

Appendix F

New York State Alternate Assessment

Science NYSAA Frameworks

to the

**Core Curriculum
Grade Level Expectations**

and

Alternate Grade Level Indicators

for

**Students with Severe Cognitive
Disabilities**

NYSAA Test Blueprint - Science Effective with 2006-07 Administration

REQUIRED COMPONENT			
Two Standards must be Assessed at each Grade Level as Marked by an X in the Chart Below.			
Science Standards	Grade 4	Grade 8	High School
1 - Scientific Inquiry	X	X	
4 - Living Environment	X	X	X
4 - Physical Setting/ Earth Science			X

CHOICE COMPONENT				
For Each Required Standard, There are Two Possible Key Ideas From Which to Draw Key Ideas Vary by Grade as Marked by an X in the Chart Below Choose 1 Key Idea for each Standard from Key Ideas Marked with an X				
Standards	Key Idea	Grade 4	Grade 8	High School*
1 - Scientific Inquiry	1- Develop explanations of natural phenomena	X		
	2- Testing proposed explanations	X	X	
	3- Observations made while testing		X	
4- Living Environment	1- Similarities/differences between living and nonliving things.			X
	3- Changes in organisms over time	X		
	5- Dynamic equilibrium		X	
	7- Human decisions/activities impact			X
4- Physical Setting/ Earth Science	1- Relative motion and perspective			X
	2- Interactions among components of air, water and land	X		X
	3- Particle properties determine observable characteristics of matter and its reactivity		X	

*Note: at the high school level, choices are made within one Standard, i.e., Standard 4. One choice is drawn from the two designated within the Living Environment section of the curriculum and the other choice is drawn from the two designated within the Physical Setting/Earth Science section of the curriculum. See the Core Curricula for Science at <http://www.emsc.nysed.gov/ciai/cores.htm#science>.


Grade 4

Standard: 1-Analysis, Inquiry, and Design (Scientific Inquiry)

Key Idea 1: The central purpose of scientific inquiry is to develop explanations of natural phenomena in a continuing, creative process.

Science Core Curriculum	Performance Indicators	Essence of Indicators
Pg. 6	<p>S1.1 Ask “why” questions in attempts to seek greater understanding concerning objects and events they have observed and heard about.</p> <p>S1.1a Observe and discuss objects and events and record observations</p> <p>S1.1b Articulate appropriate questions based on observations</p> <p>S1.2 Question the explanations they hear from others and read about, seeking clarification and comparing them with their own observations and understandings.</p> <p>S1.2a Identify similarities and differences between explanations received from others or in print and personal observations or understandings</p> <p>S1.3 Develop relationships among observations to construct descriptions of objects and events and to form their own tentative explanations of what they have observed.</p> <p>S1.3a Clearly express a tentative explanation or description which can be tested</p>	<ul style="list-style-type: none"> • Observe objects and events and ask questions about them • Describe observations about objects or events • Identify similarities and differences in various observations

ALTERNATE GRADE LEVEL INDICATORS			
POSSIBLE ENTRY POINTS for Analysis, Inquiry, and Design (Scientific Inquiry)			
Less Complex		More Complex	
Key Idea 1	<p>The student will:</p> <ul style="list-style-type: none"> • interact with and/or make observations about objects (11101) • make observations about events (11102) • recognize similarities and/or differences between objects (11103) 	<p>The student will:</p> <ul style="list-style-type: none"> • identify similarities and/or differences among objects and/or events (11201) • sort objects according to similarities and/or differences (11202) 	<p>The student will:</p> <ul style="list-style-type: none"> • describe observations of objects and/or events they observe (11301) • ask questions about objects and/or events they observe (11302)

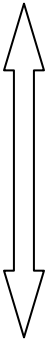
Sample Assessment Tasks		
Sample Assessment Tasks:		Possible Assessment Strategies and Datafolio Products
<p style="text-align: center;">Less Complex</p>  <p style="text-align: center;">More Complex</p>	<p>The student will interact with a variety of objects that have different characteristics using his/her senses. (e.g., objects such as— leaf, flower, sandpaper, cotton, silk, soil, fur; texture characteristics such as— rough, smooth, bumpy, prickly; object characteristics such as—warm, cool, etc.)</p>	<ul style="list-style-type: none"> Data collection recording student performance when the student holds, feels, smells, and/or observes different objects using his/her senses
	<p>The student will sort objects according to their similarities. (e.g., similarities when sorting by physical characteristics of two animals— a dog and a horse identifying do both have a tail, ears, eyes, fur, etc.; similarities when sorting by texture characteristics of multiple objects—a cotton ball, a tissue, a blanket are all soft or a rock, a pencil, a block are all hard, etc.)</p>	<ul style="list-style-type: none"> Sequenced, captioned, dated photographs of the student sorting the objects by similarities
	<p>The student will ask a question related to the weekly science experiment. (e.g., questions such as—did it work?; what happened?; why did it happen?; how long did it take?, etc.)</p>	<ul style="list-style-type: none"> Audio/video clip of the student asking a question about a science experiment

Grade 4

Standard: 1-Analysis, Inquiry, and Design (Scientific Inquiry)
Key Idea 2: Beyond the use of reasoning and consensus, scientific inquiry involves the testing of proposed explanations involving the use of conventional techniques and procedures and usually requiring considerable ingenuity.

Science Core Curriculum	Performance Indicators	Essence of Indicators
Pg. 6	<p>S2.1 Develop written plans for exploring phenomena or for evaluating explanations guided by questions or proposed explanations they have helped formulate.</p> <p>S2.1a Indicate materials to be used and steps to follow to conduct the investigation and describe how data will be recorded (journal, dates and times, etc.)</p> <p>S2.2 Share their research plans with others and revise them based on their suggestions.</p> <p>S2.2a Explain the steps of a plan to others, actively listening to their suggestions for possible modification of the plan, seeking clarification and understanding of the suggestions and modifying the plan where appropriate</p> <p>S2.3 Carry out their plans for exploring phenomena through direct observation and through the use of simple instruments that permit measurement of quantities, such as length, mass, volume, temperature and time.</p> <p>S2.3a Use appropriate “inquiry and process skills” to collect data</p> <p>S2.3b Record observations accurately and concisely</p>	<ul style="list-style-type: none"> • Plan and develop procedures for exploration • Identify materials needed for exploration • Implement an exploration • Report observations

ALTERNATE GRADE LEVEL INDICATORS			
POSSIBLE ENTRY POINTS for Analysis, Inquiry, and Design (Scientific Inquiry)			
Less Complex		More Complex	
Key Idea 2	<p>The student will:</p> <ul style="list-style-type: none"> recognize scientific tools used in simple explorations (investigation) (12101) attend to someone conducting a single procedure for a simple exploration (investigation) (12102) complete a single procedure of a simple exploration (investigation) (12103) recognize the general outcome of the procedure (12104) 	<p>The student will:</p> <ul style="list-style-type: none"> identify the purpose of common tools and/or materials needed for a simple exploration (investigation) (12201) complete two procedures of a simple exploration (investigation) (12202) recognize the planning steps of a simple exploration (investigation) (12203) recognize specific results of an exploration (12204) sequence the steps of a familiar exploration (investigation) (12205) 	<p>The student will:</p> <ul style="list-style-type: none"> gather common tools and/or materials that will be needed for a simple exploration (investigation) (12301) plan a simple exploration (investigation) (12302) implement the procedures of a simple exploration (investigation) (12303) report specific results of an exploration (investigation) (12304)

Sample Assessment Tasks		
Sample Assessment Tasks:		Possible Assessment Strategies and Datafolio Products
 <p>Less Complex</p> <p>More Complex</p>	The student will select a scientific tool commonly used in classroom experiments. (e.g., thermometer, scale, ruler, beaker, etc.)	<ul style="list-style-type: none"> Data collection recording student performance when selecting scientific tools
	The student will complete two steps of a simple experiment. (e.g., sinking and floating –step one identify the objects to use, step two put them in a bucket, and step three observe the results)	<ul style="list-style-type: none"> Video clip of student completing two steps of a three step experiment
	The student will create a simple report showing the results of an experiment. (e.g., using a simple tally to illustrate results, sorting objects into piles according to results, etc).	<ul style="list-style-type: none"> Student work product that communicates pictures of the results of the experiment

Grade 4

Standard: 4-The Living Environment

Key Idea 3: Individual organisms and species change over time.

