**“Overlapping” Science and Technology/Engineering Standards that May Be Assessed on the 2018 MCAS Grades 5 STE Test**

Below are lists of the 2001/06 and 2016 science and technology/engineering (STE) standards that may be assessed on the **2018 MCAS STE tests for grade 5**. The focus of the questions on the 2018 tests will be on the overlapping content and skills between the two sets of standards.

**2001/06 Grade 5 STE Standards**

**Earth and Space Science**

2. Identify the physical properties of minerals (hardness, color, luster, cleavage, and streak), and explain how minerals can be tested for these different physical properties.

4. Explain and give examples of the ways in which soil is formed (the weathering of rock by water and wind and from the decomposition of plant and animal remains).

6. Explain how air temperature, moisture, wind speed and direction, and precipitation make up the weather in a particular place and time.

9. Differentiate between weather and climate.

10. Describe how water on earth cycles in different forms and in different locations, including underground and in the atmosphere.

12. Give examples of how the surface of the earth changes due to slow processes such as erosion and weathering, and rapid processes such as landslides, volcanic eruptions, and earthquakes.

13. Recognize that the earth is part of a system called the “solar system” that includes the sun (a star), planets, and many moons. The earth is the third planet from the sun in our solar system.

14. Recognize that the earth revolves around (orbits) the sun in a year’s time and that the earth rotates on its axis once approximately every 24 hours. Make connections between the rotation of the earth and day/night, and the apparent movement of the sun, moon, and stars across the sky.

15. Describe the changes that occur in the observable shape of the moon over the course of a month.

**Life Science**

2. Identify the structures in plants (leaves, roots, flowers, stem, bark, wood) that are responsible for food production, support, water transport, reproduction, growth, and protection.

3. Recognize that plants and animals go through predictable life cycles that include birth, growth, development, reproduction, and death.

4. Describe the major stages that characterize the life cycle of the frog and butterfly as they go through metamorphosis.

5. Differentiate between observed characteristics of plants and animals that are fully inherited (e.g., color of flower, shape of leaves, color of eyes, number of appendages) and characteristics that are affected by the climate or environment (e.g., browning of leaves due to too much sun, language spoken).

6. Give examples of how inherited characteristics may change over time as adaptations to changes in the environment that enable organisms to survive, e.g., shape of beak or feet, placement of eyes on head, length of neck, shape of teeth, color.

7. Give examples of how changes in the environment (drought, cold) have caused some plants and animals to die or move to new locations (migration).

8. Describe how organisms meet some of their needs in an environment by using behaviors in response to information received from the environment. Recognize that some animal behaviors are instinctive, and others are learned.

9. Recognize plant behaviors, such as the way seedlings’ stems grow toward light and their roots grow downward in response to gravity. Recognize that many plants and animals can survive harsh environments because of seasonal behaviors, e.g., in winter, some trees shed leaves, some animals hibernate, and other animals migrate.

10. Give examples of how organisms can cause changes in their environment to ensure survival. Explain how some of these changes may affect the ecosystem.

11. Describe how energy derived from the sun is used by plants to produce sugars (photosynthesis) and is transferred within a food chain from producers (plants) to consumers to decomposers.

**Physical Science**

1. Differentiate between properties of objects (e.g., size, shape, weight) and properties of materials (e.g., color, texture, hardness).

2. Compare and contrast solids, liquids, and gases based on the basic properties of each of these states of matter.

3. Describe how water can be changed from one state to another by adding or taking away heat.

4. Identify the basic forms of energy (light, sound, heat, electrical, and magnetic). Recognize that energy is the ability to cause motion or make change.

5. Give examples of how energy can be transferred from one form to another.

6. Recognize that electricity in circuits requires a complete loop through which an electrical current can pass, and that electricity can produce light, heat, and sound.

7. Identify and classify objects and materials that conduct electricity and objects and materials that are insulators of electricity.

9. Recognize that magnets have poles that repel and attract each other.

10. Identify and classify objects and materials that a magnet will attract and objects and materials that a magnet will not attract.

12. Recognize that light travels in a straight line until it strikes an object or travels from one medium to another, and that light can be reflected, refracted, and absorbed.

**Technology/Engineering**

1.1 Identify materials used to accomplish a design task based on a specific property, e.g., strength, hardness, and flexibility.

2.1. Identify a problem that reflects the need for shelter, storage, or convenience.

2.2. Describe different ways in which a problem can be represented, e.g., sketches, diagrams, graphic organizers, and lists.

2.3 Identify relevant design features (e.g., size, shape, weight) for building a prototype of a solution to a given problem.

