-ESS2-1

Reducing Weather Hazards Merits of Design

Make a claim about the merit of a design solution that reduces the impacts of a weather-related hazard.

ES

3-ESS3-1

Investigation of Balanced and Unbalanced Forces

Plan and conduct an investigation to provide evidence of the effects of balanced and unbalanced forces on the motion of an object.

ES

3-PS2-1

Evidence to Predict Future Motion

Make observations and/or measurements of an object's motion to provide evidence that a pattern can be used to predict future motion.

ES

3-PS2-2

Cause and Effect of Electric or Magnetic Interactions

Ask questions to determine cause and effect relationships of electric or magnetic interactions between two objects not in contact with each other.

ES

3-PS2-3

Magnetic Design Solution

Define a simple design problem that can be solved by applying scientific ideas about magnets.

ES

3-PS2-4

Plant and Animal Survival Mechanisms

Construct an argument that plants and animals have internal and external structures that function to support survival, growth, behavior, and reproduction.

ES

4-LS1-1

Models of the Animal Sensory System

Emphasis is on systems of information transfer. Responses could include animals running from predators, animals returning to breeding grounds, animals scavenging for food, or humans responding to stimuli.

ES

4-LS1-2

Evidence of Landscape Change Over Time

Identify evidence from patterns in rock formations and fossils in rock layers for changes in a landscape over time to support an explanation for changes in a landscape over time.

ES

4-ESS1-1

Clarification Statement: Examples could include an unbalanced force on one side of a ball can make it start moving; and, balanced forces pushing on a box from both sides will not produce any motion at all.

3-PS2-1

Clarification Statement: Examples of design solutions to weather-related hazards could include barriers to prevent flooding, wind resistant roofs, and lightning rods.

3-ESS3-1

Clarification Statement: Examples of an electric force could include the force on hair from an electrically charged balloon and the electrical forces between a charged rod and pieces of paper; examples of a magnetic force could include the force between two permanent magnets, the force between an electromagnet and steel paperclips, and the force exerted by one magnet versus the force exerted by two magnets. Examples of cause and effect relationships could include how the distance between objects affects strength of the force and how the orientation of magnets affects the direction of the magnetic force.

3-PS2-3

Clarification Statement: Examples of motion with a predictable pattern could include a child swinging in a swing, a ball rolling back and forth in a bowl, and two children on a see-saw.

3-PS2-2

Clarification Statement: Examples of structures could include thorns, stems, roots, colored petals, heart, stomach, lung, brain, and skin.

4-LS1-1

Clarification Statement: Examples of problems could include constructing a latch to keep a door shut and creating a device to keep two moving objects from touching each other.

3-PS2-4

Clarification Statement: Examples of evidence from patterns could include rock layers with marine shell fossils above rock layers with plant fossils and no shells, indicating a change from land to water over time; and, a canyon with different rock layers in the walls and a river in the bottom, indicating that over time a river cut through the rock.

4-ESS1-1

Clarification Statement: Emphasis is on systems of information transfer.

4-LS1-2

Measuring the Rate of Weathering

Plan and conduct investigations on the effects of water, ice, wind, and vegetation on the relative rate of weathering and erosion.

ES

4-ESS2-1

Describing Patterns of Earth's Features

Analyze and interpret data from maps to describe patterns of Earth's features.

ES

4-ESS2-2

Energy and Natural Resources Environmental Effects

Obtain and combine information to describe that energy and fuels are derived from renewable and non-renewable resources and how their uses affect the environment.

ES

4-ESS3-1

Natural Hazards Design Solution

Generate and compare multiple solutions to reduce the impacts of natural Earth processes on humans.

ES

4-ESS3-2

Evidence of Kinetic Energy

Use evidence to construct an explanation relating the speed of an object to the energy of that object.

ES

4-PS3-1

Evidence of Energy Transfer

Make observations to provide evidence that energy can be transferred from place to place by sound, light, heat, and electric currents.

ES

4-PS3-2

Energy in Collisions

Ask questions and predict outcomes about the changes in energy that occur when objects collide

ES

4-PS3-3

Energy Conversion Device Design

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

ES

4-PS3-4

Clarification Statement: Maps can include topographic maps of Earth's land and ocean floor, as well as maps of the locations of mountains, continental boundaries, volcanoes, and earthquakes.

4-ESS2-2

Clarification Statement: Examples of variables to test could include angle of slope in the downhill movement of water, amount of vegetation, speed of wind, relative rate of deposition, cycles of freezing and thawing of water, cycles of heating and cooling, and volume of water flow.

4-ESS2-1

Clarification Statement: Examples of solutions could include designing flood, wind, or earthquake resistant structures and models to prevent soil erosion.

4-ESS3-2

Clarification Statement: Examples of renewable energy resources could include wind energy, water behind dams, and sunlight; non-renewable energy resources are fossil fuels and fissile materials. Examples of environmental effects could include loss of habitat due to dams, loss of habitat due to surface mining, and air pollution from burning of fossil fuels.

4-ESS3-1

Clarification Statement: When energy is transferred it may change forms such as when light from the sun warms a window pane.

4-PS3-2

Clarification Statement: Relating the speed of an object to the energy of the object does not require calculation of the object's speed.

4-PS3-1

Clarification Statement: Examples of devices could include electric circuits that convert electrical energy into motion energy of a vehicle, light, or sound; and, a passive solar heater that converts light into heat. Examples of constraints could include the materials, cost, or time to design the device.