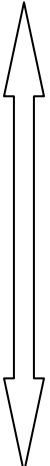
Science Core Curriculum	Performance Indicators	Essence of Indicators
Pg. 18–19	<p>3.1 Describe how the structures of plants and animals complement the environment of the plant or animal.</p> <p>3.1a Each animal has different structures that serve different functions in growth, survival, and reproduction.</p> <ul style="list-style-type: none"> • wings, legs, or fins enable some animals to seek shelter and escape predators • the mouth, including teeth, jaws and tongue, enables some animals to eat and drink • eyes, nose, ears, tongue, and skin of some animals enable the animals to sense their surroundings • claws, shells, spines, feathers, fur, scales, and color of body covering enable some animals to protect themselves from predators and other environmental conditions, or enable them to obtain food • some animals have parts that are used to produce sounds and smells to help the animal meet its needs • the characteristics of some animals change as seasonal conditions change (e.g., fur grows and is shed to help regulate body heat; body fat is a form of stored energy and it changes as the seasons change) <p>3.1b Each plant has different structures that serve different functions in growth, survival, and reproduction.</p> <ul style="list-style-type: none"> • roots help support the plant and take in water and nutrients • leaves help plants utilize sunlight to make food for the plant • stems, stalks, trunks, and other • similar structures provide support for the plant • some plants have flowers • flowers are reproductive structures of plants that produce fruit which contains 	<ul style="list-style-type: none"> • Understand that animals and plants have different structures that are essential for growth, reproduction, and survival • Understand that animals and plants adapt to their environment

Performance Indicators (continued)	
	<p>seeds</p> <ul style="list-style-type: none"> • seeds contain stored food that aids in germination and the growth of young plants
3.1c	<p>In order to survive in their environment, plants and animals must be adapted to that environment.</p> <ul style="list-style-type: none"> • seeds disperse by a plant’s own mechanism and/or in a variety of ways that can include wind, water, and animals • leaf, flower, stem, and root adaptations may include variations in size, shape, thickness, color, smell, and texture • animal adaptations include coloration for warning or attraction, camouflage, defense mechanisms, movement, hibernation, and migration
	<p>3.2 Observe that differences within a species may give individuals an advantage in surviving and reproducing.</p>
3.2a	<p>Individuals within a species may compete with each other for food, mates, space, water, and shelter in their environment.</p>
3.2b	<p>All individuals have variations, and because of these variations, individuals of a species may have an advantage in surviving and reproducing.</p>

ALTERNATE GRADE LEVEL INDICATORS			
POSSIBLE ENTRY POINTS for The Living Environment			
Less Complex		More Complex	
←	→	←	→
Key Idea 3	<p>The student will:</p> <ul style="list-style-type: none"> distinguish between plants and/or animals (22101) identify basic plant and/or animal structures (e.g., fins, wings, legs, arms, mouths, noses, eyes, ears, roots, stems, leaves, flowers, seeds, etc.) (22102) identify that different plants and/or animals are found in different places (22103) recognize the environment in which an organism is typically found (22104) 	<p>The student will:</p> <ul style="list-style-type: none"> identify the functions of basic plant and/or animal structures (e.g., fins, wings, legs, arms, mouths, noses, eyes, ears, roots, stems, leaves, flowers, seeds, etc.) (22201) associate some characteristic features of plants and/or animals with certain environments (e.g., heavy fur for cold climates, thick stems for dry areas, etc.) (22202) identify the part that is missing from a specific plant or animal (22203) 	<p>The student will:</p> <ul style="list-style-type: none"> identify that animals and/or plants have different structures that are essential for growth, reproduction, and/or survival (22301) recognize how animals and/or plants adapt to their environment (22302)

Grade 4

Standard 4-The Living Environment
(Key Idea 3)

Sample Assessment Tasks		
Sample Assessment Tasks:		Possible Assessment Strategies and Datafolio Products
<p>Less Complex</p>  <p>More Complex</p>	<p>The student will distinguish between a plant and an animal. (e.g., flower labeled plant; tree labeled plant; cat labeled animal; human labeled animal, etc.)</p>	<ul style="list-style-type: none"> • Student work product of a scrapbook containing pictures of plants with labels and animals with labels
	<p>The student will identify animal adaptations and/or survival techniques. (e.g., chameleon and changing color to match environment)</p>	<ul style="list-style-type: none"> • Student work product showing a specific animal and its survival technique
	<p>The student will record the basic elements needed for a plant to grow, reproduce and/or survive (e.g., growing a plant from a seed—elements needed such as water, sunlight, etc.).</p>	<ul style="list-style-type: none"> • Data chart containing information about student participation in growing a plant from a seed and recognizing what the plant needs for growth, reproduction, and/or survival

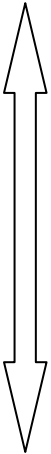
Grade 4

Standard: 4-The Physical Setting/Earth Science

Key Idea 2: Many of the phenomena that we observe on Earth involve interactions among components of air, water, and land.

Science Core Curriculum	Performance Indicators	Essence of Indicators
Pg. 13	<p>2.1 Describe the relationship among air, water and land on Earth.</p> <p>2.1a Weather is the condition of the outside air at the particular moment.</p> <p>2.1b Weather can be described and measured by:</p> <ul style="list-style-type: none"> • temperature • wind speed and direction • form and amount of precipitation • general sky conditions (cloudy, sunny, partly cloudy) <p>2.1c Water is recycled by natural processes on Earth.</p> <ul style="list-style-type: none"> • evaporation: changing of water (liquid) into water vapor (gas) • condensation: changing of water vapor (gas) into water (liquid) • precipitation: rain, snow, sleet, hail • runoff: water flowing on Earth’s surface • groundwater: water that moves downward into the ground <p>2.1d Erosion and deposition result from the interaction among air, water, and land.</p> <ul style="list-style-type: none"> ○ interaction between air and water breaks down earth materials ○ pieces of earth material may be moved by air, water, wind, and gravity ○ pieces of earth material will settle or deposit on land or in the water in different places ○ soil is composed of broken-down pieces of living and nonliving earth material <p>2.1e Extreme natural events (floods, fires, earthquakes, volcanic eruptions, hurricanes, tornadoes, and other severe storms) may have positive or negative impacts on living things.</p>	<ul style="list-style-type: none"> • Recognize that weather components (temperature, wind speed, etc.) can be described and measured • Understand that erosion, deposition, extreme natural events, and the water cycle impact the environment

ALTERNATE GRADE LEVEL INDICATORS			
POSSIBLE ENTRY POINTS for The Physical Setting/Earth Science			
Less Complex		More Complex	
Key Idea 2	<p>The student will:</p> <ul style="list-style-type: none"> • identify at least one component of daily weather conditions (e.g. general wind speed or direction, general temperature, precipitation, and/or cloudiness) (32101) • identify the appropriate tools for measuring weather conditions (e.g. thermometer, wind vane) (32102) • recognize erosion and/or deposition (32103) • recognize storms (extreme natural events) (32104) • recognize liquid and/or solid forms of water (32105) 	<p>The student will:</p> <ul style="list-style-type: none"> • distinguish between various weather conditions (e.g. sunny or cloudy, hot or cold, windy or quiet, rainy or dry) (32201) • recognize that a thermometer indicates how hot or cold something is (32202) • recognize that a wind vane indicates the direction from which the wind is blowing (32203) • identify evidence of erosion and/or deposition (32204) • identify liquid and/or solid forms of water (32205) • attend to water being evaporated (i.e. steam from heated water) (32206) • attend to water being frozen (i.e. ice cube trays with water placed in a freezer and removed with ice) (32207) • recognize that natural events change land (32208) 	<p>The student will:</p> <ul style="list-style-type: none"> • describe multiple elements of daily weather conditions (e.g. sunny, cold, and windy) (32301) • identify the temperature as indicated by a thermometer (32302) • identify the wind direction as indicated by a wind vane (32303) • identify that material is being “moved away” during erosion and/or “added to” during deposition (32304) • identify the gas form of water (32305) • recognize that liquid, solid, and gaseous water are interchangeable (32306) • describe ways that extreme natural events affect the environment (32307)

Sample Assessment Tasks		
Sample Assessment Tasks:		Possible Assessment Strategies and Datafolio Products
<div style="display: flex; flex-direction: column; align-items: center;"> <div style="margin-bottom: 10px;">Less Complex</div>  <div style="margin-top: 10px;">More Complex</div> </div>	<p>The student will recognize liquid and/or solid forms of water. (e.g., recognizing liquid water, then participating in putting the water in a freezer, then participating in removing the water from the freezer, then recognizing solid water)</p>	<ul style="list-style-type: none"> Sequenced captioned dated photographs showing student recognition of forms of water
	<p>The student will recognize that a wind vane indicates the direction toward which the wind is blowing. (e.g., using a fan to produce wind, going outside, matching pictures of wind direction to wind vane direction, etc.)</p>	<ul style="list-style-type: none"> Video clip of wind vane made by student being used to show where the wind is coming from
	<p>The student will identify that material is being “moved away” during erosion and/or “added to” during deposition. (e.g., pouring water on sand to illustrate erosion, having a fan blow air toward a pile of sand to illustrate deposition, etc.)</p>	<ul style="list-style-type: none"> Sequenced captioned dated photographs showing student creating erosion and deposition

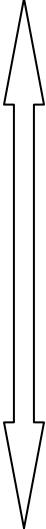
Grade 8

Standard 1: Analysis, Inquiry, and Design (Scientific Inquiry)
Key Idea 2: Beyond the use of reasoning and consensus, scientific inquiry involves the testing of proposed explanations involving the use of conventional techniques and procedures and usually requiring considerable ingenuity.

