



North Carolina Department of Public Instruction

INSTRUCTIONAL SUPPORT TOOLS

FOR ACHIEVING NEW STANDARDS

This document is designed to assist North Carolina educators in effective instruction of the new Common Core State and/or North Carolina Essential Standards (Standard Course of Study) in order to increase student achievement. NCDPI staff are continually updating and improving instructional tools to better serve teachers.

North Carolina Essential Standards Assessment Examples **Science, Grades 6-8**

What is the purpose of this tool?

Assessment is a vital component of the teaching and learning process. These assessment examples are aligned to new content standards and reinforce teaching the standards to their intended level of deep mastery. The purpose of providing examples is to illustrate ways in which the standards or part(s) of the standards might be assessed in the classroom.

How do I send Feedback?

We intend the examples in this document to be helpful and specific. That said, we believe that as this document is used, educators will find ways in which the tool can be improved and made even more useful. Please send feedback to us at feedback@dpi.nc.gov and we will use your input to refine our instructional tool. Thank You!

Where are the new Common Core State and North Carolina Essential Standards?

All standards are located at <http://www.ncpublicschools.org/acre/>

Science Grades 6-8 Assessment Examples

Essential Standards • Grade 6 Science

Physical Science (P) Earth Science (E) Life Science (L)

Forces and Motion (P)

6.P.1 Understand the properties of waves and the wavelike property of energy in earthquakes, light and sound waves.

Matter: Properties and Change (P)

6.P.2 Understand the structure, classifications and physical properties of matter.

Energy: Conservation and Transfer (P)

6.P.3 Understand characteristics of energy transfer and interactions of matter and energy.

Earth in the Universe (E)

6.E.1 Understand the earth/moon/sun system, and the properties, structures and predictable motions of celestial bodies in the Universe.

Earth Systems, Structures & Processes (E)

6.E.2 Understand the structure of the earth and how interactions of constructive and destructive forces have resulted in changes in the surface of the earth over time and the effects of the lithosphere on humans.

Structures & Functions of Living Organisms (L)

6.L.1 Understand the structures, processes and behaviors of plants that enable them to survive and reproduce.

Ecosystems (L)

6.L.2 Understand the flow of energy through ecosystems and the responses of populations to the biotic and abiotic factors in their environment.

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Forces and Motion																	
Essential Standards	Clarifying Objectives	Assessment Examples															
6.P.1 Understand the properties of waves and the wavelike property of energy in earthquakes, light and sound waves.	6.P.1.1 Compare the properties of waves to the wavelike property of energy in earthquakes, light and sound.	6.P.1.1 Which is one way sound waves are different from light waves? a. Sound waves travel through space but light waves cannot. b. Sound waves travel at a slower speed than light waves. c. Sound waves have shorter wavelengths than light waves. d. Sound waves are a source of energy but light waves are not.															
	6.P.1.2 Explain the relationship among visible light, the electromagnetic spectrum, and sight.	6.P.1.2 Which is true about the relationship between light and the electromagnetic spectrum? a. Visible light travels slower than the rest of the electromagnetic spectrum. b. Visible light has more energy than the rest of the electromagnetic spectrum. c. Visible light is only part of the electromagnetic spectrum that can be detected by the human eye. d. Visible light is the only part of the electromagnetic spectrum that can travel through space.															
	6.P.1.3 Explain the relationship among the rate of vibration, the medium through which vibrations travel, sound and hearing.	<p>The table below shows the speed of sound through various substances.</p> <table border="1"> <thead> <tr> <th>Substance</th> <th>Speed (meters/sec)</th> </tr> </thead> <tbody> <tr> <td>Rubber</td> <td>60</td> </tr> <tr> <td>Brick</td> <td>3,650</td> </tr> <tr> <td>Cork</td> <td>500</td> </tr> <tr> <td>Stone</td> <td>5,971</td> </tr> <tr> <td>Air at 0 degrees Celcius</td> <td>331</td> </tr> <tr> <td>Air at 25 degrees Celcius</td> <td>346</td> </tr> <tr> <td>Water at 25 degrees Celcius</td> <td>1,498</td> </tr> </tbody> </table>	Substance	Speed (meters/sec)	Rubber	60	Brick	3,650	Cork	500	Stone	5,971	Air at 0 degrees Celcius	331	Air at 25 degrees Celcius	346	Water at 25 degrees Celcius
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		6.P.1.3 According to the table above, the speed of sound through air increases as the: a. density of the air increases b. temperature of the air increases c. loudness of the sound increases d. pitch of the sound increases															

