EIGHTH GRADE STANDARDS					
Standard	Conceptual Strand	Guiding Question	Grade Level Expectations	Checks for Understanding	State Performance Indicators
5. Biodiversity & Change	A rich variety of complex organisms have developed in response to a continually changing environment.	How does natural selection explain how organisms have changed over time?	1. Identify various criteria used to classify organisms into groups. 2. Use a simple classification key to identify a specific organism. 3. Analyze how structural, behavioral, and physiological adaptations within a population enable it to survive in a given environment. 4. Explain why variation within a population can enhance the chances for group survival. 5. Describe the importance of maintaining the earth's biodiversity. 6. Investigate fossils in sedimentary rock layers to gather evidence of changing life forms.	1. Select characteristics of plants and animals that serve as the basis for developing a classification key. 2. Create and apply a simple classification key to identify an organism. 3. Compare and contrast the ability of an organism to survive under different environmental conditions. 4. Collect and analyze data relating to variation within a population of organisms. 5. Prepare a poster that illustrates the major factors responsible for reducing the amount of global biodiversity. 6. Prepare graphs that demonstrate how the amount of biodiversity has changed in a particular continent or biome. 7. Create a timeline that illustrates the relative ages of fossils in sedimentary rock layers.	1. Use a simple classification key to identify an unknown organism. 2. Analyze structural, behavioral, and physiological adaptations to predict which populations are likely to survive in a particular environment. 3. Analyze data on levels of variation within a population to make predictions about survival under particular environmental conditions. 4. Identify several reasons for the importance of maintaining the earth's biodiversity. 5. Compare fossils found in sedimentary rock to determine their relative age.
9. Matter	The composition and structure of matter is known, and it behaves according to principles that are generally understood.	How does the structure of matter influence its physical and chemical behavior?	1. Understand that all matter is made up of atoms. 2. Explain that matter has properties that are determined by the structure and arrangement of its atoms. 3. Interpret data from an investigation to differentiate between physical and chemical changes. 4. Distinguish among elements, compounds, and mixtures. 5. Apply the chemical properties of mthe atmosphere to illustrate a mixture of gases. 6. Use the periodic table to determine the characteristics of an element. 7. Explain the Law of Conservation of Mass. 8. Interpret the events represented by a chemical equation. 9. Explain the basic difference between acids and bases.	1. Identify atoms as the fundamental particles that make up matter. 2. Illustrate the particle arrangement and type of motion associated with different states of matter. 3. Measure or calculate the mass, volume, and temperature of a given substance. 4. Calculate the density of various objects. 5. Distinguish between elements and compounds by their symbols and formulas. 6. Differentiate between physical and chemical changes. 7. Describe how the characteristics of a compound are different than the characteristics of their component parts. 8. Determine the types of interactions between substances that result in a chemical change. 9. Explain how the chemical makeup of the atmosphere illustrates a mixture of gases. 10. Identify the atomic number, atomic mass, number of protons, neutrons, and electrons in an atom of an element using the periodic table. 11. Use investigations of chemical and physical changes to describe the Law of Conservation of Mass. 12. Differentiate between the reactants and products of a chemical equation. 13. Determine whether a substance is an acid or a base by its reaction to an indicator.	1. Recognize that all matter consists of atoms. 2. Identify the common outcome of all chemical changes. 3. Classify common substances as elements or compounds based on their symbols or formulas. 4. Differentiate between a mixture and a compound. 5. Describe the chemical makeup of the atmosphere. 6. Compare the particle arrangement and type of particle motion associated with different states of matter. 7. Apply an equation to determine the density of an object based on its mass and volume. 8. Interpret the results of an investigation to determine whether a physical or chemical change has occurred. 9. Use the periodic table to determine the properties of an element. 10. Identify the reactants and products of a chemical reaction. 11. Recognize that in a chemical reaction the mass of the reactants is equal to the mass of the products (Law of Conservation of Mass). 12. Identify the basic properties of acids and bases.