Science Core Curriculum	Performance Indicators	Essence of Indicators
Pg. 5	<p>S2.1 Use conventional techniques and those of their own design to make further observations and refine their explanations, guided by a need for more information.</p> <p>S2.1a demonstrate appropriate safety techniques</p> <p>S2.1b conduct an experiment designed by others</p> <p>S2.1c design and conduct an experiment to test a hypothesis</p> <p>S2.1d use appropriate tools and conventional techniques to solve problems about the natural world, including:</p> <ul style="list-style-type: none"> • measuring • observing • describing • classifying • sequencing <p>S2.2 Develop, present, and defend formal research proposals for testing their own explanations of common phenomena, including ways of obtaining needed observations and ways of conducting simple controlled experiments.</p> <p>S2.2a include appropriate safety procedures</p> <p>S2.2b design scientific investigations (e.g., observing, describing, and comparing; collecting samples; seeking more information, conducting a controlled experiment; discovering new objects or phenomena; making models)</p>	<ul style="list-style-type: none"> • Use appropriate techniques, tools, and safety procedures to design and conduct scientific investigations • Record quantitative and qualitative data

Performance Indicators (continued)		
	<p>S2.2c design a simple controlled experiment</p> <p>S2.2d identify independent variables (manipulated), dependent variables (responding), and constants in a simple controlled experiment</p> <p>S2.2e choose appropriate sample size and number of trials</p> <p>S2.3 Carry out research proposals, recording observations and measurements (e.g., lab notes, audiotape, computer disk, videotape) to help assess the explanation.</p> <p>S2.3a use appropriate safety procedures</p> <p>S2.3b conduct a scientific investigation</p> <p>S2.3c collect quantitative and qualitative data</p>	

ALTERNATE GRADE LEVEL INDICATORS			
POSSIBLE ENTRY POINTS for Analysis, Inquiry, and Design (Scientific Inquiry)			
Less Complex		More Complex	
Key Idea 2	<p>The student will:</p> <ul style="list-style-type: none"> • demonstrate one technique for conducting scientific investigations (12101) • identify tools used for scientific investigations (12102) • recognize a safety hazard associated with a scientific investigation (12103) • recognize results of an investigation (data) (12104) 	<p>The student will:</p> <ul style="list-style-type: none"> • identify simple techniques used during scientific investigations (12201) • identify tools needed for a scientific investigation (12202) • identify a safety procedure for a scientific investigation (12203) • conduct all steps of a simple scientific investigation (12204) • identify results of an investigation (12205) • assemble tools needed for a scientific investigation (12206) 	<p>The student will:</p> <ul style="list-style-type: none"> • identify and/or implement a technique that is appropriate to answer a specific question (12301) • use appropriate safety procedures during a scientific investigation (12302) • design a simple scientific investigation (12303) • recognize independent, dependent variables, and constants in a simple investigation (12304) • record qualitative and quantitative results of an investigation (12305) • record results of an investigation (12306)

Sample Assessment Tasks		
Sample Assessment Tasks:		Possible Assessment Strategies and Datafolio Products
 <p>Less Complex</p> <p>More Complex</p>	<p>The student will identify tools used for scientific investigations. (e.g., pictures of measuring cup and thermometer for investigation of water temperature at room temperature and in refrigerator)</p>	<ul style="list-style-type: none"> • Student work product showing a list of common scientific tools identified for an investigation
	<p>The student will assemble tools needed for a scientific investigation. (e.g., have the student gather materials to do an experiment such as a ruler to measure the growth of a plant)</p>	<ul style="list-style-type: none"> • Sequenced, captioned, dated photographs of the tools assembled by the student for the investigation
	<p>The student will record results of an investigation. (e.g., record the results of what happens when ball slides down a ramp and hits an object such as a cup)</p>	<ul style="list-style-type: none"> • Data chart of results of an investigation that were recorded by the student

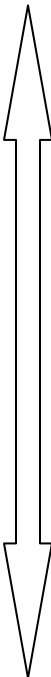
Grade 8

Standard 1: Analysis, Inquiry, and Design (Scientific Inquiry)

Key Idea 3: The observations made while testing proposed explanations, when analyzed using conventional and invented methods, provide new insights into phenomena.

Science Core Curriculum	Performance Indicators	Essence of Indicators
Pg. 5–6	<p>S3.1 Design charts, tables, graphs and other representations of observations in conventional and creative ways to help the address their research question or hypothesis.</p> <p>S3.1a organize results, using appropriate graphs, diagrams, data tables, and other models to show relationships</p> <p>S3.1b generate and use scales, create legends, and appropriately label axes</p> <p>S3.2 Interpret the organized data to answer the research question or hypothesis and to gain insight into the problem.</p> <p>S3.2a accurately describe the procedures used and the data gathered</p> <p>S3.2b identify sources of error and the limitations of data collected</p> <p>S3.2c evaluate the original hypothesis in light of the data</p> <p>S3.2d formulate and defend explanations and conclusions as they relate to scientific phenomena</p> <p>S3.2e form and defend a logical argument about cause-and-effect relationships in an investigation</p> <p>S3.2f make predictions based on experimental data</p> <p>S3.2g suggest improvements and recommendations for further studying</p> <p>S3.2h use and interpret graphs and data tables</p> <p>S3.3 Modify their personal understanding of phenomena based on evaluation of their hypothesis.</p>	<ul style="list-style-type: none"> • Organize data (results) using graphs, diagrams, tables, and models • Draw conclusions based on data from an investigation

ALTERNATE GRADE LEVEL INDICATORS			
POSSIBLE ENTRY POINTS for Analysis, Inquiry, and Design (Scientific Inquiry)			
Less Complex		More Complex	
Key Idea 3	<p>The student will:</p> <ul style="list-style-type: none"> recognize the results of investigations presented using concrete objects, graphs, diagrams, tables, or models (13101) identify cause and/or effect relationships (13102) determine whether an event is possible or impossible (13103) 	<p>The student will:</p> <ul style="list-style-type: none"> record results of an investigation in a graph, diagram, table, or model (13201) identify simple trends in the results of investigations (13202) recognize a conclusion based on the results of an investigation (13203) 	<p>The student will:</p> <ul style="list-style-type: none"> compare results of investigations using graphs, diagrams, tables, or models (13301) describe simple trends in the results of investigations (13302) explain a conclusion based on the results of an investigation (13303)

Sample Assessment Tasks		
Sample Assessment Tasks:		Possible Assessment Strategies and Datafolio Products
 <p>Less Complex</p> <p>More Complex</p>	<p>The student will recognize the results of investigations presented using tools such as graphs, charts, diagrams, and/or tables. (e.g., Show the student a line graph indicating the distance an object travels. Have the student point to the place on the graph where the object traveled after a specific period of time.)</p>	<ul style="list-style-type: none"> Student work product showing marks that the student makes indicating the results of an investigation, on a graph, table, chart, etc.
	<p>The student will identify simple trends in the results of investigations. (e.g., using previously recorded data regarding distance a bird traveled ask the student to identify the trend by pointing to the place on the graph where he/she would expect the bird to travel at a later time in the experiment, using previously recorded data about temperatures in the month of July ask the student to identify the trend by eye gazing to the next temperature he/she would expect in July, etc.)</p>	<ul style="list-style-type: none"> Student work product showing trends indicated by the student
	<p>The student will explain a conclusion based on the results of an investigation. (e.g., indicate which object would travel farther based on the weight of the objects using data of an investigation in which weights were found)</p>	<ul style="list-style-type: none"> Audio/video clip of student answering questions about possible conclusions by pointing to different objects

Grade 8

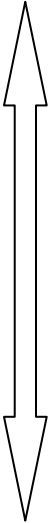
Standard 4: The Living Environment

Key Idea 5: Organisms maintain a dynamic equilibrium that sustains life.