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		<p>6.P.1.3 Through which medium does sound travel the fastest?</p> <ul style="list-style-type: none"> a. air b. steel c. steam d. water
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Matter: Properties and Change		
Essential Standards	Clarifying Objectives	Assessment Examples
6.P.2 Understand the structure, classifications and physical properties of matter.	6.P.2.1 Recognize that all matter is made up of atoms and atoms of the same element are all alike, but are different from the atoms of other elements.	<p>6.P.2.1 In what way are atoms of oxygen most different from atoms of nitrogen?</p> <ul style="list-style-type: none"> a. They have different temperatures. b. They have different states of matter. c. They have different masses. d. They have different colors.
	6.P.2.2 Explain the effect of heat on the motion of atoms and molecules through a description of what happens to particles during a change in phase.	<p>6.P.2.2 The melting point of a solid is 24.9⁰C. As heat is added to melt the solid, what happens to the particles?</p> <ul style="list-style-type: none"> a. The motion of the particles increases. b. The motion of particles decreases. c. The particles move farther apart. d. The particles move closer together.
	6.P.2.3 Compare the physical properties of matter that are independent of the amount of matter present including density, melting point, boiling point, and solubility to properties that are dependent on the amount of matter present to include volume, mass and weight.	<p>6.P.2.3 An example of a property of matter that can be observed without changing the identity of the matter is:</p> <ul style="list-style-type: none"> a. flammability b. reactivity c. solubility d. ability to rust

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Energy: Conservation and Transfer		
Essential Standards	Clarifying Objectives	Assessment Examples
6.P.3 Understand characteristics of energy transfer and interactions of matter and energy.	6.P.3.1 Illustrate the transfer of heat energy from warmer objects to cooler ones using examples of conduction, radiation and convection and the effects that may result.	6.P.3.1 If you placed a hot stone in a beaker of cold water, what would happen to stone and water after 10 minutes of time elapsed? <ol style="list-style-type: none"> The stone would get warmer and the water would get cooler. The stone will get as cold as the water had been. The water would get as hot as the stone had been. The stone would get cooler and the water would get warmer.
	6.P.3.2 Explain the effects of electromagnetic waves on various materials to include absorption, scattering, and change in temperature.	6.P.3.2 When electromagnetic waves strike a metal pipe, what usually happens? <ol style="list-style-type: none"> The pipe gets colder. The pipe absorbs some of the waves. The pipe reflects all of the waves. The pipe begins to produce light.
	6.P.3.3 Explain the suitability of materials for use in technological design based on a response to heat (to include conduction, expansion, and contraction) and electrical energy (conductors and insulators).	6.P.3.3 Which best describes why metals are used for making pots and pans that are used for cooking? <ol style="list-style-type: none"> Metals conduct heat and have a high melting point. Metals conduct heat and have a low melting point. Metals radiate heat and have a high melting point. Metals radiate heat and have a low melting point.

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Earth In the Universe		
Essential Standards	Clarifying Objectives	Assessment Examples
6.E.1 Understand the earth/moon/sun system, and the properties, structures and predictable motions of celestial bodies in the Universe.	6.E.1.1 Explain how the relative motion and relative position of the sun, Earth and moon affect the seasons, tides, phases of the moon, and eclipses.	6.E.1.1 Why do the moon phases occur? a. because the moon is closer to the earth than the sun b. because the sun is farther from earth than the moon c. because the gravitational pull of the earth-moon-sun system as the moon orbits the earth d. because of changing angles of the earth-moon-sun system as the moon orbits the earth
	6.E.1.2 Explain why Earth sustains life while other planets do not based on their properties (including types of surface, atmosphere and gravitational force) and location to the Sun.	6.E.1.2 Why is Earth better able to support life than either Venus or Mars?
	6.E.1.3 Summarize space exploration and the understandings gained from them.	6.E.1.3 What is the most useful purpose for the International Space Station? a. To provide a vacation destination for wealthy Americans. b. To enable long-term exploration of space. c. To enable the designs of rockets to be tested. d. To provide a home to humans when the Earth becomes to polluted.

