

Science Grade 7

Assessment Anchors and Eligible Content



Pennsylvania Department of Education

www.education.state.pa.us

2010

S.7.A The Nature of Science

Reporting Category

ASSESSMENT ANCHOR

S.7.A.1 Reasoning and Analysis

ELIGIBLE CONTENT

<p>S.7.A.1.1 Explain, interpret, and apply scientific, environmental, or technological knowledge presented in a variety of formats (visuals, scenarios, graphs).</p> <p>Reference: 3.1.7.A, 3.4.7.C</p>	<p>S.7.A.1.1.1 Distinguish between a scientific theory and a general opinion, explaining how a theory is supported with evidence.</p> <p>S.7.A.1.1.2 Develop questions that can be answered through scientific inquiry and/or technological design.</p> <p>S.7.A.1.1.3 Use evidence such as observations or experimental results to support inferences.</p> <p>S.7.A.1.1.4 Use evidence to develop descriptions, explanations, and models.</p>
<p>S.7.A.1.2 Identify and explain the impacts of applying scientific, environmental, or technological knowledge to address solutions to practical problems.</p> <p>Reference: 3.1.7.A, 3.4.7.A, 3.4.7.B, 3.4.7.D, 4.4.7.D</p>	<p>S.7.A.1.2.1 Describe the positive and negative effects (both intended and unintended) of scientific results or technological developments.</p>
<p>S.7.A.1.3 Identify and analyze evidence that certain variables may have caused measurable changes in natural or human-made systems.</p> <p>Reference: 3.1.7.A</p>	<p>S.7.A.1.3.1 Describe how variables can cause changes in a system over time.</p> <p>S.7.A.1.3.2 Use evidence, observations, or explanations to make inferences about changes in systems over time (e.g., carrying capacity, succession, fossil evidence in the geologic time scale).</p>

S.7.A The Nature of Science**Reporting Category****ASSESSMENT ANCHOR****S.7.A.2 Processes, Procedures, and Tools of Scientific Investigations****ELIGIBLE CONTENT**

<p>S.7.A.2.1 Apply knowledge of scientific investigation or technological design in different contexts to make inferences, solve problems, and/or answer questions.</p> <p><i>Reference: 3.1.7.A, 3.4.7.C, 3.4.7.D</i></p>	<p>S.7.A.2.1.1 Use evidence from investigations to clearly describe relationships and communicate and support conclusions.</p> <p>S.7.A.2.1.2 Identify a design flaw in a simple technological system and devise possible working solutions.</p>
<p>S.7.A.2.2 Select and safely use appropriate tools and describe the information provided by each tool.</p> <p><i>Reference: 3.1.7.A, 3.4.7.A, 3.4.7.B, 3.4.7.D, 3.4.7.E, 4.2.7.C</i></p>	<p>S.7.A.2.2.1 Describe the safe and appropriate use of instruments and scales to accurately and safely make measurements under a variety of conditions.</p> <p>S.7.A.2.2.2 Apply measurement systems to record and interpret observations under a variety of conditions.</p> <p>S.7.A.2.2.3 Describe ways technology is used to enhance scientific study and/or human life.</p>

S.7.A The Nature of Science

Reporting Category

ASSESSMENT ANCHOR

S.7.A.3 Systems, Models, and Patterns

ELIGIBLE CONTENT

<p>S.7.A.3.1 Explain the parts of a simple system, their roles, and their relationships to the system as a whole.</p> <p><i>Reference: 3.1.7.A, 3.4.7.C</i></p>	<p>S.7.A.3.1.1 Describe a system (e.g., ecosystem, circulatory system, agricultural system) as a group of related parts with specific roles that work together to achieve an observed result.</p> <p>S.7.A.3.1.2 Explain the concept of order in a system (e.g., first to last manufacturing steps; trophic levels; simple to complex—levels of biological organization from cell to organism).</p> <p>S.7.A.3.1.3 Distinguish between system inputs, system processes, system outputs, and system feedback.</p> <p>S.7.A.3.1.4 Identify examples of open- and closed-looped systems.</p>
<p>S.7.A.3.2 Apply knowledge of models to make predictions, draw inferences, or explain technological concepts.</p> <p><i>Reference: 3.1.7.A, 3.4.7.B, 3.4.7.E</i></p>	<p>S.7.A.3.2.1 Make inferences based on scientific models (e.g., charts, graphs, diagrams).</p> <p>S.7.A.3.2.2 Describe how engineers use models to develop new and improved technologies to improve scientific study and/or human life.</p>
<p>S.7.A.3.3 Describe repeated processes or recurring elements in natural, scientific, and technological patterns.</p> <p><i>Reference: 3.1.7.A</i></p>	<p>S.7.A.3.3.1 Describe patterns as repeated processes or recurring elements in natural and human-made systems.</p>

S.7.B Biological Sciences

Reporting Category

ASSESSMENT ANCHOR

S.7.B.1 Structure and Function of Organisms

ELIGIBLE CONTENT

S.7.B.1.1 Describe and compare structural and functional similarities and differences that characterize diverse living things.