4-PS3-4

Clarification Statement: Emphasis is on the change in the energy due to the change in speed, not on the forces, as objects interact.

4-PS3-3

Develop a Model of a Wave

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

ES

4-PS4-1

Develop a Model of Vision

Develop a model to describe that light reflecting from objects and entering the eye allows objects to be seen.

ES

4-PS4-2

Biogeology

Ask questions that can be investigated and predict reasonable outcomes about how living things affect the physical characteristics of their environment.

ES

4-ESS2-3

Plants Require Air and Water

Ask questions about how air and water affect the growth of plants.

ES

5-LS1-1

Develop a Model of Matter Cycling

Develop a model to describe the movement of matter among plants, animals, decomposers, and the environment.

ES

5-LS2-1

Stellar Brightness and Relative Distance

Support an argument that differences in the apparent brightness of the sun compared to other stars is due to their relative distances from the Earth.

ES

5-ESS1-1

Daily and Seasonal Changes in the Sky

Represent data in graphical displays to reveal patterns of daily changes in length and direction of shadows, day and night, and the seasonal appearance of some stars in the night sky.

ES

5-ESS1-2

Develop a Model of the Earth's Spheres

Develop a model using an example to describe ways the geosphere, biosphere, hydrosphere, and/or atmosphere interact.

ES

5-ESS2-1

Clarification Statement: Develop a model to make sense of a phenomenon involving the relationship between light reflection and visibility of objects. In the model, identify the relevant components including light and its source, objects, the path that light follows, and the eye.

4-PS4-2

Clarification Statement: Investigations include making observations in various habitats in real life or virtual circumstances. Living things could include animals such as beavers, crawfish, armadillos, nutria, gophers, and plants such as kudzu, water hyacinth, and Chinese tallow.

4-PS4-1

Clarification Statement: Emphasis is on the idea that plant matter comes mostly from air and water, not from the soil.

5-LS1-1

Clarification Statement: Examples of solutions could include drums sending coded information through sound waves, using a grid of 1's and 0's representing black and white to send information about a picture, and using Morse code to send text.

4-ESS2-3

Clarification Statement: Examples include the relative distances of the stars, but not the sizes. It does not include other factors that affect apparent brightness (such as stellar masses, age, stage).

5-ESS1-1

Clarification Statement: Emphasis is on the idea that matter that is not food (air, water, decomposed materials in soil) is changed by plants into matter that is food. Examples of systems could include organisms, ecosystems, and the Earth.

5-LS2-1

Clarification Statement: Examples could include the influence of the ocean on ecosystems, landform shape, and climate; the influence of the atmosphere on landforms and ecosystems through weather and climate; and the influence of mountain ranges on winds and clouds in the atmosphere. The geosphere, hydrosphere, atmosphere, and biosphere are each a system.

5-ESS2-1

Clarification Statement: Examples of patterns could include the position and motion of Earth with respect to the sun and selected stars that are visible only in particular months.

5-ESS1-2

Describing and Graphing Water Availability and Distribution

Describe and graph the amounts and percentages of water and fresh water in various reservoirs to provide evidence about the distribution of water on Earth.

ES

5-ESS2-2

Protecting the Earth's Resources and Environment

Generate and compare multiple solutions about ways individual communities can use science to protect the Earth's resources and environment.

ES

5-ESS3-1

Develop a Particle Model of Matter

Develop a model to describe that matter is made of particles too small to be seen.

ES

5-PS1-1

Provide Evidence of the Conservation of Matter

Measure and graph quantities to provide evidence that regardless of the type of change that occurs when heating, cooling, or mixing substances, the total weight of matter is conserved.

ES

5-PS1-2

Identify Materials Based on Their Properties

Make observations and measurements to identify materials based on their properties.

ES

5-PS1-3

Investigating New Substances

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

ES

5-PS1-4

Direction of the Gravitational Force

Support an argument that the gravitational force exerted by Earth on objects is directed down.

ES

5-PS2-1

Food Energy from the Sun Using Models

Use models to describe that energy in animals' food (used for body repair, growth, motion, and to maintain body warmth) was once energy from the sun.

ES

5-PS3-1

Clarification Statement: Examples of solutions can include cleanup of oil spills, protecting against coastal erosion, or prevention of polluted runoff into waterways.

5-ESS3-1

Clarification Statement: Examples include oceans, lakes, rivers, glaciers, ground water, and polar ice caps.

5-ESS2-2

Clarification Statement: Examples of reactions or changes could include phase changes, dissolving, and mixing that form new substances.

5-PS1-2

Clarification Statement: Examples of evidence could include adding air to expand a basketball, compressing air in a syringe, dissolving sugar in water, and evaporating salt water.

5-PS1-1

Clarification Statement: Examples of interactions forming new substances can include mixing baking soda and vinegar. Examples of interactions not forming new substances can include mixing baking soda and water.

5-PS1-4

Clarification Statement: Examples of materials to be identified could include baking soda and other powders, metals, minerals, and liquids. Examples of properties could include color, hardness, reflectivity, electrical conductivity, thermal conductivity, response to magnetic forces, and solubility; density is not intended as an identifiable property.

5-PS1-3

Clarification Statement: Examples of models could include diagrams, and flow charts.

5-PS3-1

Clarification Statement: “Down” is a local description of the direction that points toward the center of the spherical Earth. Earth’s mass causes objects to have a force on them that points toward the center of the Earth, “down”. Support for arguments can be drawn from diagrams, evidence, and data that are provided. This does not include mathematical representation of gravitational force.

.

5-PS2-1