Science Grade 6

Strand:
S1 Scientific Inquiry

The student demonstrates abilities necessary to do scientific inquiry and an understanding about scientific inquiry; that is, the student:

Standards:

S1a: develops research questions that can be answered through scientific investigations.

S1b: accesses, evaluates and uses information from a variety of reliable sources.

S1c: designs, conducts, and records scientific investigations following the general procedures of scientific inquiry.

S1d: applies appropriate tools and techniques to systematically collect, record, analyze, interpret and present data.

S1e: develops logical descriptions, explanations, predictions, and models using evidence.

S1f: recognizes and analyzes interpretations, conclusions, and predictions based upon alternative evidence and explanations.

S1g: communicates scientific procedures, explanations, and conclusions using appropriate scientific language and mathematics.

Strand:
S2 History and Nature of Science

The student demonstrates an understanding of science as a human endeavor, and the history and nature of science; that is, the student:

Standards:

S2a: describes how doing science requires varying human abilities, interest and habits of mind (such as: reasoning, insight, skill, creativity, intellectual honesty, tolerance of ambiguity, skepticism, and openness to new ideas.)

S2b: identifies contributions of individuals from diverse cultures who have extended the knowledge in science and technology.

S2c: explains how the effects of science and technology affect cultural development, innovation and human history.

Strand:
S3 Science in Personal and Social Perspectives

The student demonstrates an understanding of safety and risks and benefits associated with natural and personal hazards; that is, the student:

Standards:

S3a: demonstrates personal and group safety and resource conservation.

S3b: compares the safety precautions needed during different natural hazards.

S3c: describes the risks, costs, and benefits of human decisions related to natural hazards.

S3d: explores causes of environmental degradation and resources depletion.

Strand:
S4 Science and Technology

The student demonstrates an understanding about science and technology, and the nature of technological design; that is, the student:

Standards:

S4a: explores how societal challenges may drive scientific research.

S4b: designs and conducts a test on an invention (or existing product) based on specified criteria.

S4c: compares the intended benefits and unintended consequences of technology and how it impacts society.

S4d: describes how technology responds to societal needs.

Strand:
S5 Physical Science

The student demonstrates a conceptual understanding of matter, motions and forces, and transfer of energy; that is, the student:

Standard:

S5a: investigates how some common elements combine to form mixtures and compounds.

Components:

S5a.1: Mixtures and compounds have properties.

S5a.2: A mixture can be separated into its original components using one or more of the physical properties.

S5a.3: All mixtures and compounds are composed of about 100 common elements with identifying properties.

Standard:

S5b: identifies and illustrates the multiple forces on the movement, speed, and direction of an object.

Components:

S5b.1: An object that is not being subjected to a force will continue to move in a straight line and at a constant speed.

S5b.2: If more than one force acts on an object along a straight line, then the forces will reinforce or cancel one another, depending on their direction and strength.

Standard:

S5c: communicates how energy can be transferred through conduction, convection, and radiation, and how objects have potential energy and kinetic energy.

Components:

S5c.1: Conduction is the process by which heat energy is transmitted through collisions between neighboring molecules.

S5c.2: Convection occurs when warmer particles move upward in warm air or water and colder particles move downward.

S5c.3: Infrared radiation is energy transferred through space.

S5c.4: Potential energy is the stored energy of an object based upon its position.

S5c.5: Kinetic energy is the energy of motion and depends on both the mass and the speed of the object.

Strand:
S6 Life Science

The student demonstrates a conceptual understanding of the structure and function of living systems, populations and ecosystems; that is, the student:

Standard:

S6a: compares and contrasts structure and function in single celled and multicellular organisms.

Components:

S6a.1: Most organisms are single cells; other organisms, including humans, are multicellular.

S6a.2: Cells perform many functions needed to sustain life. They grow and divide, thereby producing more cells.

S6a.3: Specialized cells may also perform specialized functions in multicellular organisms.

Standard: **S6b:** compares asexual and sexual reproduction and infers their role in the survival of a species.

Components:

S6b.1: Reproduction is a characteristic of all living organisms. Some organisms reproduce asexually, others reproduce sexually.

S6b.2: Asexual reproduction includes budding, fission, conjugation, and regeneration.

S6b.3: Fertilization occurs when sperm cells from a male's testes are deposited near an egg cell from the female ovary, and one of the sperm cells enters the egg cell. Most of the time, by chance or design, a sperm never arrives or an egg isn't available.

