

SCIENCE OUTCOMES
PRESCHOOL AND KINDERGARTEN PREP

1. Observing

- A. Use senses to explore materials and the environment.
- B. Identify and/or describe objects by physical characteristics.

2. Questioning

- A. Express wonder about the natural world.
- B. Ask questions and seek answers through active exploration.
- C. Make predictions about objects and natural events.

3. Investigating

- A. Use tools (e.g., magnifying glass, binoculars, maps) for investigation of the environment.
- B. Make comparisons between objects that have been collected or observed.

SCIENCE OUTCOMES
KINDERGARTEN

- 1. Scientific inquiry is a set of interrelated processes used to pose questions about the natural world and investigate phenomena.**
 - A. Use observations to develop an accurate description of a natural phenomenon.
 - B. Compare one's observations and descriptions with those of others.

- 2. Some objects occur in nature; others have been designed and processed by people.**
 - A. Sort objects into two groups: those that are found in nature and those that are human made.

- 3. Objects can be described in terms of the materials they are made of and their physical properties.**
 - A. Sort objects in terms of color, size, shape, and texture, and communicate reasoning for the sorting system.
 - B. Describe ways to change different forms of matter (i.e. paper, cloth, clay).
 - C. Identify the changing states of water.
 - D. Understand the relationship between motion and speed.
 - E. Compare characteristics of different sounds.
 - F. Analyze and demonstrate the relationship between magnets and movement.

- 4. Weather can be described in measurable quantities and changes from day to day and with the seasons.**
 - A. Monitor daily and seasonal changes in weather and summarize the changes.
 - B. Identify the sun as a source of heat, light, and shadows.
 - C. Describe the elements of the night sky.
 - D. Analyze the water cycle.

- 5. Earth can be described in terms of its' environmental characteristics.**
 - A. Analyze and describe the characteristics of rocks, geographic features, rivers, lakes, and oceans.
 - B. Analyzes and describes the composition and creation of soil.
 - C. Describe characteristics of different types of clouds.

- 6. Living things are diverse with many different observable characteristics.**
 - A. Observe and compare plants and animals.
 - B. Identify the external parts of a variety of plants and animals including humans.
 - C. Understand characteristics of organisms.
 - D. Analyze an animal's needs for survival.
 - E. Describe the changes in characteristics as an animal grows.

F. Describe the changes in characteristics as a plant grows

7. Natural systems have many components that interact to maintain the system.

A. Observe a natural system or its model.

B. Identify living and nonliving components in that system.

C. Understand the relationships between animals and their habits

D. Describe interactions with the environment through the five senses.

E. Explain the process of recycling and the consequences of not recycling.

F. Explain the process of travel for both plant seeds and animals.

SCIENCE OUTCOMES
FIRST GRADE

- 1. Scientists work as individuals and in groups to investigate the natural world, emphasizing evidence and communicating with others.**
 - A. Describe and support answers using thorough and accurate observations.

- 2. Designed and natural systems exist in the world. These systems are made up of components that act within a system and interact with other systems.**
 - A. Observe that many living and nonliving things are made of parts and that if a part is missing or broken, they may not function properly.

- 3. Men and women throughout the history of all cultures, including Minnesota American Indian tribes and communities, have been involved in engineering design and scientific inquiry.**
 - A. Recognize that tools are used to gather information and solve problems.

- 4. Earth materials include solid rocks, sand, soil and water. These materials have different observable physical properties that make them useful.**
 - A. Group or classify rocks in terms of color, shape and size.
 - B. Describe similarities and differences between soil and rocks.
 - C. Identify and describe large and small objects made of Earth materials.

- 5. Living things are diverse with many different observable characteristics.**
 - A. Describe and sort animals into groups in many ways, according to their physical characteristics and behaviors.

- 6. Natural systems have many components that interact to maintain the living system.**
 - A. Recognize that animals need space, water, food, shelter and air.
 - B. Describe ways in which an animal's habitat provides for its basic needs.