Reference: 3.1.7.A, 3.1.7.B

S.7.B.1.1.1

Describe levels of biological organization from cell to organism.

S.7.B.1.1.2

Describe how specific structures in living things (from cell to organism) help them function effectively in specific ways (e.g., chlorophyll in plant cells—photosynthesis; root hairs—increased surface area; beak structures in birds—food gathering; cacti spines—protection from predators).

S.7.B.1.1.3

Explain how characteristic similarities and differences (from cell to organism) are used to identify and/or categorize organisms.

S.7.B.1.2 Compare methods of reproduction.

Reference: 3.1.7.A, 3.1.7.B

S.7.B.1.2.1

Explain how cells arise from the division of a pre-existing cell.

S.7.B.1.2.2

Compare various basic sexual and asexual reproductive processes (e.g., budding, cuttings).

S.7.B.1.2.3

Explain why the life cycles of different organisms have varied lengths.

S.7.B Biological Sciences

Reporting Category

ASSESSMENT ANCHOR

S.7.B.2 Continuity of Life

ELIGIBLE CONTENT

<p>S.7.B.2.1 Explain natural selection and its role in evolution.</p> <p><i>Reference: 3.1.7.B, 3.1.7.C</i></p>	<p>S.7.B.2.1.1 Explain how inherited traits (genes) and/or behaviors help organisms survive and reproduce in different environments.</p> <p>S.7.B.2.1.2 Describe how natural selection is an underlying factor in a population’s ability to adapt to change.</p> <p>S.7.B.2.1.3 Explain that adaptations within species (physical, behavioral, physiological) are developed over long periods of time.</p>
<p>S.7.B.2.2 Explain how a set of genetic instructions determines inherited traits of organisms.</p> <p><i>Reference: 3.1.7.B, 3.1.7.C</i></p>	<p>S.7.B.2.2.1 Identify and explain differences between inherited and acquired traits.</p> <p>S.7.B.2.2.2 Recognize evidence that the gene is the basic unit of inheritance and explain the effect of dominant and recessive genes on inherited traits.</p> <p>S.7.B.2.2.3 Explain how mutations can alter a gene and are a source of new variations in a population.</p> <p>S.7.B.2.2.4 Describe how selective breeding or biotechnologies can change the genetic makeup of an organism (e.g., domesticated dogs, horses, cows; crops, hybrid plants; integrated pest management).</p>

S.7.B Biological Sciences**Reporting Category****ASSESSMENT ANCHOR****S.7.B.3 Ecological Behavior and Systems****ELIGIBLE CONTENT**

<p>S.7.B.3.1 Compare the biotic and abiotic factors of different ecosystems and explain relationships between and these factors.</p> <p>Reference: 4.1.7.A</p>	<p>S.7.B.3.1.1 Describe relationships (e.g., predator/prey competition, symbiosis) between organisms in different ecosystems.</p> <p>S.7.B.3.1.2 Identify the major biomes (terrestrial and aquatic) and describe their characteristic biotic and abiotic factors.</p>
<p>S.7.B.3.2 Explain ways different variables may cause and/or influence changes in natural or human-made systems.</p> <p>Reference: 4.5.7.D, 4.1.7.E</p>	<p>S.7.B.3.2.1 Identify and describe factors that cause and/or influence changes in populations (e.g., deforestation, disease, land use, natural disaster, invasive species).</p> <p>S.7.B.3.2.2 Explain how diversity affects the integrity of natural ecological systems.</p> <p>S.7.B.3.2.3 Describe how human interactions with the environment impact an ecosystem (e.g., road construction, pollution, urban development, dam building/removal).</p> <p>S.7.B.3.2.4 Explain how changes in environmental conditions can affect the survival of a population and entire species (e.g., climate, hibernation, migration, coloration).</p>
<p>S.7.B.3.3 Explain how renewable and nonrenewable resources provide for human needs and how these needs impact the environment.</p> <p>Reference: 4.1.7.E, 4.3.7.A, 4.4.7.A, 4.5.7.A, 4.5.7.C, 4.5.7.D, 4.5.7.E</p>	<p>S.7.B.3.3.1 Explain how renewable and/or nonrenewable resources provide for human needs (i.e., energy, food, water, clothing, and shelter).</p> <p>S.7.B.3.3.2 Explain how the use of renewable and/or nonrenewable resources affects the environment.</p>