Science Core Curriculum	Performance Indicators	Essence of Indicators
Pg. 17–18	<p>5.1 Compare the way a variety of living specimens carry out basic life functions and maintain dynamic equilibrium.</p> <p>5.1a Animals and plants have a great variety of body plans and internal structures that contribute to their ability to maintain a balanced condition.</p> <p>5.1b An organism’s overall body plan and its environment determine the way that the organism carries out the life processes.</p> <p>5.1c All organisms require energy to survive. The amount of energy needed and the method for obtaining this energy vary among cells. Some cells use oxygen to release the energy stored in food.</p> <p>5.1d The methods for obtaining nutrients vary among organisms. Producers, such as green plants, use light energy to make their food. Consumers, such as animals, take in energy-rich foods.</p> <p>5.1e Herbivores obtain energy from plants. Carnivores obtain energy from animals. Omnivores obtain energy from both plants and animals. Decomposers, such as bacteria and fungi, obtain energy by consuming wastes and/or dead organisms.</p> <p>5.1f Regulation of an organism’s internal environment involves sensing the internal environment and changing physiological activities to keep conditions within the range required for survival. Regulation includes a variety of nervous and hormonal feedback systems.</p>	<ul style="list-style-type: none"> • Understand that all organisms require energy and nutrients and obtain them in a variety of ways • Understand that all organisms attempt to maintain a balanced condition from their design and response • Understand that organisms require food to maintain a healthy condition

Performance Indicators (continued)	
5.1g	The survival of an organism depends on its ability to sense and respond to its external environment.
5.2 Describe the importance of major nutrients, vitamins, and minerals in maintaining health and promoting growth, and explain the need for a constant input of energy for living organisms.	
5.2a	Food provides molecules that serve as fuel and building material for all organisms. All living things, including plants, must release energy from their food, using it to carry on their life processes.
5.2b	Foods contain a variety of substances, which include carbohydrates, fats, vitamins, proteins, minerals, and water. Each substance is vital to the survival of the organism.
5.2c	Metabolism is the sum of all chemical reactions in an organism. Metabolism can be influenced by hormones, exercise, diet, and aging.
5.2d	Energy in foods is measured in Calories. The total caloric value of each type of food varies. The number of Calories a person requires varies from person to person.
5.2e	In order to maintain a balanced state, all organisms have a minimum daily intake of each type of nutrient based on species, size, age, sex, activity, etc. An imbalance in any of the nutrients might result in weight gain, weight loss, or a diseased state.
5.2f	Contraction of infectious disease, and personal behaviors such as the use of toxic substances and some dietary habits, may interfere with one's dynamic equilibrium. During pregnancy these conditions may also affect the development of the child. Some effects of these conditions are immediate; others may not appear for many years.

ALTERNATE GRADE LEVEL INDICATORS			
POSSIBLE ENTRY POINTS for The Living Environment			
Less Complex		More Complex	
Key Idea 5	<p>The student will:</p> <ul style="list-style-type: none"> • recognize that organisms need food, water, air and/or sunlight to live and/or maintain health (23101) • recognize an aspect of an organism's design that helps the organism get food (23102) • recognize an aspect of an organism's response that helps the organism get food (23103) • identify the functions of the basic parts of plants (23104) • identify animal organs and/or body design (23105) • recognize some behaviors of common living specimens (23106) 	<p>The student will:</p> <ul style="list-style-type: none"> • recognize that organisms get energy and/or nutrients from food (23201) • identify that organisms need food, water, air and/or sunlight to live and/or maintain health (23202) • identify an aspect of an organism's design that helps the organism get food (23203) • identify an aspect of an organisms response that helps the organism get food (23204) • specify the features that enable a plant or animal to survive in its environment (23205) 	<p>The student will:</p> <ul style="list-style-type: none"> • compare similarities and/or differences in the ways that plants and/or animals get energy and/or nutrients from food (23301) • identify that organisms need food to live, maintain health and/or a balanced condition (23302) • identify how an aspect of an organism's design helps the organism get food (23303) • identify how the responses of organisms help them get food (23304) • recognize that humans need carbohydrates, fats, and/or proteins along with vitamins and/or minerals to maintain health (23305)

Sample Assessment Tasks		
	Sample Assessment Tasks:	Possible Assessment Strategies and Datafolio Products
Less Complex  More Complex	<p>The student will recognize an aspect of an organism's design that helps the organism get food. (e.g., carnivores such as bears and hawks have claws to catch and hold their prey, animals such as cows and goats do not have claws as they eat plants and do not seek prey, etc.)</p>	<ul style="list-style-type: none"> Student work product in which the student matches animals and/or plants that get food in a similar way
	<p>The student will specify the features of an animal that enable it to survive in its environment. (e.g., animals that live in a desert will have different features than animals that live in the woods)</p>	<ul style="list-style-type: none"> Student work product consisting of a chart listing different animals and their features for survival
	<p>The student will identify how the responses of organisms help them get food. (e.g., hiding until the prey comes close, sneaking up on prey, etc.)</p>	<ul style="list-style-type: none"> Audio/video clip of student answering questions after watching video clips of animals obtaining food and student recognizing how the animal's actions helped it obtain food

Grade 8

Standard 4: The Physical Setting/Earth Science

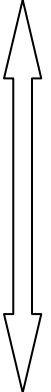
Key Idea 3: Matter is made up of particles whose properties determine the observable characteristics of matter and its reactivity.

Science Core Curriculum	Performance Indicators	Essence of Indicators
Pg. 24–25	<p>3.1 Observe and describe properties of materials, such as density, conductivity, and solubility.</p> <p>3.1a Substances have characteristic properties. Some of these properties include color, odor, phase at room temperature, density, solubility, heat and electrical conductivity, hardness, and boiling and freezing points.</p> <p>3.1b Solubility can be affected by the nature of the solute and solvent, temperature, and pressure. The rate of solution can be affected by the size of the particles, stirring, temperature, and the amount of solute already dissolved.</p> <p>3.1c The motion of particles helps to explain the phases (states) of matter as well as changes from one phase to another. The phase in which matter exists depends upon the attractive forces among its particles.</p> <p>3.1d Gases have neither a determined shape nor a definite volume. Gases assume the shape and volume of a closed container.</p> <p>3.1e A liquid has a definite volume, but takes the shape of a container.</p> <p>3.1f A solid has definite shape and volume. Particles resist a change in position.</p> <p>3.1g Characteristic properties can be used to identify different materials, and separate a mixture of substances into its components. For example, iron can be removed from a mixture by means of a magnet. An insoluble substance can be separated from a soluble substance by such processes as filtration, settling, and evaporation.</p>	<ul style="list-style-type: none"> • Understand that matter can be described by its characteristics such as color, odor, state of matter, density, solubility, heat and electrical conductivity, hardness, boiling point, and freezing point • Recognize that matter can change either physically or chemically but matter is always conserved • Understand that matter is made up of atoms • Understand that elements combine to form all substances

Performance Indicators (continued)	
3.1h	Density can be described as the amount of matter that is in a given amount of space. If two objects have equal volume, but one has more mass, the one with more mass is denser.
3.1g	Buoyancy is determined by comparative densities.
3.2 Distinguish between chemical and physical changes.	
3.2a	During a physical change a substance keeps its chemical composition and properties. Examples of physical changes include freezing, melting, condensation, boiling, evaporation, tearing, and crushing.
3.2b	Mixtures are physical combinations of materials and can be separated by physical means.
3.2c	During a chemical change, substances react in characteristic ways to form new substances with different physical and chemical properties. Examples of chemical changes include burning of wood, cooking of an egg, rusting of iron, and souring of milk.
3.2d	Substances are often placed in categories if they react in similar ways. Examples include metals, nonmetals, and noble gases.
3.2e	The Law of Conservation of Mass states that during an ordinary chemical reaction matter cannot be created or destroyed. In chemical reactions, the total mass of the reactants equals the total mass of the products.
3.3 Develop mental models to explain common chemical reactions and changes in states of matter.	
3.3a	All matter is made up of atoms. Atoms are far too small to see with a light microscope.

Performance Indicators (continued)		
3.3b	Atoms and molecules are perpetually in motion. The greater the temperature, the greater the motion.	
3.3c	Atoms may join together in well-defined molecules or may be arranged in regular geometric patterns.	
3.3d	Interactions among atoms and/or molecules result in chemical reactions.	
3.3e	The atoms of any one element are different from the atoms of other elements.	
3.3f	There are more than 100 elements. Elements combine in a multitude of ways to produce compounds that account for all living and nonliving substances. Few elements are found in their pure form.	
3.3g	The periodic table is one useful model for classifying elements. The periodic table can be used to predict properties of elements (metals, nonmetals, noble gases).	