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Earth Systems, Structures and Processes		
Essential Standards	Clarifying Objectives	Assessment Examples
6.E.2 Understand the structure of the earth and how interactions of constructive and destructive forces have resulted in changes in the surface of the Earth over time and the effects of the lithosphere on humans.	6.E.2.1 Summarize the structure of the earth, including the layers, the mantle and core based on the relative position, composition and density.	<p>6.E.2.1 What are the characteristics of the layers of the earth?</p> <p><i>Student answers might include:</i></p> <p><i>The Earth is a sphere of radius 6371km which is stratified or layered. Compositional layers differ in chemical composition. The Earth has three compositional layers:</i></p> <ol style="list-style-type: none"> 1. The crust: low density <i>silicate</i> rock, 5-70 km thick. There are two distinct types of crust: <ol style="list-style-type: none"> a. Continental crust is variable in thickness and composition. Thickness ranges from 5-70 km. The composition ranges from mafic to felsic. b. Oceanic crust is uniform in thickness and composition. It is 5-6 km thick and is mafic in composition. c. The differences in thickness and density between continental and oceanic are responsible for the existence of ocean basins as the crust floats on the more dense mantle. 2. The mantle: high density, silicate rock which can flow when subjected to long duration stresses. The mantle is over 2900 km thick and makes up over 80% of the volume of the Earth. The mantle is not molten. 3. The core: iron and nickel, liquid outer region with a solid center. The core is just over half the diameter of the Earth. <p><i>These compositional layers have sharp or abrupt boundaries between them.</i></p>
	6.E.2.2 Explain how crustal plates and ocean basins are formed, move and interact using earthquakes, heat flow and volcanoes to reflect forces within the earth.	6.E.2.2 Where are earthquakes and volcanoes most often located? <ol style="list-style-type: none"> a. center of crustal planes b. edges of crustal plates c. center of continents d. edges of continents
	6.E.2.3 Explain how the formation of soil is related to the parent rock type and the environment in which it develops.	6.E.2.3 Soil is usually a mixture of many different things. Living and dead plants and animals are part of most soil. Particles or pieces of rock and minerals are also part of soil. In dry areas rocks break down slowly. This causes a thin layer of soil made up of bigger particles to form. In areas where there is lot of heat and water, rocks are more quickly broken down. This causes a thick layer of soil made up of

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smaller particles to form. Soil made up of larger particles has lots of air spaces between each particle. The air spaces allow water to drain quickly through the soil. Soil made up of smaller particles packs together more tightly. This type of soil has smaller air spaces between each particle, so this soil drains water more slowly. The table below shows the range of particle sizes (measured in micrometers) that are found in four types of particles which soil is made from.

Particle type	Particle size
Coarse sand	20 to 40 micrometers
Fine sand	15 to 20 micrometers
Silt	8 to 15 micrometers
Clay	1 to 7 micrometers

6.E.2.3 A scientist studied the soil at a certain location. She determined that most of the soil was made up of particles between 10 micrometers and 18 micrometers. What type or types of particles make up the soil at this location?

- a. Fine sand only
- b. **Fine sand and silt**
- c. Coarse sand only
- d. Coarse sand and clay only

6.E.2.3 How does sandy soil form?

- a. by the accumulation of dead and decayed organic matter
- b. **by the disintegration and weathering of rocks such as limestone, granite, quartz and shale**
- c. by sedimentary deposits after rock is weathered, eroded and transported
- d. by the suspension of sediment in water column of a body of water

6.E.2.3 In the picture below, a man is using one type of stone to break another into smaller pieces. As the stones are broken apart, very tiny pieces are completely pulverized and are swept into the area around the large stone.



Which of the following can be said about the soil near the large stone?