- 7. Plants and animals undergo a series of orderly changes during their life cycles.**
 - A. Demonstrate an understanding that animals pass through life cycles that include a beginning, development into adults, reproduction and eventually death.

SCIENCE OUTCOMES
SECOND GRADE

- 1. Engineering design is the process of identifying a problem and devising a product to solve the problem.**
 - A. Identify a need of a problem to be solved.
 - B. Construct an invention that helps to solve the problem.
 - C. Explain how the designed invention and other designed items help benefit people's everyday lives.

- 2. Objects can be described in terms of physical properties.**
 - A. Describe the physical properties of different types of objects.
 - B. Categorize objects according to their various physical properties. (size, color, shape, texture, flexibility)

- 3. Physical properties of materials can be changed but not all materials respond in the same way.**
 - A. Observe, record, and recognize the three states of matter and how they change from one state to another.
 - B. Describe the three states of matter and their characteristics.

- 4. The motion of an object can be described by a change in its position over time.**
 - A. Describe an object's change in position relative to other objects in the background.
 - B. Demonstrate that objects move in a variety of ways and at different speeds.

- 5. The motion of an object can be changed by push or pull forces.**
 - A. Demonstrate how pushes and pulls make something move.
 - B. Conduct an experiment that shows how things near the Earth fall to the ground unless something holds them up.

- 6. Identifying the properties of earth's materials and explaining the changes that take place in the earth and sky.**
 - A. Explain the water cycle and how it affects the Earth.
 - B. Describe how the weather changes the Earth slowly and quickly.
 - C. Explain what causes the four seasons on Earth.

- 7. Living things are diverse with many different observable characteristics.**
 - A. Classify plants into groups in many ways according to their physical characteristics and behaviors.
 - B. List the six animal groups and the characteristics in each group.
 - C. Create a food chain and how animals interact with each other.

8. Natural systems have many components that interact to maintain the system.

A. Compare and contrast living and non-living things.

B. Explain how plants fulfill their needs in different ways.

9. Plants and animals undergo a series of orderly changes during their life cycles.

A. Describe the parts of a plant and the plants function and life cycle.

B. Compare and contrast the life cycle stages of different kinds of animals.

SCIENCE OUTCOMES
THIRD GRADE

- 1. Scientists work as individuals and in groups, emphasizing evidence, open communication and skepticism.**
 - A. Provide evidence to support claims other than saying “Everyone knows that,” or “I just know,” and question such reasons when given by others.

- 2. Scientific inquiry is a set of interrelated processes that are used to pose questions and investigate.**
 - A. Generate questions that can be answered when scientific knowledge is combined with knowledge gained from one’s own observations or investigations.
 - B. Recognize that similar results are expected when a science investigation is done the way it was done before.
 - C. Maintain a record of observations, procedures and explanations.
 - D. Construct reasonable explanations based on evidence collected from observations or experiments.

- 3. Men and women throughout the history of all cultures have been involved in engineering design and scientific inquiry.**
 - A. Understand that everybody can use evidence to learn about the natural world, identify patterns in nature, and develop tools.
 - B. Recognize that science and engineering involves many different kinds of work and engages men and women of all ages and backgrounds.

- 4. Tools and mathematic help scientists and engineers see more, measure more accurately, and do things that they could not otherwise accomplish.**
 - A. Use tools, including rulers, thermometers, magnifiers and simple balances, to improve observations and keep a record of the observations made.

- 5. Energy appears in different forms, including sound and light.**
 - A. Explain the relationship between the pitch of a sound, the rate of vibration of the source and factors that affect pitch.
 - B. Explain how shadows can form in various ways.
 - C. Describe how light travels in a straight line until it is absorbed, redirected, reflected or allowed to pass through an object.