ALTERNATE GRADE LEVEL INDICATORS			
POSSIBLE ENTRY POINTS for The Physical Setting/Earth Science			
Less Complex		More Complex	
Key Idea 3	<p>The student will:</p> <ul style="list-style-type: none"> • identify one characteristic of matter (e.g. color, odor, heaviness, hardness, etc.) (33101) • distinguish between solids and/or liquids (33102) • recognize an object as hot (warm) or cold (cool) (33103) • recognize that matter is made of small parts (33104) • recognize that everything is made of matter (33105) • sort objects according to characteristics such as weight, length and/or size (33106) 	<p>The student will:</p> <ul style="list-style-type: none"> • identify multiple characteristics of matter (e.g. color, odor, heaviness, hardness, etc.) (33201) • identify whether matter is solid, liquid, or gas (33202) • indicate the changes that occur when materials interact (e.g., sugar/milk, salt/water, etc.) (33203) • recognize a physical change in a substance (33204) • recognize a chemical change in a substance (33205) 	<p>The student will:</p> <ul style="list-style-type: none"> • describe the color, odor, heaviness, or hardness of matter (33301) • describe the properties of a solid, liquid, or gas (33302) • compare the mass of two objects that are the same size (density) (33303) • recognize that electricity causes a light bulb to produce light and/or heat (33304) • demonstrate that matter is conserved (33305) • describe that everything is made of matter (33306) • describe how matter is made of small parts (33307) • describe and/or perform an investigation involving a physical change (33308) • describe and/or perform an investigation involving a chemical change (33309)

Sample Assessment Tasks		
Sample Assessment Tasks:		Possible Assessment Strategies and Datafolio Products
 <p>Less Complex</p> <p>More Complex</p>	The student will recognize the color, odor, heaviness, or hardness of matter. (e.g., a feather is light, a rock is hard, etc.)	<ul style="list-style-type: none"> Data chart recording about the student recognizing the color, odor, heaviness, and/or hardness of familiar objects
	The student will identify whether a substance is a solid or a liquid (e.g., ice, milk, rock, etc.)	<ul style="list-style-type: none"> Video clip of student identifying various things as a solid or a liquid
	The student will demonstrate that matter is conserved. (e.g., when an ice cube melts, the water will be the same mass as the ice cube was when frozen)	<ul style="list-style-type: none"> Student work product from an investigation showing that matter is conserved

High School

Standard 4: The Living Environment

Key Idea 1: Living things are both similar to and different from each other and from nonliving things.

Science Core Curriculum	Performance Indicators	Essence of Indicators
Pg. 9–11	<p>1.1 Explain how diversity of populations within ecosystems relates to the stability of ecosystems.</p> <p>1.1a Populations can be categorized by the function they serve. Food webs identify the relationships among producers, consumers, and decomposers carrying out either autotropic or heterotropic nutrition.</p> <p>1.1b An ecosystem is shaped by the nonliving environment as well as its interacting species. The world contains a wide diversity of physical conditions, which creates a variety of environments.</p> <p>1.1c In all environments, organisms compete for vital resources. The linked and changing interactions of populations and the environment compose the total ecosystem.</p> <p>1.1d The interdependence of organisms in an established ecosystem often results in approximate stability over hundreds and thousands of years. For example, as one population increases, it is held in check by one or more environmental factors or another species.</p> <p>1.1e Ecosystems, like many other complex systems, tend to show cyclic changes around a state of approximate equilibrium.</p> <p>1.1f Every population is linked, directly or indirectly, with many others in an ecosystem. Disruptions in the numbers and types of species and environmental changes can upset ecosystem stability.</p> <p>1.2 Describe and explain the structures and functions of the human body at different organizational levels (e.g., systems, tissues, cells, organelles).</p>	<ul style="list-style-type: none"> • Understand that the interdependence of living and non-living things maintains the equilibrium (homeostasis) of the ecosystem. Disruption to the ecosystem will alter its stability • Understand that humans are complex organisms that are made up of different systems. Each system interacts to maintain a balanced internal environment. Cells have particular structures that perform specific jobs to maintain homeostasis. • Understand that one-celled organisms contain structures to maintain homeostasis

Performance Indicators (continued)	
1.2a	Important levels of organization for structure and function include organelles, cells, tissues, organs, organ systems, and whole organisms.
1.2b	Humans are complex organisms. They require multiple systems for digestion, respiration, reproduction, circulation, excretion, movement, coordination, and immunity. The systems interact to perform the life functions.
1.2c	The components of the human body, from organ systems to cell organelles, interact to maintain a balanced internal environment. To successfully accomplish this, organisms possess a diversity of control mechanisms that detect deviations and make corrective actions.
1.2d	If there is a disruption in any human system, there may be a corresponding imbalance in homeostasis.
1.2e	The organs and systems of the body help to provide all the cells with their basic needs. The cells of the body are of different kinds and are grouped in ways that enhance how they function together.
1.2f	Cells have particular structures that perform specific jobs. These structures perform the actual work of the cell. Just as systems are coordinated and work together, cell parts must also be coordinated and work together.
1.2g	Each cell is covered by a membrane that performs a number of important functions for the cell. These include: separation from its outside environment, controlling which molecules enter and leave the cell, and recognition of chemical signals. The processes of diffusion and active transport are important in the movement of materials in and out of cells.
1.2h	Many organic and inorganic substances dissolved in cells allow necessary chemical reactions to take place in order to maintain life. Large organic food molecules such as

Performance Indicators (continued)		
	<p>proteins and starches must initially be broken down (digested to amino acids and simple sugars respectively), in order to enter cells. Once nutrients enter a cell, the cell will use them as building blocks in the synthesis of compounds necessary for life.</p> <p>1.2i Inside the cell a variety of specialized structures, formed from many different molecules, carry out the transport of materials (cytoplasm), extraction of energy from nutrients (mitochondria) protein building (ribosomes), waste disposal (cell membrane), storage (vacuole), and information storage (nucleus).</p> <p>1.2j Receptor molecules play an important role in the interactions between cells. Two primary agents of cellular communication are hormones and chemicals produced by nerve cells. If nerve or hormone signals are blocked, cellular communication is disrupted and the organism's stability is affected.</p> <p>1.3 Explain how a one-celled organism is able to function despite lacking the levels of organization present in more complex organisms.</p> <p>1.3a The structures present in some single-celled organisms act in a manner similar to the tissues and systems found in multicellular organisms, thus enabling them to perform all of the life processes needed to maintain homeostasis.</p>	

ALTERNATE GRADE LEVEL INDICATORS			
POSSIBLE ENTRY POINTS for The Living Environment			
Less Complex		More Complex	
Key Idea 1	<p>The student will:</p> <ul style="list-style-type: none"> • recognize relationships between themselves and living and/or non-living things (21101) • recognize that humans have structures (organs) that are connected to fulfill certain needs (e.g. circulation, respiration, digestion, waste removal) (21102) • recognize the five senses (21103) • identify a living thing (21104) • identify a non-living thing (21105) 	<p>The student will:</p> <ul style="list-style-type: none"> • identify relationships within an ecosystem in which living things depend on living and/or non-living things (21201) • identify that humans have groups of organs that work together to fulfill certain needs (e.g. circulation, respiration, digestion, waste removal) (21202) • recognize that organisms are made up of cells (21203) • recognize a one-celled organism or a model of a one-celled organism (21204) 	<p>The student will:</p> <ul style="list-style-type: none"> • recognize disruptions in the relationships between living and/or non-living things within an ecosystem (21301) • describe how humans have systems of organs that fulfill certain needs (e.g. circulation, respiration, digestion, waste removal) (21302) • understand that the human body is made up of cells (21303) • understand that cells have structures that fulfill certain needs (21304) • recognize that one-celled organisms have structures that fulfill certain needs (21305)

Sample Assessment Tasks		
Sample Assessment Tasks:		Possible Assessment Strategies and Datafolio Products
<div style="display: flex; flex-direction: column; align-items: center;"> <div style="margin-bottom: 10px;">Less Complex</div> <div style="margin-bottom: 10px;">↑</div> <div style="margin-bottom: 10px;">↕</div> <div style="margin-bottom: 10px;">↓</div> <div>More Complex</div> </div>	<p>The student will identify living things from a selection of living and non-living objects or examples. (e.g., a fish, a rock, a shoe, or a plant, a CD-Rom, a pencil, etc.)</p>	<ul style="list-style-type: none"> Sequenced, captioned dated photographs of student choosing the living thing from a choice of two
	<p>The student will identify that humans have systems of organs that fulfill certain needs (e.g., circulation-heart, veins, arteries; respiration-lungs, diaphragm; digestion-stomach, intestine; waste removal-intestine, kidneys, liver; etc.).</p>	<ul style="list-style-type: none"> Student work product with diagrams of body systems with labels pasted on showing some of the groups of major organs and the need the fulfill
	<p>The student will recognize disruptions in the relationships between living and/or non-living things. (e.g., fire disrupting an ecosystem, severe storms disrupting an ecosystem, etc.)</p>	<ul style="list-style-type: none"> Audio/video clip of student explaining poster created about disruptions in the relationship between living and/or non-living things recognized by the student

High School


Standard 4: Living Environment

Key Idea 7: Human decisions and activities have had a profound impact on the physical and living environment.

