Below is a list of the 2001/06 Grade 6-8 STE standards that will be assessed on the 2017 MCAS Grade 5 STE test. This list of standards is being released because schools and districts are currently transitioning to the standards in the 2016 Massachusetts STE Framework. Schools and districts are at different points of transition, so providing this list identifies standards that may need to be included in instruction.

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| **Earth and Space Science** |
| 2. Describe the layers of the solid earth, including the lithosphere, the hot convecting mantle, and the dense metallic core. |
| 3.  Differentiate among radiation, conduction, and convection, the three mechanisms by which heat is transferred through the earth’s system.  |
| 4.  Explain the relationship among the energy provided by the sun, the global patterns of atmospheric movement, and the temperature differences among water, land, and atmosphere. |
| 5. Describe how the movement of the earth’s crustal plates causes both slow changes in the earth’s surface (e.g., formation of mountains and ocean basins) and rapid ones (e.g., volcanic eruptions and earthquakes). |
| 6.  Describe and give examples of ways in which the earth’s surface is built up and torn down by natural processes, including deposition of sediments, rock formation, erosion, and weathering. |
| 7.  Explain and give examples of how physical evidence, such as fossils and surface features of glaciation, supports theories that the earth has evolved over geologic time. |
| 8.  Recognize that gravity is a force that pulls all things on and near the earth toward the center of the earth. Gravity plays a major role in the formation of the planets, stars, and solar system and in determining their motions. |
| 9.   Describe lunar and solar eclipses, the observed moon phases, and tides. Relate them to the relative positions of the earth, moon, and sun. |
| 10.  Compare and contrast properties and conditions of objects in the solar system (i.e., sun, planets, and moons) to those on Earth (i.e., gravitational force, distance from the sun, speed, movement, temperature, and atmospheric conditions). |
| 11.  Explain how the tilt of the earth and its revolution around the sun result in an uneven heating of the earth, which in turn causes the seasons. |
| 12.  Recognize that the universe contains many billions of galaxies, and that each galaxy contains many billions of stars. |

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| **Life Science** |
| 2.   Recognize that all organisms are composed of cells, and that many organisms are single-celled (unicellular), e.g., bacteria, yeast. In these single-celled organisms, one cell must carry out all of the basic functions of life. |
| 3.   Compare and contrast plant and animal cells, including major organelles (cell membrane, cell wall, nucleus, cytoplasm, chloroplasts, mitochondria, vacuoles). |
| 4.   Recognize that within cells, many of the basic functions of organisms (e.g., extracting energy from food and getting rid of waste) are carried out. The way in which cells function is similar in all living organisms. |
| 6.  Identify the general functions of the major systems of the human body (digestion, respiration, reproduction, circulation, excretion, protection from disease, and movement, control, and coordination) and describe ways that these systems interact with each other. |
| 7.  Recognize that every organism requires a set of instructions that specifies its traits. These instructions are stored in the organism’s chromosomes. Heredity is the passage of these instructions from one generation to another. |
| 8.  Recognize that hereditary information is contained in genes located in the chromosomes of each cell. A human cell contains about 30,000 different genes on 23 different chromosomes. |
| 10.  Give examples of ways in which genetic variation and environmental factors are causes of evolution and the diversity of organisms. |
| 11.  Recognize that evidence drawn from geology, fossils, and comparative anatomy provide the basis of the theory of evolution. |
| 15.  Explain how dead plants and animals are broken down by other living organisms and how this process contributes to the system as a whole. |
| 16.  Recognize that producers (plants that contain chlorophyll) use the energy from sunlight to make sugars from carbon dioxide and water through a process called photosynthesis. This food can be used immediately, stored for later use, or used by other organisms. |
| 17.     Identify ways in which ecosystems have changed throughout geologic time in response to physical conditions, interactions among organisms, and the actions of humans. Describe how changes may be catastrophes such as volcanic eruptions or ice storms. |
| 18.  Recognize that biological evolution accounts for the diversity of species developed through gradual processes over many generations. |
| **Physical Science** |
| 2.   Differentiate between volume and mass. Define density. |
| 4.   Explain and give examples of how mass is conserved in a closed system. |
| 6.   Differentiate between an atom (the smallest unit of an element that maintains the characteristics of that element) and a molecule (the smallest unit of a compound that maintains the characteristics of that compound). |
| 7. Give basic examples of elements and compounds.  |
| 8. Differentiate between mixtures and pure substances.  |
| 9. Recognize that a substance (element or compound) has a melting point and a boiling point, both of which are independent of the amount of the sample. |
| 12. Graph and interpret distance vs. time graphs for constant speed. |
| 13. Differentiate between potential and kinetic energy. Identify situations where kinetic energy is transformed into potential energy and vice versa. |
| 14. Recognize that heat is a form of energy and that temperature change results from adding or taking away heat from a system. |
| 16. Give examples of how heat moves in predictable ways, moving from warmer objects to cooler ones until they reach equilibrium. |
| **Technology/Engineering** |
| 1.1  Given a design task, identify appropriate materials (e.g., wood, paper, plastic, aggregates, ceramics, metals, solvents, adhesives) based on specific properties and characteristics (e.g., weight, strength, hardness, and flexibility). |
| 2.1  Identify and explain the steps of the engineering design process, i.e., identify the need or problem, research the problem, develop possible solutions, select the best possible solution(s), construct a prototype, test and evaluate, communicate the solution(s), and redesign. |
| 2.4  Identify appropriate materials, tools, and machines needed to construct a prototype of a given engineering design. |
| 3.1     Identify and explain the components of a communication system, i.e., source, encoder, transmitter, receiver, decoder, storage, retrieval, and destination. |
| 3.2     Identify and explain the appropriate tools, machines, and electronic devices (e.g., drawing tools, computer-aided design, and cameras) used to produce and/or reproduce design solutions (e.g., engineering drawings, prototypes, and reports). |
| 4.2  Explain and give examples of the impacts of interchangeable parts, components of mass-produced products, and the use of automation, e.g., robotics. |
| 5.1     Describe and explain parts of a structure, e.g., foundation, flooring, decking, wall, roofing systems. |
| 5.3     Explain how the forces of tension, compression, torsion, bending, and shear affect the performance of bridges. |
| 6.2     Given a transportation problem, explain a possible solution using the universal systems model. |
| 6.3  Identify and describe three subsystems of a transportation vehicle or device, i.e., structural, propulsion, guidance, suspension, control, and support. |