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	<p>6.E.2.4 Conclude that the good health of humans requires: monitoring the pedosphere, maintaining soil quality and stewardship.</p>	<p>a. It is different than the stone because the wind blows the pulverized rock far away.</p> <p>b. It has a chemical constitution similar to the stone because of the pulverized rock settling there.</p> <p>c. Not much will grow there because the stone contaminates the soil.</p> <p>d. Many animals are attracted to the smell of the minerals and try to create homes in the soil.</p> <p>6.E.2.4 A chicken farmer’s waste product of excess manure was spread over an open field and plowed into the soil. How could this affect the soil quality for growing vegetables for human consumption in the future?</p> <p><i>Student answers might include:</i></p> <p><i>Application on crop land is the most common and efficient method of handling excess animal (chicken, livestock, hog, etc) manures. Mismanagement of the large quantities of manure generated by animal farm operations can adversely affect soil and water resources. Without proper management, manure application over a period of years can cause a build-up of nutrients and salts in the soil. Excess manure can contaminate groundwater when soluble nitrate and salts leach through the soil. Runoff from manured land can carry phosphorus, nitrogen, organic sediments, and pathogens to surface water bodies.</i></p>
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Structures and Functions of Living Organisms		
Essential Standards	Clarifying Objectives	Assessment Examples
6.L.1 Understand the structures, processes and behaviors of plants that enable them to survive and reproduce	<p>6.L.1.1 Summarize the basic structures and functions of flowering plants required for survival, reproduction and defense.</p> <p>6.L.1.2 Explain the significance of the processes of photosynthesis, respiration, and transpiration to the survival of green plants and other organisms.</p>	<p>6.L.1.1 What is the benefit of flowers on some plants?</p> <ul style="list-style-type: none"> a. they make food b. they provide heat c. they absorb water from the air d. they attract birds and insects that spread pollen <p>6.L.1.2 What is the purpose of photosynthesis occurring in green plants?</p> <ul style="list-style-type: none"> a. it provides protection b. it provides food and energy c. it provides water for the cells d. it provides carbon dioxide and water

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Ecosystems		
Essential Standards	Clarifying Objectives	Assessment Examples
6.L.2 Understand the flow of energy through ecosystems and the responses of populations to the biotic and abiotic factors in their environment.	6.L.2.1 Summarize how energy derived from the sun is used by plants to produce sugars (photosynthesis) and is transferred within food chains or food webs (terrestrial and aquatic) from producers to consumers to decomposers.	6.L.2.1 Which of these best illustrates the correct order of flow of energy through a food chain? a. rabbit → mouse → grain → sun b. rabbit → grain → mouse → sun c. sun → grain → mouse → rabbit d. sun → mouse → grain → rabbit
	6.L.2.2 Explain how plants respond to external stimuli (including dormancy and forms of tropism) to enhance survival in an environment.	6.L.2.2 How can trees minimize water loss through the colder months of the year? a. Trees can use more sunlight for energy b. Trees can add layers of bark. c. Trees can lose their leaves. d. Trees can grow more leaves.
	6.L.2.3 Summarize how the abiotic factors (such as temperature, water, sunlight, and soil quality) of biomes (freshwater, marine, forest, grasslands, desert, Tundra) affect the ability of organisms to grow, survive and/or create their own food through photosynthesis.	6.L.2.3 Why do large trees have a difficult time living in a Tundra? a. A Tundra is too hot for trees to grow large. b. Animals that live in a Tundra destroy most vegetation. c. Flooding occurs too often in a Tundra for large trees to grow. d. The soil in a Tundra is too nutrient- poor for large trees to grow.

Science Grades 6-8 Assessment Examples

Essential Standards • Grade 7 Science

Physical Science (P) Earth Science (E) Life Science (L)

Forces and Motion (P)

7.P.1 Understand motion, the effects of forces on motion and the graphical representations of motion.

Energy: Conservation and Transfer (P)

7.P.2 Understand forms of energy, energy transfer and transformation and conservation in mechanical systems.

Earth Systems, Structures & Processes (E)

7.E.1 Understand how the cycling of matter (water and gases) in and out of the atmosphere relates to Earth's atmosphere, weather and climate and the effects of the atmosphere on humans.

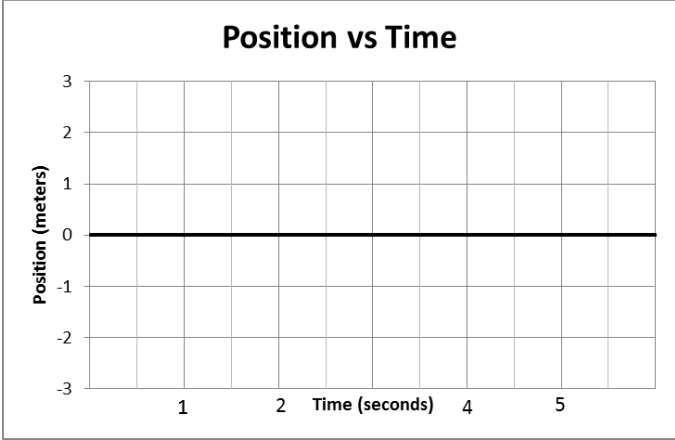
Structures & Functions of Living Organisms (L)

7.L.1 Understand the processes, structures and functions of living organisms that enable them to survive, reproduce and carry out the basic functions of life.