Science Core Curriculum	Performance Indicators	Essence of Indicators
Pg. 19–20	<p>7.1 Describe the range of interrelationships of humans with the living and nonliving environment.</p> <p>7.1a The Earth has finite resources; increasing human consumption of resources places stress on the natural processes that renew some resources and deplete those resources that cannot be renewed.</p> <p>7.1b Natural ecosystems provide an array of basic processes that affect humans. Those processes include but are not limited to: maintenance of the quality of the atmosphere, generation of soils, control of the water cycle, removal of wastes, energy flow, and recycling of nutrients.</p> <p>7.1c Human beings are part of the Earth’s ecosystems. Human activities can, deliberately or inadvertently, alter the equilibrium in ecosystems. Humans modify ecosystems as a result of population growth, consumption, and technology. Human destruction of habitats through direct harvesting, pollution, atmospheric changes, and other factors is threatening current global stability, and if not addresses, ecosystems may be irreversibly affected.</p> <p>7.2 Explain the impact of technological development and growth in the human population on the living and nonliving environment.</p> <p>7.2a Human activities that degrade ecosystems result in the loss of diversity of the living and nonliving environment. For example, the influence of humans on other organisms occurs through land use and pollution. Land use decreases the space and resources available to other species, and pollution changes the chemical</p>	<ul style="list-style-type: none"> • Understand that living and non-living things share a strong interdependence in maintaining Earth’s ecosystem. Earth provides various resources to support human populations. Therefore, human activity plays a huge part in renewing or depleting these resources. • Recognize that technological advances and population growth affect both living and non-living environments • Understand that the choices we make now affect future generations

Performance Indicators (continued)	
	composition of air, soil, and water.
7.2b	When humans alter ecosystems either by adding or removing specific organisms, serious consequences may result. For example, planting large expanses of one crop reduces the biodiversity of the area.
7.2c	Industrialization brings an increased demand for and use of energy and other resources including fossil and nuclear fuels. This usage can have positive and negative effects on humans and ecosystems.
	7.3 Explain how individual choices and societal actions can contribute to improving the environment.
7.3a	Societies must decide on proposals which involve the introduction of new technologies. Individuals need to make decisions which will assess risks, costs, benefits, and trade-offs.
7.3b	The decisions of one generation both provide and limit the range of possibilities open to the next generation.

ALTERNATE GRADE LEVEL INDICATORS			
POSSIBLE ENTRY POINTS for The Living Environment			
Less Complex		More Complex	
Key Idea 7	<p>The student will:</p> <ul style="list-style-type: none"> • recognize that living things (including humans) need non-living things (24101) • recognize ways that humans use non-living things (24102) • recognize impacts that humans have on the environment (24103) • demonstrate ways to minimize human impacts on the environment (24104) • identify ways that human actions affect the environment (24105) 	<p>The student will:</p> <ul style="list-style-type: none"> • identify at least one way that people need non-living things (24201) • identify at least one way that humans need Earth’s resources (24202) • identify at least one way that humans can use non-living things wisely (24203) • identify at least one way that humans impact the environment (24204) • identify ways that humans can influence the environment (24205) 	<p>The student will:</p> <ul style="list-style-type: none"> • describe examples of how living and non-living things are interdependent (24301) • describe at least one way humans need the Earth’s resources (24302) • describe at least one way that humans impact the Earth’s resources (24303) • understand how humans can minimize their impact by using resources wisely (24304) • describe at least one impact on the environment from technology and human populations (24305) • describe that humans can deplete or ruin resources and they will no longer be available for other people to use (24306)

Sample Assessment Tasks		
	Sample Assessment Tasks:	Possible Assessment Strategies and Datafolio Products
<div style="display: flex; flex-direction: column; align-items: center;"> <div style="writing-mode: vertical-rl; transform: rotate(180deg);">Less Complex</div>  <div style="writing-mode: vertical-rl; transform: rotate(180deg);">More Complex</div> </div>	<p>The student will recognize that living things need non-living things. (e.g., humans need sun, water, shelter, etc.)</p>	<ul style="list-style-type: none"> • Student work product of a list of non-living things that humans need
	<p>The student will identify at least one way humans impact the environment. (e.g., positive and/or negative impacts such as global warming, deforestation, planting a garden in the city, recycling, etc.)</p>	<ul style="list-style-type: none"> • Student work product consisting of a collection of pictures showing ways people have impacted (changed) the environment
	<p>The student will describe that humans can deplete or ruin resources so they will no longer be available for other people to use. (e.g., answering questions about what will happen when something is taken away that can be used up and/or when depletion of trees/forests takes away shelters for some animals, shade for some plants, and/or when pollution of water affects drinking water, plant growth, fish life, etc.)</p>	<ul style="list-style-type: none"> • Videotape of student demonstrating that resources can be depleted

High School

Standard 4: Physical Setting/Earth Science

Key Idea 1: The Earth and celestial phenomena can be described by principles of relative motion and perspective.

Science Core Curriculum	Performance Indicators	Essence of Indicators
Pg. 8–10	<p>1.1 Explain complex phenomena, such as tides, variations in day length, solar isolation, apparent motion of the planets and annual traverse of the constellations.</p> <p>1.1a Most objects in the solar system are in regular and predictable motion.</p> <ul style="list-style-type: none"> • These motions explain such phenomena as the day, the year, the seasons, phases of the moon, eclipses and tides. • Gravity influences the motions of celestial objects. The force of gravity between two objects in the universe depends on their masses and the distance between them. <p>1.1b Nine planets move around the sun in nearly circular orbits.</p> <ul style="list-style-type: none"> • The orbit of each planet is an ellipse with the Sun located at one end of the foci. • Earth is orbited by one moon and many artificial satellites. <p>1.1c Earth’s coordinate system of latitude and longitude, with the equator and prime meridian as reference lines, is based upon Earth’s rotation and our observation of the Sun and stars.</p> <p>1.1d Earth rotates on an imaginary axis at a rate of 15 degrees per hour. To people on Earth, this turning of the planet makes it seem as though the Sun, the moon, and the stars are moving around Earth once a day. Rotation provides a basis for our system of local time; meridians of longitude are the basis for time zones.</p> <p>1.1e The Foucault pendulum and the Coriolis</p>	<ul style="list-style-type: none"> • Understand that most objects in the solar system are in regular and predictable motion. As the earth revolves around the sun, it rotates (spins) on its axis. Earth’s changing position with regard to the Sun and the Moon has noticeable effects. Seasonal changes provide evidence of earth’s revolution around the Sun. • Understand that evidence shows that the universe is vast and very old. Stars, planets, asteroids, comets and meteors are all part of the universe. • Understand that water on Earth moves through the water cycle • Recognize that geologic history can be determined from rocks and fossils

Performance Indicators (continued)		
	effect provide evidence of Earth's rotation.	
1.1f	<p>Earth's changing position with regard to the Sun and the moon has noticeable effects.</p> <ul style="list-style-type: none"> • Earth revolves around the Sun with its rotational axis tilted at 23.5 degrees to a line perpendicular to the plane of its orbit, with the North Pole aligned with the Polaris. • During Earth's one-year period of revolution, the tilt of the axis results in changes in the angle of incidence of the Sun's rays at a given latitude; these changes cause variation in the heating of the surface. This produces seasonal variation in weather. 	
1.1g	Seasonal changes in the apparent positions of constellations provide evidence of the Earth's revolution.	
1.1h	The Sun's apparent path through the sky varies with latitude and season.	
1.1i	Approximately 70 percent of Earth's surface is covered by a relatively thin layer of water, which responds to the gravitational attraction of the moon and the Sun with a daily cycle of high and low tides.	
	1.2 Describe current theories about the origin of the universe and solar system.	
1.2a	<p>The universe is vast and estimated to be over ten billion years old. The current theory is that the universe was created from an explosion called the Big Bang. Evidence for this theory includes:</p> <ul style="list-style-type: none"> • cosmic background radiation • a red-shift (the Doppler Effect) in the light from very distant galaxies. 	
1.2b	Stars form when gravity causes clouds of molecules to contract until nuclear fusion of light elements into heavier	