- 6. The sun and moon have locations and movement that can be observed and described.**
 - A. Observe and describe the daily and seasonal changes in the position of the sun.
 - B. Recognize the pattern of apparent changes in the moon’s shape and position.

- 7. Objects in the solar system are seen from Earth as points of light with distinctive patterns of motion.**
- A. Demonstrate how a large light source at a great distance looks like a small light that is much closer.
 - B. Recognize that the Earth is one of several planets that orbit the sun, and that the moon orbits the Earth.
- 8. Living things are diverse with many different characteristics that enable them to grow, reproduce and survive.**
- A. Compare how the different structures of plants and animals serve various functions of growth, survival and reproduction.
 - B. Identify common groups of plants and animals using observable physical characteristics, structures and behaviors.
- 9. Offspring are generally similar to their parents, but may have variations.**
- A. Give examples of likenesses between adults and offspring in plants and animals that can be inherited or acquired.
 - B. Give examples of differences among individuals that can sometimes give an individual an advantage in survival and reproduction.

SCIENCE OUTCOMES

FOURTH GRADE

- 1. Engineers design, create, and develop structures, processes, and systems that are intended to improve society and may make humans more productive.**
 - A. Describe the positive and negative impacts that engineered products and services have on the natural world.

- 2. Engineering design is the process of identifying problems, developing multiple solutions, selecting the best possible solution, and building the product.**
 - A. Identify and investigate a design solution and describe how it was used to solve an everyday problem.
 - B. Generate ideas and possible constraints for solving a problem through engineering design.
 - C. Test and evaluate solutions, considering advantages and disadvantages of the engineering solution, and communicate the results effectively.

- 3. The needs of any society influence the technologies that are developed and how they are used.**
 - A. Describe a situation in which one invention led to other inventions.

- 4. Objects have observable properties that can be measured.**
 - A. Measure temperature, volume, weight, and length using appropriate tools and units.

- 5. Solids, liquids, and gases are states of matter that have unique properties.**
 - A. Distinguish between solids, liquids, and gases in terms of shape and volume.
 - B. Describe how the states of matter change as a result of heating and cooling.

- 6. Energy appears in different forms including electromagnetism.**
 - A. Describe the transfer of heat energy when a warm and a cool object are touching or placed near each other.
 - B. Describe how magnets can repel or attract each other and how they attract certain metal objects.
 - C. Compare materials that are conductors and insulators of electricity.

- 7. Energy can be changed within a system or transferred to other systems or the environment.**
 - A. Identify several ways to generate heat energy.
 - B. Construct a simple electrical circuit using wire, batteries, and light bulbs.
 - C. Demonstrate how an electric current can produce a magnetic force.

8. Rocks are Earth materials that may vary in composition.

- A. Recognize that rocks may be uniform or made of a mixture of different materials.
- B. Describe and classify minerals based on their physical properties.

9. Water circulates through the Earth's crust, oceans, and atmosphere in what is known as the water cycle.

- A. Identify where water collects on Earth and describe how water moves through the Earth system using the process of evaporation, condensation, and precipitation.

10. In order to improve existence, humans interact with and influence Earth systems.

- A. Describe how the methods people utilize to obtain water can affect water supply and quality.

11. Microorganisms can get inside one's body and they may keep it from working properly.

- A. Recognize that the body has defense systems against germs; including tears, saliva, skin and blood.
- B. Give examples of diseases that can be prevented by vaccination.

SCIENCE OUTCOMES
FIFTH GRADE

- 1. Science is characterized by empirical criteria, logical argument and skeptical review.**
 - A. Explain why evidence, clear communication, and accurate record-keeping are essential to science.
 - B. Compare/contrast reasons why an investigation might have the same or different results.
 - C. State why explanations for a similar observation leads to more observations.
 - D. Explain why different models are used to represent phenomena and that the models have limits to what they can explain.