S.7.C Physical Sciences**Reporting Category****ASSESSMENT ANCHOR****S.7.C.1 Structure, Properties, and Interaction of Matter and Energy**

		ELIGIBLE CONTENT	
S.7.C.1.1	Describe the structure of matter and its chemical and physical properties. <i>Reference: 3.2.7.A</i>	S.7.C.1.1.1	Use characteristic physical or chemical properties of matter to distinguish one substance from another (e.g., density, freezing/melting points, solubility, ability to rust).
		S.7.C.1.1.2	Recognize that the atom is the basic building block for all matter.
		S.7.C.1.1.3	Explain the differences between elements, compounds, and mixtures.
		S.7.C.1.1.4	Describe the relationship between mass and volume as density.
S.7.C.1.2	Compare chemical and physical changes of matter. <i>Reference: 3.2.7.A</i>	S.7.C.1.2.1	Identify the reactants and products of simple chemical reactions (e.g., photosynthesis, cellular respiration).
		S.7.C.1.2.2	Compare the behavior of particle motion in solids, liquids, and gasses.

ASSESSMENT ANCHOR**S.7.C.2 Forms, Sources, Conversion, and Transfer of Energy**

		ELIGIBLE CONTENT	
S.7.C.2.1	Describe how energy flows through the living world. <i>Reference: 3.1.7.A, 3.2.7.B, 4.1.7.C</i>	S.7.C.2.1.1	Describe how energy is obtained and used by organisms throughout their lives.
		S.7.C.2.1.2	Describe how energy is transferred and conserved in a closed system.
		S.7.C.2.1.3	Describe energy transformations within an ecosystem.

ASSESSMENT ANCHOR**S.7.C.3 Principles of Motion and Force****ELIGIBLE CONTENT**

S.7.C.3.1 Explain the principles of force and motion.

Reference: 3.2.7.B

S.7.C.3.1.1 Describe how unbalanced forces acting on an object change its velocity.

S.7.C.3.1.2 Describe forces acting on an object (e.g., friction, gravity, balanced versus unbalanced).

S.7.C.3.1.3 Explain the mechanical advantages of simple machines.

S.7.D Earth and Space Sciences**Reporting Category****ASSESSMENT ANCHOR****S.7.D.1 Earth Features and Processes that Change Earth and Its Resources**

		ELIGIBLE CONTENT	
S.7.D.1.1	Describe Earth structures and processes that characterize different biomes on Earth. <i>Reference: 3.1.7.C, 3.3.7.A, 4.1.7.A</i>	S.7.D.1.1.1	Identify and describe soil characteristics (i.e., particle size, porosity, and permeability) of different biomes.
		S.7.D.1.1.2	Explain how fossils are formed and how they can provide evidence about plants and animals that once lived on Earth.
S.7.D.1.2	Describe characteristic features and significance of Earth's water systems. <i>Reference: 3.3.7.A, 4.1.7.A, 4.2.7.A, 4.2.7.B</i>	S.7.D.1.2.1	Compare the different water systems on Earth (e.g., wetland, watershed, ocean, river).
		S.7.D.1.2.2	Compare biotic and abiotic features of freshwater and saltwater systems.
		S.7.D.1.2.3	Describe the importance of water systems on the diversity and distribution of life on Earth.

ASSESSMENT ANCHOR**S.7.D.2 Weather, Climate, and Atmospheric Processes**

		ELIGIBLE CONTENT	
S.7.D.2.1	Explain the basic elements of meteorology. <i>Reference: 3.3.7.A</i>	S.7.D.2.1.1	Explain the effect of wind patterns, circulation of oceans currents, atmospheric pressure, and temperature on weather.
		S.7.D.2.1.2	Describe changes in atmospheric conditions associated with various weather patterns.

ASSESSMENT ANCHOR**S.7.D.3 Composition and Structure of the Universe**

S.7.D.3.1 Describe the essential ideas about the composition and structure of the universe and Earth's place in it.

Reference: 3.3.7.B

ELIGIBLE CONTENT

- S.7.D.3.1.1 Describe the patterns of Earth's rotation and revolution in relation to the Sun and Moon (i.e., solar eclipse, lunar eclipse, phases of the Moon, and time).
- S.7.D.3.1.2 Explain how gravity is the essential force in determining the motions of the planets and other objects in the solar system.
- S.7.D.3.1.3 Compare the properties and conditions of objects in the solar system to those of Earth.
- S.7.D.3.1.4 Identify and describe instruments that are used to study the universe (e.g., telescope, probes, satellites, space observatories).