S6b.4: Following fertilization, cell division produces a small cluster of cells that then differentiate by appearance and function to form the basic tissues of an embryo.

Standard: **S6c:** assesses the relationships among producers, consumers, and decomposers in ecosystems.

Components:

S6c.1: Organisms can be categorized by the function they serve in an ecosystem. Plants and some microorganisms are producers (make their own food). All animals, including humans, are consumers because they eat other organisms. Decomposers, primarily bacteria and fungi, are also consumers that use waste materials and dead organisms for food.

S6c.2: The number of organisms an ecosystem can support depends on the resources available and non-living factors such as quantity of light and water, range of temperatures, and soil composition.

S6c.3: The interrelationships and interdependencies of organisms and environments establish a variety of ecosystems.

Strand:
S7 Earth and Space Sciences

The student demonstrates a conceptual understanding of the Earth's systems, history, and place in the solar system; that is, the student:

Standards: **S7a:** explains the processes of the Earth that produce gradual changes, such as weathering, erosion, and the development of landforms.

Components:

S7a.1: Landforms are the result of a combination of constructive and destructive forces. Constructive forces include crustal formation, volcanic eruption, and soil deposition. Destructive forces include weathering and erosion.

S7a.2: Weathering is the process by which the weather mechanically disintegrates or chemically decomposes the rocks at or near the Earth's surface.

S7a.3: Erosion refers to the reduction of the land surface through weathering, stream action, glacial action, wind action, chemical action, and other forces.

S7a.4: Waves, wind, water, and ice shape and reshape the Earth's land surface by eroding rock and soil in some areas and depositing them in other areas, sometimes in seasonal layers. Water evaporates from the Earth's surface, rises and cools as it moves to higher elevations, condenses as rain or snow, and falls to the surface where it collects in lakes, oceans, soil, and in rocks underground.

S7a.5: Sediments of sand and smaller particles (sometimes containing the remains of organisms) are gradually buried and are cemented together by dissolved minerals to form solid rock again.

S7a.6: Thousands of layers of sedimentary rock confirm the long history of the changing surface of the Earth and the changing life forms whose remains are found in successive layers. The youngest layers are not always found on top, because of folding, breaking, and uplift of layers.

S7a.7: Sedimentary rock buried deep enough may be reformed by pressure and heat, perhaps melting and recrystallizing into different kinds of rock. These re-formed rock layers may be forced up again to become land surface and even mountains. Subsequently, this new rock too will erode. Rock bears evidence of the minerals, temperatures, and forces that created it.

Standard: **S7b:** evaluates the impact of atmospheric changes (clouds, air masses and precipitation) and other factors (oceans, meteors, and glaciers) on weather, climate, and landforms.

Components: **S7b.1:** Gas and dust from large volcanoes can change the atmosphere.

S7b.2: The cycling of water in and out of the atmosphere plays an important role in determining climatic patterns. Water evaporates from the surface of the Earth, rises and cools, condenses into rain or snow, and falls again to the surface. The water falling on land collects in rivers and lakes, soil, and porous layers of rock, and much of it flows back into the ocean.

S7b.3: Clouds, formed by the condensation of water vapor, affect weather and climate.

S7b.4: Oceans have a major effect on climate, because ocean water can retain and release a large amount of heat. This is why land areas near oceans tend to have more moderate temperatures than would otherwise.

S7b.5: Heat energy carried by ocean currents has a strong influence on climate around the world.

S7b.6: Climates have sometimes changed abruptly in the past as a result of changes in the Earth's crust, such as volcanic eruptions or asteroids. Even relatively small changes in atmospheric or ocean content can have widespread effects on climate if the change lasts long enough.

S7b.7: Global patterns of atmospheric movement influence local weather.

Standard: **S7c:** catalogues the planets of this solar system including Earth.

Components: **S7c.1:** Like all planets and stars, the Earth is approximately spherical in shape. The rotation of the Earth on its axis every 24 hours produces the night-and-day cycle. To people on Earth, this turning of the planet makes it seem as though the sun, moon, planets, and stars are orbiting the Earth once a day.

S7c.2: Nine planets of very different size, composition, distance from the sun, and surface features move around the sun in nearly circular orbits. Some planets have a great variety of moons and even flat rings of rock and ice particles orbiting around them. Some of these planets and moons show evidence of geologic activity. The Earth is orbited by one moon, many artificial satellites, and debris.