Evolution and Genetics (L)

7.L.2 Understand the relationship of the mechanisms of cellular reproduction, patterns of inheritance and external factors to potential variation among offspring

Science Grades 6-8 Assessment Examples

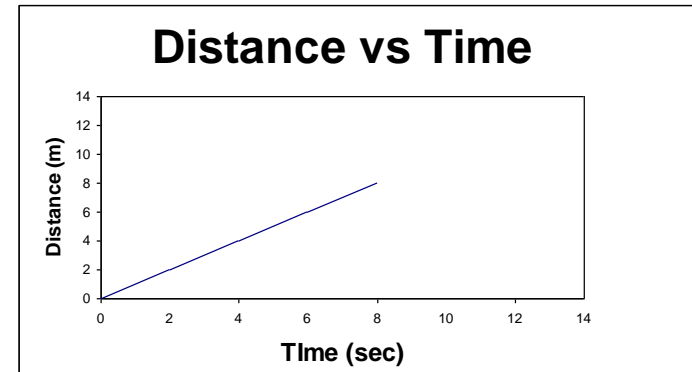
Forces & Motion		
Essential Standards	Clarifying Objectives	Assessment Examples
7.P.1 Understand motion, the effects of forces on motion and the graphical representations of motion.	7.P.1.1 Explain how the motion of an object can be described by its position, direction of motion, and speed with respect to some other object.	7.P.1.1 A dog runs for 2 seconds without stopping. After 1 second, the dog travels 6 meters. By the end of the next second, the dog has traveled an additional 4 meters. Which best describes the motion of the dog during the two seconds? a. The dog slows down. b. The dog speeds up. c. The dog moves with a constant speed. d. The dog changes directions.
	7.P.1.2 Explain the effects of balanced and unbalanced forces acting on an object (including friction, gravity and magnets).	7.P.1.2 Which best describes how forces must interact for a kite to sail up into the air? a. The force of gravity must be equal to the force of the wind. b. The force of gravity must be greater than the force of the wind. c. The force of the wind must be greater than the force of gravity. d. The force of the person flying the kite must be equal to the force of the wind.
	7.P.1.3 Illustrate the motion of an object using a graph to show a change in position over a period of time.	7.P.1.3 The graph below shows the relationship between the distance an object moves and the time it travels. <div style="text-align: center;">  <p>Position vs Time</p> <p>The graph shows Position (meters) on the y-axis ranging from -3 to 3, and Time (seconds) on the x-axis ranging from 0 to 5. A horizontal line is drawn at Position = 0 meters for the entire duration of 5 seconds.</p> </div>
		What can be concluded from the graph? a. The object is accelerating. b. The object is slowing down.

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7.P.1.4 Interpret distance versus time graphs for constant speed and variable motion.

- c. **The object is not moving.**
- d. The object is moving in a straight line.

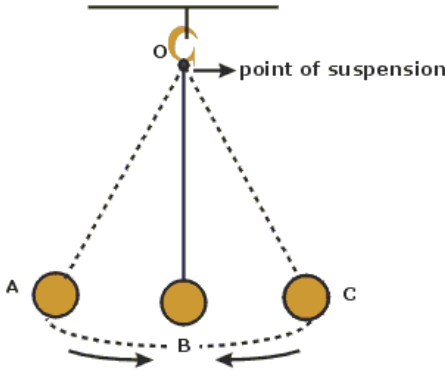
7.P.1.4 The graph below shows the distance traveled during a time interval



What is the speed of the object?

- a. 0 meters/sec
- b. **1 meter/sec**
- c. 2 meters/sec
- d. 8 meters/sec

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Energy: Conservation and Transfer		
Essential Standards	Clarifying Objectives	Assessment Examples
7.P.2 Understand forms of energy, energy transfer and transformation and conservation in mechanical systems.	7.P.2.1 Explain how kinetic and potential energy contribute to the mechanical energy of an object.	7.P.2.1 If the motion of an object increased, which type of mechanical energy was gained by the object? a. chemical energy b. gravitational potential energy c. kinetic energy d. electromagnetic energy
	7.P.2.2 Explain how energy can be transformed from one form to another (specifically potential energy and kinetic energy) using a model or diagram of a moving object (roller coaster, pendulum, or cars on ramps as examples).	7.P.2.2 The diagram below shows a mass suspended on a string called a pendulum.  <p>What energy transformation occurs as the mass moves from point A to B?</p> a. Kinetic energy is converted to potential energy. b. Potential energy is converted to kinetic energy. c. Chemical energy is converted to electromagnetic energy. d. Gravitational energy is converted to chemical energy.
	7.P.2.3 Recognize that energy can be transferred from one system to another when two objects push or pull on each other over a distance (work) and electrical circuits require a complete loop through which an electrical current can pass.	7.P.2.3 Which statement is true about the work done in lifting a box? a. Energy is transferred to the box from the lifter. b. Energy is transferred to the lifter from the box. c. The energy of the box remains constant. d. The energy of the lifter remains constant.