**2016 Grade 5 STE Standards**

**Earth and Space Science**

**3-ESS2-1. Use graphs and tables of weather data to describe and predict typical weather during a particular season in an area.***Clarification Statements: Examples of weather data could include temperature, amount and type of precipitation (e.g., rain, snow), wind direction, and wind speed. Graphical displays should focus on pictographs and bar graphs.*

**3-ESS2-2. Obtain and summarize information about the climate of different regions of the world to illustrate that typical weather conditions over a year vary by region.** *Clarification Statement: Examples of information can include climate data (average temperature, average precipitation, average wind speed) or comparative descriptions of seasonal weather for different regions. State Assessment Boundary: An understanding of climate change is not expected in state assessment.*

**4-ESS1-1. Use evidence from a given landscape that includes simple landforms and rock layers to support a claim about the role of erosion or deposition in the formation of the landscape over long periods of time.** *Clarification Statements: Examples of evidence and claims could include rock layers with shell fossils above rock layers with plant fossils and no shells, indicating a change from deposition on land to deposition in water over time; and, a canyon with rock layers in the walls and a river in the bottom, indicating that a river eroded the rock over time. Examples of simple landforms can include valleys, hills, mountains, plains, and canyons. Focus should be on relative time. State Assessment Boundary: Specific details of the mechanisms of rock formation or specific rock formations and layers are not expected in state assessment.*

**4-ESS2-1. Make observations and collect data to provide evidence that rocks, soils, and sediments are broken into smaller pieces through mechanical weathering and moved around through erosion by water, ice, wind, and vegetation.** *Clarification Statements: Mechanical weathering processes can include frost wedging, abrasion, and tree root wedging. Erosion can include movement by blowing wind, flowing water, and moving ice. State Assessment Boundary: Chemical processes are not expected in state assessment.*

**5-ESS1-2. Use a model to describe Earth’s relationship to the Sun, Moon, and other stars that explain (a) why people on Earth experience day and night, (b) patterns in daily changes in length and direction of shadows over a day, and (c) changes in the apparent position of the Sun, Moon, and stars at different times during a day, over a month, and over a year.** *Clarification Statement: Models should illustrate that the Earth, Sun, and Moon are spheres; include orbits of the Earth around the Sun and of the Moon around Earth; and demonstrate Earth’s rotation about its axis. State Assessment Boundary: Causes of lunar phases or seasons, or use of Earth’s tilt are not expected in state assessment.*

**5-ESS2-1. Use a model to describe the cycling of water through a watershed through evaporation, precipitation, absorption, surface runoff, and condensation.** *State Assessment Boundary: Transpiration or explanations of mechanisms that drive the cycle are not expected in state assessment.*

**Life Science**

**3-LS1-1. Use simple graphical representations to show that different types of organisms have unique and diverse life cycles. Describe that all organisms have birth, growth, reproduction, and death in common but there are a variety of ways in which these happen.** *Clarification Statements: Examples can include different ways plants and animals begin (e.g., sprout from a seed, born from an egg), grow (e.g., increase in size and weight, produce new part), reproduce (e.g., develop seeds, root runners, mate and lay eggs that hatch), and die (e.g., length of life). Plant life cycles should focus on those of flowering plants. Describing variation in organism life cycles should focus on comparisons of the general stages of each, not specifics. State Assessment Boundary: Detailed descriptions of any one organism’s cycle, the differences of “complete metamorphosis” and “incomplete metamorphosis”, or details of human reproduction are not expected in state assessment.*

**3-LS3-1. Provide evidence, including through the analysis of data, that plants and animals have traits inherited from parents and that variation of these traits exist in a group of similar organisms.** *Clarification Statements: Examples of inherited traits that vary can include the color of fur, shape of leaves, length of legs, and size of flowers. Focus should be on non-human examples. State Assessment Boundary: Genetic mechanisms of inheritance or prediction of traits are not expected in state assessment.*

**3-LS3-2. Distinguish between inherited characteristics and those characteristics that result from a direct interaction with the environment. Give examples of characteristics of living organisms that are influenced by both inheritance and the environment.** *Clarification Statements: Examples of the environment affecting a characteristic could include normally tall plants grown with insufficient water or light are stunted; a lizard missing a tail due to a predator; and, a pet dog that is given too much food and little exercise may become overweight. Focus should be on non-human examples.*

**3-LS4-2. Use evidence to construct an explanation for how the variations in characteristics among individuals within the same species may provide advantages to these individuals in their survival and reproduction.** *Clarification Statements: Examples can include rose bushes of the same species, one with slightly longer thorns than the other which may prevent its predation by deer; and, color variation within a species that may provide advantages so one organism may be more likely to survive and therefore more likely to produce offspring. Examples of evidence could include needs and characteristics of the organisms and habitats involved.*

**3-LS4-4. Analyze and interpret given data about changes in a habitat and describe how the changes may affect the ability of organisms that live in that habitat to survive and reproduce.** *Clarification Statements: Changes should include changes to landforms, distribution of water, climate, and availability of resources. Changes in the habitat could range in time from a season to a decade. While it is understood that ecological changes are complex the focus should be on a single change to the habitat.*