- 2. Scientific inquiry requires assumptions, critical and logical thinking and alternate explanations.**
 - A. Compose a scientific question and plan a scientific investigation to answer the question.
 - B. Investigate and collect evidence in a scientific investigation.
 - C. Conduct an experiment and explain how and why the results may change depending on the validity of the experiment.

- 3. Men and women throughout history of all cultures, including Minnesota American Indian tribes, have been involved in engineering design and scientific inquiry.**
 - A. Describe how science and engineering are influenced by local traditions and beliefs.

- 4. Tools and mathematics help scientists and engineers measure accurately.**
 - A. Demonstrate appropriate tools and techniques when gathering, analyzing, and interpreting data.
 - B. Create different kinds of maps of the community and state.

- 5. An object's motion is affected by forces and is described by the object's speed and direction of movement.**
 - A. List examples of simple machines and demonstrate how they change input/output of forces and motion.
 - B. Name the force that starts something moving or changes speed or direction of motion.
 - C. Demonstrate that a greater force of an object produces a greater change in motion.

- 6. The surface of the Earth changes due to slow or rapid processes.**
 - A. Explain how rocks and weather combine with organic matter to form soil.
 - B. Compare/Contrast how slow processes and rapid processes form the features of Earth's surface.

- 7. To maintain and improve their existence, humans interact and influence Earth systems.**
 - A. Name renewable and non-renewable energy and resources found in MN and describe how they're used.
 - B. Explain how mineral and energy resources are obtained and processed and how their properties make them useful.
 - C. Explain how individual decisions on natural systems are impacted.

- 8. Living things are diverse with many different characteristics that enable them to grow, reproduce, and survive.**
 - A. Describe how plant and animal structures and functions provide advantages for survival.

- 9. Natural systems have many components that interact to maintain the living system.**
 - A. Describe a natural system in MN with relationships among its living and nonliving parts and inputs and outputs.
 - B. Explain what would happen to a system if one of its parts were changed.

- 10. Humans change environments in ways that can be beneficial or harmful to themselves and other organisms.**
 - A. Name examples of beneficial and harmful interaction with natural systems.

SCIENCE OUTCOMES

SIXTH GRADE

- 1. Engineers create, develop and manufacture machines, structures, processes and systems that impact society and may make humans more productive.**
 - A. Identify a common engineered system and evaluate its impact on the daily life of humans.
 - B. Recognize that there is no perfect design and that new technologies have consequences that may increase some risks and decrease others.
 - C. Describe the trade-offs in using manufactured products in terms of features, performance, durability and cost.
 - D. Explain the importance of learning from past failures, in order to inform future designs of similar products or systems.
- 2. Engineering design is the process of devising products, processes and systems that address a need, capitalize on an opportunity, or solve a specific problem.**
 - A. Apply and document an engineering design process that includes identifying criteria and constraints, making representations, testing and evaluation, and refining the design as needed to construct a product or system that solves a problem.
- 3. Designed and natural systems exist in the world. These systems consist of components that act within the system and interact with other systems.**
 - A. Describe a system in terms of its subsystems and parts, as well as its inputs, processes and outputs.
 - B. Distinguish between open and closed systems.
- 4. Current and emerging technologies have enabled humans to develop and use models to understand and communicate how natural and designed systems work and interact.**
 - A. Determine and use appropriate safe procedures, tools, measurements, graphs and mathematical analyses to describe and investigate natural and designed systems in a physical science context.
 - B. Demonstrate the conversion of units within the International System of Units (SI, or metric) and estimate the magnitude of common objects and quantities using metric units.
- 5. Pure substances can be identified by properties which are independent of the sample of the substance and the properties can be explained by a model of matter that is composed of small particles.**
 - A. Explain density, dissolving, compression, diffusion and thermal expansion using the particle model of matter.