12. Forces in Nature	Everything in the universe exerts a gravitational force on everything else; there is an interplay between magnetic fields and electrical currents.	What are the scientific principles that explain gravity and electromagnetism?	1. Investigate the relationship between magnetism and electricity. 2. Design an investigation to change the strength of an electromagnet. 3. Compare and contrast the earth's magnetic field to that of a magnet and an electromagnet. 4. Identify factors that influence the amount of gravitational force between objects. 5. Recognize that gravity is the force that controls the motion of objects in the solar system.	1. Create a diagram to explain the relationship between electricity and magnetism. 2. Produce an electromagnet using a bar magnet and a wire coil. 3. Experiment with an electromagnet to determine how to vary its strength. 4. Create a chart to distinguish among the earth's magnetic field, and fields that surround a magnet and an electromagnet. 5. Explain the difference between mass and weight. 6. Identify factors that influence the amount of gravitational force between objects. 7. Explain how the motion of objects in the solar system is affected by gravity.	1. Recognize that electricity can be produced using a magnet and wire coil. 2. Describe the basic principles of an electromagnet. 3. Distinguish among the Earth's magnetic field, a magnet, and the fields that surround a magnet and an electromagnet. 4. Distinguish between mass and weight using appropriate measuring instruments and units. 5. Determine the relationship among the mass of objects, the distance between these objects, and the amount of gravitational attraction. 6. Illustrate how gravity controls the motion of objects in the solar system.
Embedded Inquiry	Understandings about scientific inquiry and the ability to conduct inquiry are essential for living in the 21st century.	What tools, skills, knowledge, and dispositions are needed to conduct scientific inquiry?	1.Design and conduct open-ended scientific investigations. 2. Use appropriate tools and techniques to gather, organize, analyze, and interpret data. 3. Synthesize information to determine cause and effect relationships between evidence and explanations. 4. Recognize possible sources of bias and error, alternative explanations, and questions for further exploration. 5. Communicate scientific understanding using descriptions, explanations, and models	1. Design and conduct an open-ended scientific investigation to answer a question that includes a control and appropriate variables. 2. Identify tools and techniques needed to gather, organize, analyze, and interpret data collected from a moderately complex scientific investigation. 3. Use evidence from a dataset to determine cause and effect relationships that explain a phenomenon. 4. Review an experimental design to determine possible sources of bias or error, state alternative explanations, and identify questions	1. Design a simple experimental procedure with an identified control and appropriate variables. 2. Select tools and procedures needed to conduct a moderately complex experiment. 3. Interpret and translate data in a table, graph, or diagram. 4. Draw a conclusion that establishes a cause and effect relationship supported by evidence. 5. Identify a faulty interpretation of data that is due to bias or experimental error.
Embedded Technology and Engineering	Society benefits when engineers apply scientific discoveries to design materials and processes that develop into enabling technologies.	How do science concepts, engineering skills, and applications of technology improve the quality of life?	1. Explore how technology responds to social, political, and economic needs. 2. Know that the engineering design process involves an ongoing series of events that incorporate design constraints, model building, testing, evaluating, modifying, and retesting. 3. Compare the intended benefits with the unintended consequences of a new technology. 4. Describe and explain adaptive and assistive bioengineered products.	1. Use appropriate tools to test for strength, hardness, and flexibility of materials. 2. Apply the engineering design process to construct a prototype that meets certain specifications. 3. Explore how the unintended consequences of new technologies can impact society. 4. Research bioengineering technologies that advance health and contribute to improvements in our daily lives. 5. Develop an adaptive design and test its effectiveness.	1. Identify the tools and procedures needed to test the design features of a prototype. 2. Evaluate a protocol to determine if the engineering design process was successfully applied. 3. Distinguish between the intended benefits and the unintended consequences of a new technology. 4. Differentiate between adaptive and assistive engineered products (e.g., food, biofuels, medicines, integrated pest management).