Performance Indicators (continued)	
	<p>ones occurs. Fusion releases great amounts of energy over millions of years.</p> <ul style="list-style-type: none"> • The stars differ from each other in size, temperature, and age. • Our Sun is a medium-sized star within a spiral galaxy of stars known as the Milky Way. Our galaxy contains billions of stars, and the universe contains billions of such galaxies.
1.2c	<p>Our solar system formed about five billion years ago from a giant cloud of gas and debris. Gravity caused Earth and the other planets to become layered according to density differences in their materials.</p> <ul style="list-style-type: none"> • The characteristics of the planets of the solar system are affected by each planet's location in relationship to the Sun. • The terrestrial planets are small, rocky, and dense. The Jovian planets are large, gaseous, and of low density.
1.2d	<p>Asteroids, comets, and meteors are components of our solar system.</p> <ul style="list-style-type: none"> • Impact events have been correlated with mass extinction and global climactic change. • Impact craters can be identified in Earth's crust.
1.2e	<p>Earth's early atmosphere formed as a result of the outgassing of water vapor, carbon dioxide, nitrogen, and lesser amounts of other gases from its interior.</p>
1.2f	<p>Earth's oceans formed as a result of precipitation over millions of years. The presence of an early ocean is indicated by sedimentary rocks of marine origin, dating back about four billion years.</p>
1.2g	<p>Earth has continuously been recycling water since the outgassing of water early in its history. This constant</p>

Performance Indicators (continued)		
	<p>recirculation of water at and near Earth's surface is described by the hydrologic (water) cycle.</p> <ul style="list-style-type: none"> • Water is returned from the atmosphere to the Earth's surface by precipitation. Water returns to the atmosphere by evaporation or transpiration from plants. A portion of the precipitation becomes runoff over the land or infiltrates into the ground to become stored in the soil or groundwater below the water table. Soil capillarity influences these processes. • The amount of precipitation that seeps into the ground or runs off is influenced by climate, slope of the land, rock type, vegetation, land use, and degree of saturation. • Porosity, permeability, and water retention affect runoff and infiltration. 	
1.2h	<p>The evolution of life caused dramatic changes in the composition of Earth's atmosphere. Free oxygen did not form in the atmosphere until oxygen-producing organisms evolved.</p>	
1.2i	<p>The pattern of evolution of life-forms on Earth is at least partially preserved in the rock record.</p> <ul style="list-style-type: none"> • Fossil evidence indicates that a wide variety of life-forms has existed in the past and that most of these forms have become extinct. • Human existence has been very brief compared to the expanse of geologic time. 	
1.2j	<p>Geologic history can be reconstructed by observing sequences of rock types and fossils to correlate bedrock at various locations.</p> <ul style="list-style-type: none"> • The characteristics of rocks indicate the processes by which they formed and the environments in which these processes took place. • Fossils preserved in rocks provide 	

	Performance Indicators (continued)	
	<p>information about past environmental conditions.</p> <ul style="list-style-type: none"> • Geologists have divided Earth’s history into time units based upon the fossil record. • Age relationships among bodies of rocks can be determined using principles of original horizontality, superposition, inclusions, cross-cutting relationships, contact metamorphism, and unconformities. The presence of volcanic ash layers, index fossils, and meteoric debris can provide additional information. • The regular rate of nuclear decay (half-life time period) of radioactive isotopes allows geologists to determine the absolute age of materials found in some rocks. 	

ALTERNATE GRADE LEVEL INDICATORS			
POSSIBLE ENTRY POINTS for The Physical Setting/Earth Science			
Less Complex		More Complex	
Key Idea 1	<p>The student will:</p> <ul style="list-style-type: none"> • identify the earth, sun, moon and/or stars (31101) • identify night and/or day (31102) • recognize that the moon changes shape over the course of a month (31103) • recognize that seasons change over the course of a year (31104) • recognize other planets, asteroids, comets, and/or meteors (31105) • label a diagram of the water cycle (31106) • identify fossils as remains of living things (31107) • recognize patterns of daily, monthly and/or seasonal changes in their environment (31108) 	<p>The student will:</p> <ul style="list-style-type: none"> • recognize the earth tilts on its axis and its relation to night, day and/or seasons (31201) • recognize the movements of the earth, moon and sun relative to each other (31202) • identify that the moon changes shape over the course of a month (31203) • identify stars, planets, asteroids, comets, and/or meteors (31204) • identify parts of the water cycle (31205) • identify ways that fossils form (31206) • recognize how fossils can provide evidence of past conditions (31207) • recognize how rocks can provide evidence of past conditions (31208) 	<p>The student will:</p> <ul style="list-style-type: none"> • explain the effects of the earth spinning on its axis (31301) • describe the movements of the earth, moon and sun relative to each other (31302) • describe changes in the moon’s shape over the course of a month (31303) • describe changes in the seasons over the course of a year (31304) • describe stars, planets, asteroids, comets, and/or meteors (31305) • recognize that the universe is vast and/or very old (31306) • describe parts of the water cycle (31307) • identify how fossils can provide evidence of past conditions (31308) • identify how rocks can provide evidence of past conditions (31309)

Sample Assessment Tasks		
Sample Assessment Tasks:		Possible Assessment Strategies and Datafolio Products
<div style="display: flex; flex-direction: column; align-items: center;"> <div style="margin-bottom: 10px;">Less Complex</div> <div style="margin-top: 10px;">More Complex</div> </div>	<p>The student will identify fossils as remains of living things. (e.g., piece of amber with an embedded mosquito, rock with a fish/leaf fossil embedded in it, petrified wood, etc.)</p>	<ul style="list-style-type: none"> Student work product indicating which rocks/objects are/contain fossils in a collection
	<p>The student will recognize the movements of the earth and moon relative to each other and the sun. (e.g., sun is central, earth moves around the sun, moon moves around the earth)</p>	<ul style="list-style-type: none"> Video clip of student participating in model demonstration
	<p>The student will describe stars, planets, asteroids, comets, and/or meteors. (e.g., recognizes a picture as a planet [or the planet Jupiter] and another picture as an asteroid; identify a model or picture of a comet; describe characteristics of a star or meteor, etc.)</p>	<ul style="list-style-type: none"> Sequenced, captioned dated photographs of student sorting pictures of space objects into categories

High School

Standard 4: Physical Setting/Earth Science

Key Idea 2: Many of the phenomena that we observe on Earth involve interactions among components of air, water, and land.

Science Core Curriculum	Performance Indicators	Essence of Indicators
Pg. 11–14	<p>2.1 Use the concepts of density and heat energy to explain observations of weather patterns, seasonal changes, and the movements of Earth’s plates.</p> <p>2.1a Earth’s systems have internal and external sources of energy, both of which create heat.</p> <p>2.1b The transfer of heat energy within the atmosphere, the hydrosphere, and Earth’s interior results in the formation of regions of different densities. These density differences result in motion.</p> <p>2.1c Weather patterns become evident when weather variables are observed, measured, and recorded. These variables include air temperature, air pressure, moisture (relative humidity and dewpoint), precipitation (rain, snow, hail, sleet, etc.), wind speed and direction, and cloud cover.</p> <p>2.1d Weather variables are measured using instruments such as thermometers, barometers, psychrometers, precipitation gauges, anemometers, and wind vanes.</p> <p>2.1e Weather variables are interrelated. For example:</p> <ul style="list-style-type: none"> • temperature and humidity affect air pressure and probability of precipitation • air pressure gradient controls wind velocity <p>2.1f Air temperature, dewpoint, cloud formation, and precipitation are affected by the expansion and contraction of air due to vertical atmospheric movement.</p>	<ul style="list-style-type: none"> • Recognize that the Earth’s external sources of heat energy determine weather patterns, seasonal changes, and atmospheric conditions. Earth’s internal heat determines the motion within layers of Earth. • Understand how internal forces create landforms that can be broken down by weathering and erosion • Understand how weather and climate are affected by solar radiation, ocean currents, and land masses