- 6. Substances can undergo physical changes which do not change the composition or the total mass of the substance in a closed system.**
 - A. Identify evidence of physical changes, including changing phase or shape, and dissolving in other materials.
 - B. Describe how mass is conserved during a physical change in a closed system.
 - C. Use the relationship between heat and the motion and arrangement of particles in solids, liquids and gases to explain melting, freezing, condensation and evaporation.

- 7. The motion of an object can be described in terms of speed, direction and change of position.**
 - A. Measure and calculate the speed of an object that is traveling in a straight line.
 - B. For an object traveling in a straight line, graph the object's position as a function of time, and its speed as a function of time. Explain how these graphs describe the object's motion.

- 8. Forces have magnitude and direction and affect the motion of objects.**
 - A. Recognize that when the forces acting on an object are balanced, the object remains at rest or continues to move at a constant speed in a straight line, and that unbalanced forces cause a change in the speed or direction of the motion of an object.
 - B. Identify the forces acting on an object and describe how the sum of the forces affects the motion of the object.
 - C. Recognize that some forces between objects act when the objects are in direct contact and others, such as magnetic, electrical and gravitational forces can act from a distance.
 - D. Distinguish between mass and weight.

- 9. Waves involve the transfer of energy without the transfer of matter.**
 - A. Differentiate between kinetic and potential energy and analyze situations where kinetic energy is converted to potential energy and vice versa.
 - B. Trace the changes of energy forms, including thermal, electrical, chemical, mechanical, or others as energy is used in devices.
 - C. Describe how heat energy is transferred in conduction, convection and radiation.

SCIENCE OUTCOMES
SEVENTH GRADE

- 1. Science is a way of knowing about the natural world and is characterized by empirical criteria, logical argument and skeptical review.**
 - A. Understand that prior expectations can create bias when conducting scientific investigations.
 - B. Understand that when similar investigations give different results, the challenge is to judge whether the differences are significant, and if further studies are required.

- 2. Scientific inquiry uses multiple interrelated processes to investigate questions and propose explanations about the natural world.**
 - A. Generate and refine a variety of scientific questions and match them with appropriate methods of investigation, such as field studies, controlled experiments, reviews of existing work, and development of models.
 - B. Plan and conduct a controlled experiment to test a hypothesis about a relationship between two variables, ensuring that one variable is systematically manipulated, the other is measured and recorded, and any other variables are kept the same (controlled).
 - C. Generate a scientific conclusion from an investigation, clearly distinguishing between results (evidence) and conclusions (explanation).
 - D. Evaluate explanations proposed by others by examining and comparing evidence, identifying faulty reasoning, and suggesting alternative explanations.

- 3. Current and emerging technologies have enabled humans to develop and use models to understand and communicate how natural and designed systems work and interact.**
 - A. Use maps, satellite images and other data sets to describe patterns and make predictions about natural systems in a life science context.
 - B. Determine and use appropriate safety procedures, tools, measurements, graphs and mathematical analyses to describe and investigate natural and designed systems in a life science context.

- 4. The idea that matter is made up of atoms and molecules provides the basis for understanding the properties of matter.**
 - A. Recognize that all substances are composed of one or more of approximately one hundred elements and that the periodic table organizes the elements into groups with similar properties.
 - B. Describe the differences between elements and compounds in terms of atoms and molecules.

- C. Recognize that a chemical equation describes a reaction where pure substances change to produce one or more pure substances whose properties are different from the original substance(s).

5. Tissues, organs and organ systems are composed of cells and function to serve the needs of all cells for food, air and waste removal.

- A. Recognize that all cells do not look alike and that specialized cells in multi-cellular organisms are organized into tissues and organs that perform specialized functions.
- B. Describe how the organs in the respiratory, circulatory, digestive, nervous, skin and urinary systems interact to serve the needs of vertebrate organisms.