**4-LS1-1. Construct an argument that animals and plants have internal and external structures that support their survival, growth, behavior, and reproduction.** *Clarification Statements: Animal structures can include legs, wings, fins, feathers, trunks, claws, horns, antennae, eyes, ears, nose, heart, stomach, lung, brain, and skin. Plant structures can include leaves, roots, stems, bark, branches, flowers, fruit, and seeds. State Assessment Boundary: State assessment will be limited to macroscopic structures.*

**5-LS1-1. Ask testable questions about the process by which plants use air, water, and energy from sunlight to produce sugars and plant materials needed for growth and reproduction.** *State Assessment Boundary: The chemical formula or molecular details about the process of photosynthesis are not expected in state assessment.*

**5-LS2-1. Develop a model to describe the movement of matter among producers, consumers, decomposers, and the air, water, and soil in the environment to (a) show that plants produce sugars and plant materials, (b) show that animals can eat plants and/or other animals for food, and (c) show that some organisms, including fungi and bacteria, break down dead organisms and recycle some materials back to the air and soil.** *Clarification Statement: Emphasis is on matter moving throughout the ecosystem. State Assessment Boundary: Molecular explanations, or distinctions among primary, secondary, and tertiary consumers are not expected in state assessment.*

**5-PS3-1. Use a model to describe that the food animals digest (a) contains energy that was once energy from the Sun, and (b) provides energy and nutrients for life processes, including body repair, growth, motion, body warmth, and reproduction. Clarification Statement: Examples of models could include diagrams and flow charts.***State Assessment Boundary: Details of cellular respiration, ATP, or molecular details of the process of photosynthesis or respiration are not expected in state assessment.*

**Physical Science**

**3-PS2-3. Conduct an investigation to determine the nature of the forces between two magnets based on their orientations and distance relative to each other.** *Clarification Statement: Focus should be on forces produced by magnetic objects that are easily manipulated.*

**3-PS2-4. Define a simple design problem that can be solved by applying the use of the interactions between magnets.** *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.*

**4-PS3-2. Make observations to show that energy can be transferred from place to place by sound, light, heat, and electric currents.** *Clarification Statement: Evidence of energy being transferred can include vibrations felt a small distance from a source, a solar-powered toy that moves when placed in direct light, warming a metal object on one end and observing the other end getting warm, and a wire carrying electric energy from a battery to light a bulb. State Assessment Boundary: Quantitative measurements of energy are not expected in state assessment.*

**4-PS3-4. Apply scientific principles of energy and motion to test and refine a device that converts kinetic energy to electrical energy or uses stored energy to cause motion or produce light or sound.\***  *Clarification Statement: Sources of stored energy can include water in a bucket or a weight suspended at a height, and a battery.*

**4-PS4-2. Develop a model to describe that light must reflect off an object and enter the eye for the object to be seen.** *State Assessment Boundary: Specific colors reflected and seen, the cellular mechanisms of vision, angles of incidence and reflection, or how the retina works are not expected in state assessment.*

**5-PS1-1. Use a particle model of matter to explain common phenomena involving gases, and phase changes between gas and liquid and between liquid and solid.** *Clarification Statement: Examples of common phenomena the model should be able to describe include adding air to expand a balloon, compressing air in a syringe, and evaporating water from a salt water solution. State Assessment Boundary: Atomic-scale mechanisms of evaporation and condensation or defining unseen particles are not expected in state assessment.*

**5-PS1-3. Make observations and measurements of substances to describe characteristic properties of each, including color, hardness, reflectivity, electrical conductivity, thermal conductivity, response to magnetic forces, and solubility.** *Clarification Statements: Emphasis is on describing how each substance has a unique set of properties. Examples of substances could include baking soda and other powders, metals, minerals, and liquids. State Assessment Boundary: Density, distinguishing mass and weight, or specific tests or procedures are not expected in state assessment.*

**Technology/Engineering**

**3.3-5-ETS1-1. Define a simple design problem that reflects a need or a want. Include criteria for success and constraints on materials, time, or cost that a potential solution must meet.\***

**3.3-5-ETS1-2. Generate several possible solutions to a given design problem. Compare each solution based on how well each is likely to meet the criteria and constraints of the design problem.\*** *Clarification Statement: Examples of design problems can include adapting a switch on a toy for children that have a motor coordination disability, designing a way to clear or collect debris or trash from a storm drain, or creating safe moveable playground equipment for a new recess game.*

**3.3-5-ETS1-4(MA). Gather information using various informational resources on possible solutions to a design problem. Present different representations of a design solution. \*** *Clarification Statements: Examples of informational resources can include books, videos, and websites. Examples of representations can include graphic organizers, sketches, models, and prototypes.*

**4.3-5-ETS1-5(MA). Evaluate relevant design features that must be considered in building a model or prototype of a solution to a given design problem.\***