Performance Indicators (continued)	
2.1g	Weather variables can be represented in a variety of formats including radar and satellite images, weather maps (including station models, isobars, and fronts), atmospheric cross-sections, and computer models.
2.1h	Atmospheric moisture, temperature and pressure distributions; jet streams, wind; air masses and frontal boundaries; and the movement of cyclonic systems and associated tornadoes, thunderstorms, and hurricanes occur in observable patterns. Loss of property, personal injury, and loss of life can be reduced by effective emergency preparedness.
2.1i	Seasonal changes can be explained using concepts of density and heat energy. These changes include the shifting of global temperature zones, the shifting of planetary wind and ocean current patterns, the occurrence of monsoons, hurricanes, flooding, and severe weather.
2.1j	Properties of Earth's internal structure (crust, mantle, inner core, and outer core) can be inferred from the analysis of the behavior of seismic waves (including velocity and refraction). <ul style="list-style-type: none"> • Analysis of seismic waves allows the determination of the location of earthquake epicenters, and the measurement of earthquake magnitude; this analysis leads to the inference that Earth's interior is composed of layers that differ in composition and states of matter.
2.1k	The outward transfer of Earth's internal heat drives convective circulation in the mantle that moves the lithospheric plates comprising Earth's surface.
2.1l	The lithosphere consists of separate plates that ride on the more fluid asthenosphere and move slowly in relationship to one another, creating convergent, divergent, and transform plate boundaries. These


Performance Indicators (continued)		
	<p>motions indicate Earth is a dynamic geologic system.</p> <ul style="list-style-type: none"> • These plate boundaries are the sites of most earthquakes, volcanoes and young mountain ranges. • Compared to continental crust, ocean crust is thinner and denser. New ocean crust continues to form at mid-ocean ridges. • Earthquakes and volcanoes present geologic hazards to humans. Loss of property, personal injury, and loss of life can be reduced by effective emergency preparedness. 	
2.1m	<p>Many processes of the rock cycle are consequences of plate dynamics. These include the production of magma (and subsequent igneous rock formation and contact metamorphism) at both subduction and rifting regions, regional metamorphism within subduction zones, and the creation of major depositional basins through down-warping of the crust.</p>	
2.1n	<p>Many of Earth’s surface features such as mid-ocean ridges/rifts, trenches/subduction zones/island arcs, mountain ranges (folded, faulted and volcanic), hot spots, and the magnetic and age patterns in surface bedrock are a consequence of forces associated with plate motion and interaction.</p>	
2.1o	<p>Plate motions have resulted in global changes in geography, climate, and the patterns of organic evolution.</p>	
2.1p	<p>Landforms are the result of the interaction of tectonic forces and the processes of weathering, erosion, and deposition.</p>	
2.1q	<p>Topographic maps represent landforms through the use of contour lines that are isolines connecting points of equal elevation. Gradients and profiles can be determined from changes in elevation over a given distance.</p>	

Performance Indicators (continued)	
2.1r	Climate variations, structure and characteristics of bedrock influence the development of landscape features including mountains, plateaus, plains, valleys, ridges, escarpments, and stream drainage patterns.
2.1s	Weathering is the physical and chemical breakdown of rocks at or near Earth's surface. Soils are the result of weathering and biological activity over long periods of time.
2.1t	Natural agents of erosion, generally driven by gravity, remove, transport, and deposit weathered rock particles. Each agent of erosion produces distinctive changes in the material that it transports and creates characteristic surface features and landscapes. In certain erosional situations, loss of property, personal injury, and loss of life can be reduced by effective emergency preparedness.
2.1u	<p>The natural agents of erosion include:</p> <ul style="list-style-type: none"> • <i>Streams (running water)</i>: Gradient, discharge, and channel shape influence a stream's velocity and the erosion and deposition of sediments. Sediments transported by streams tend to become rounded as a result of abrasion. Stream features include V-shaped valleys, deltas, flood plains, and meanders. A watershed is the area drained by a stream and its tributaries. • <i>Glaciers (moving ice)</i>: Glacial erosional processes include the formation of U-shaped valleys, parallel scratches, and grooves in bedrock. Glacial features include moraines, drumlins, kettle lakes, finger lakes, and outwash plains. • <i>Wave Action</i>: Erosion and deposition cause changes in shoreline features, including beaches, sandbars, and barrier islands. Wave action rounds sediments as a result of abrasion. Waves approaching a shoreline move sand parallel to the shore within the

Performance Indicators (continued)	
	<p>zone of the breaking waves.</p> <ul style="list-style-type: none"> • <i>Wind</i>: Erosion of sediments by wind is most common in arid climates and along shorelines. Wind-generated features include dunes and sand-blasted bedrock. • <i>Mass Movement</i>: Earth materials move downslope under the influence of gravity.
2.1v	<p>Patterns of deposition result from a loss of energy within the transporting system and are influenced by the size, shape, and density of the transported particles. Sediment deposits may be sorted or unsorted.</p>
2.1w	<p>Sediments of inorganic and organic origin often accumulate in depositional environments. Sedimentary rocks form when sediments are compacted and/or cemented after burial or as the result of chemical precipitation from seawater.</p>
	<p>2.2 Explain how incoming solar radiation, ocean currents, and land masses affect weather and climate.</p>
2.2a	<p>Insolation (solar radiation) heats Earth’s surface and atmosphere unequally due to variations in:</p> <ul style="list-style-type: none"> • the intensity caused by differences in atmospheric transparency and angle of incidence which vary with time of day, latitude and season • characteristics of the materials absorbing the energy such a color, texture, transparency, state of matter, and specific heat. • duration, which varies with seasons and latitude.
2.2b	<p>The transfer of heat energy within the atmosphere, the hydrosphere, and Earth’s surface occurs as the result of radiation, convection, and conduction.</p> <ul style="list-style-type: none"> • Heating of Earth’s surface and atmosphere by the Sun drives convection within the atmosphere and

Performance Indicators (continued)		
	oceans, producing winds and ocean currents.	
2.2c	A location's climate is influenced by latitude, proximity to large bodies of water, ocean currents, prevailing winds, vegetative cover, elevation, and mountain ranges.	
2.2d	<p>Temperature and precipitation patterns are altered by:</p> <ul style="list-style-type: none"> • natural events such as El Nino and volcanic eruptions • human influences including deforestation, urbanization, and the production of greenhouse gases such as carbon dioxide and methane. 	

ALTERNATE GRADE LEVEL INDICATORS			
POSSIBLE ENTRY POINTS for The Physical Setting/Earth Science			
Less Complex		More Complex	
Key Idea 2	<p>The student will:</p> <ul style="list-style-type: none"> • recognize that it feels warmer when in the sunshine than when in the shade (32101) • recognize land can be pushed into mountains and/or valleys (32102) • recognize that land is removed by erosion (32103) • identify weather conditions (32104) • identify appropriate tools for measuring various weather conditions (32105) 	<p>The student will:</p> <ul style="list-style-type: none"> • identify the sun as an external source of heat (32201) • associate the visible presence or absence of the sun with certain weather (32202) • associate changes in the amount of heat in the atmosphere with changes in seasons (32203) • identify that forces within earth cause land to be folded into mountains and/or valleys (32204) • identify that weathering and/or erosion break down the land (32205) • associate weather and/or climate changes with differences in heating (32206) • identify weather as short-term changes and/or climate as long-term changes (32207) 	<p>The student will:</p> <ul style="list-style-type: none"> • describe the sun as an external source of heat (32301) • describe the relationship between the visible presence or absence of the sun with certain weather (32302) • describe how the amount of heat in the atmosphere changes with seasons (32303) • recognize that the earth has internal heat (32304) • recognize that the earth's internal heat drives the motion of material inside the earth (convection currents) (32305) • describe that forces within earth cause land to be folded into mountains and/or valleys (32306) • describe that erosion breaks down the land (32307) • describe the relationship between differences in heating and/or weather and/or climate (32308)

Sample Assessment Tasks		
Sample Assessment Tasks:		Possible Assessment Strategies and Datafolio Products
<p>Less Complex</p>  <p>More Complex</p>	<p>The student will identify weather conditions. (e.g., use simple calendar or chart and attach/glue weather pictures for each day over a week/month time period)</p>	<ul style="list-style-type: none"> • Student work product of daily weather record compiled by the student
	<p>The student will identify the sun as an external source of heat. (e.g., use simple chart with the temperature recorded in the shade and in the sun on the same day showing that the temperature is lower when sunshine is blocked)</p>	<ul style="list-style-type: none"> • Student work product of student chart with differing temperatures
	<p>The student will describe the relationship between differences in heating and/or weather and/or climate. (e.g., Given a picture of a sunny day with a thermometer showing a warm temperature , ask the student what the weather will feel like – what to wear, what to do [picnic etc.]; given a picture of or a thermometer showing freezing temperatures, ask the student whether it will rain or snow, etc.)</p>	<ul style="list-style-type: none"> • Student work product of flow chart labeled by student indicating the relationship between amount of heat received in an area and the weather or climate in that area