6. All living organisms are composed of one or more cells which carry on the many functions needed to sustain life.

- A. Recognize that cells carry out life functions, and that these functions are carried out in a similar way in all organisms, including animals, plants, fungi, bacteria and protists.
- B. Recognize that cells repeatedly divide to make more cells for growth and repair.
- C. Use the presence of the cell wall and chloroplasts to distinguish between plant and animal cells.

7. Natural systems include a variety of organisms that interact with one another in several ways.

- A. Identify a variety of populations and communities in an ecosystem and describe the relationships among the populations and communities in a stable ecosystem.
- B. Compare and contrast the roles of organisms with the following relationships: predator/prey, parasite/host, and producer/consumer/decomposer.
- C. Explain how the number of populations an ecosystem can support depends on the biotic resources available as well as abiotic factors such as amount of light and water, temperature range and soil composition.

8. The flow of energy and the recycling of matter are essential to a stable ecosystem.

- A. Recognize that producers 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.
- B. Describe the roles and relationships among producers, consumers and decomposers in changing energy from one form to another in a food web within an ecosystem.
- C. Explain that the total amount of matter in an ecosystem remains the same as it is transferred between organisms and their physical environment, even though its form and location change.

9. Reproduction is a characteristic of all organisms and is essential for the continuation of a species. Hereditary information is contained in genes which are inherited through asexual or sexual reproduction.

- A. Recognize that cells contain genes and that each gene carries a single unit of information that either alone, or with other genes, determines the inherited traits of an organism.
- B. Recognize that in asexually reproducing organisms all the genes come from a single parent, and that in sexually reproducing organisms about half of the genes come from each parent.
- C. Distinguish between characteristics of organisms that are inherited and those acquired through environmental influences.

10. Individual organisms with certain traits in particular environments are more likely than others to survive and have offspring.

- A. Explain how the fossil record documents the appearance, diversification and extinction of many life forms.
- B. Use internal and external anatomical structures to compare and infer relationships between living organisms as well as those in the fossil record.
- C. Recognize that variation exists in every population and describe how a variation can help or hinder an organism's ability to survive.
- D. Recognize that extinction is a common event and it can occur when the environment changes and a population's ability to adapt is insufficient to allow its survival.

11. Human activity can change living organisms and ecosystems.

- A. Describe examples where selective breeding has resulted in new varieties of cultivated plants and particular traits in domesticated animals.
- B. Describe ways that human activities can change the populations and communities in an ecosystem.

12. Human beings are constantly interacting with other organisms that cause disease.

- A. Explain how viruses, bacteria, fungi and parasites may infect the human body and interfere with normal body functions.
- B. Recognize that a microorganism can cause specific diseases and that there are a variety of medicines available that can be used to combat a given microorganism.
- C. Recognize that vaccines induce the body to build immunity to a disease without actually causing the disease itself.
- D. Recognize that the human immune system protects against microscopic organisms and foreign substances that enter from outside the body and against some cancer cells that arise from within.

SCIENCE OUTCOMES
EIGHTH GRADE

- 1. Science is a way of knowing about the natural world and is characterized by empirical criteria, logical argument and skeptical.**
 - A. Evaluate the reasoning in arguments in which fact and opinion are intermingled or when conclusions do not follow logically from the evidence given.

- 2. Scientific inquiry uses multiple interrelated processes to investigate questions and propose explanations about the natural world.**
 - A. Use logical reasoning and imagination to develop descriptions, explanations, predictions and models based on evidence.

- 3. Men and women throughout the history of all cultures, including Minnesota American Indian tribes and communities, have been involved in engineering design and scientific inquiry.**
 - A. Describe examples of important contributions to the advancement of science, engineering and technology made by individuals representing different groups and cultures at different times in history.

- 4. Science and engineering operate in the context of society and both influence and are influenced by this context.**
 - A. Explain how scientific laws and engineering principles, as well as economic, political, social, and ethical expectations, must be taken into account in designing engineering solutions or conducting scientific investigations.
 - B. Understand that scientific knowledge is always changing as new technologies and information enhance observations and analysis of data.
 - C. Provide examples of how advances in technology have impacted the ways in which people live, work and interact.

- 5. Current and emerging technologies have enabled humans to develop and use models to understand and communicate how natural and designed systems work and interact.**
 - A. Use maps, satellite images and other data sets to describe patterns and make predictions about local and global systems in Earth science contexts.
 - B. Determine and use appropriate safety procedures, tools, measurements, graphs and mathematical analyses to describe and investigate natural and designed systems in Earth and physical science contexts.

- 6. Pure substances can be identified by properties which are independent of the sample of the substance and the properties can be explained by a model of matter that is composed of small particles.**
- A. Distinguish between a mixture and a pure substance and use physical properties including color, solubility, density, melting point and boiling point to separate mixtures and identify pure substances.
 - B. Use physical properties to distinguish between metals and non-metals.
- 7. Substances can undergo physical and chemical changes which may change the properties of the substance but do not change the total mass in a closed system.**
- A. Identify evidence of chemical changes, including color change, generation of a gas, solid formation and temperature change.
 - B. Distinguish between chemical and physical changes in matter.
 - C. Use the particle model of matter to explain how mass is conserved during physical and chemical changes in a closed system.
 - D. Recognize that acids are compounds whose properties include a sour taste, characteristic color changes with litmus and other acid/base indicators, and the tendency to react with bases to produce a salt and water.
- 8. Waves involve the transfer of energy without the transfer of matter.**
- A. Explain how seismic waves transfer energy through the layers of the Earth and across its surface.
- 9. The movement of tectonic plates results from interactions among the lithosphere, mantle and core.**
- A. Recognize that the Earth is composed of layers, and describe the properties of the layers, including the lithosphere, mantle and core.
 - B. Correlate the distribution of ocean trenches, mid-ocean ridges and mountain ranges to volcanic and seismic activity.
 - C. Recognize that major geological events, such as earthquakes, volcanic eruptions and mountain building, result from the slow movement of tectonic plates.
- 10. Landforms are the result of the combination of constructive and destructive processes.**
- A. Explain how landforms result from the processes of crustal deformation, volcanic eruptions, weathering, erosion and deposition of sediment.
 - B. Explain the role of weathering, erosion and glacial activity in shaping Minnesota's current landscape.

11. Rocks and rock formations indicate evidence of the materials and conditions that produced them.

- A. Interpret successive layers of sedimentary rocks and their fossils to infer relative ages of rock sequences, past geologic events, changes in environmental conditions, and the appearance and extinction of life forms.
- B. Classify and identify rocks and minerals using characteristics including, but not limited to, density, hardness and streak for minerals; and texture and composition for rocks.
- C. Relate rock composition and texture to physical conditions at the time of formation of igneous, sedimentary and metamorphic rock.

12. The sun is the principal external energy source for the Earth.

- A. Explain how the combination of the Earth's tilted axis and revolution around the sun causes the progression of seasons.
- B. Recognize that oceans have a major effect on global climate because water in the oceans holds a large amount of heat.
- C. Explain how heating of the Earth's surface and atmosphere by the sun drives convection within the atmosphere and hydrosphere producing winds, ocean currents and the water cycle, as well as influencing global climate.

13. Patterns of atmospheric movement influence global climate and local weather.

- A. Describe how the composition and structure of the Earth's atmosphere affects energy absorption, climate, and the distribution of particulates and gases.
- B. Analyze changes in wind direction, temperature, humidity and air pressure and relate them to fronts and pressure systems.
- C. Relate global weather patterns to patterns in regional and local weather.

14. Water, which covers the majority of the Earth's surface, circulates through the crust, oceans and atmosphere in what is known as the water cycle.

- A. Describe the location, composition and use of major water reservoirs on the Earth, and the transfer of water among them.
- B. Describe how the water cycle distributes materials and purifies water.