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	<p>7.P.2.4 Explain how simple machines such as incline planes, pulley, levers and wheel and axels are used to create mechanical advantage and increase efficiency.</p>	<p>7.P.2.4 Simple Machine 1 is determined to have a greater mechanical advantage than Simple Machine 2 when moving an object. What can be concluded from this statement?</p> <ol style="list-style-type: none">Simple Machine 1 can move the object further than Simple Machine 2 can.Simple Machine 1 can lift heavier objects than can Simple Machine 2.Simple Machine 1 uses more force to move the object than does Simple Machine 2.Simple Machine 1 uses less force to move the object than does Simple Machine 2.
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Earth Systems, Structures and Processes		
Essential Standards	Clarifying Objectives	Assessment Examples
7.E.1 Understand how the cycling of matter (water and gases) in and out of the atmosphere relates to Earth's atmosphere, weather and climate and the effects of the atmosphere on humans.	7.E.1.1 Compare the composition, properties and structure of Earth's atmosphere to include: mixtures of gases and differences in temperature and pressure within layers.	7.E.1.1 Why is the Mesosphere colder than the Troposphere? a. Because the Mesosphere is closer to the ground. b. Because the Mesosphere contains ozone. c. Because the molecules in the Mesosphere are spaced farther apart. d. Because the molecules in the Troposphere are spaced farther apart.
	7.E.1.2 Explain how the cycling of water in and out of the atmosphere and atmospheric conditions relate to the weather patterns on Earth.	7.E.1.2 Which is one way the water cycle influences weather patterns on Earth? Explain your answer using specific examples. <i>Student answers might include:</i> <i>The hydrologic cycle describes the pilgrimage of water as water molecules make their way from the Earth's surface to the atmosphere, and back again. This gigantic system, powered by energy from the sun, is a continuous exchange of moisture between the oceans, the atmosphere, and the land.</i> <i>The major physical components of the global water cycle include the evaporation from the ocean and land surfaces, the transport of water vapor by the atmosphere, precipitation onto the ocean and land surfaces, the net atmospheric transport of water from land areas to ocean, and the return flow of fresh water from the land back into the ocean. The additional components of oceanic water transport are few, including the mixing of fresh water through the oceanic boundary layer, transport by ocean currents, and sea ice processes.</i> <i>On land the situation is considerably more complex, and includes the deposition of rain and snow on land; water flow in runoff; infiltration of water into the soil and groundwater; storage of water in soil, lakes and streams, and groundwater; polar and glacial ice; and use of water in vegetation and human activities.</i>
	7.E.1.3 Explain the relationship between the movement of air masses, high and low pressure systems, and frontal boundaries to storms (including thunderstorms, hurricanes, and tornadoes) and other weather conditions that may result.	7.E.1.3 Which statement is false when a cold front collides with a warm front? a. The front would stop, and the temperature would drop. b. The warm air would move overtop of the cold air producing light rain showers. c. The cold front would force the warm air mass upward producing thunderstorms. d. The cold air would push the warm air further to the south.

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	<p>7.E.1.4 Predict weather conditions and patterns based on information obtained from:</p> <ul style="list-style-type: none"> • Weather data collected from direct observations and measurement (wind speed and direction, air temperature, humidity and air pressure) • Weather maps, satellites and radar • Cloud shapes and types and associated elevation <p>7.E.1.5 Explain the influence of convection, global winds and the jet stream on weather and climatic conditions.</p> <p>7.E.1.6 Conclude that the good health of humans requires: monitoring the atmosphere, maintaining air quality and stewardship.</p>	<p>7.E.1.4 What is most likely occurring if the land temperature near the beach is rising more rapidly than the ocean temperature?</p> <ol style="list-style-type: none"> a. A low pressure air mass is forming over the land while a high pressure air mass is forming over the ocean. b. Differences in air pressure over land and ocean are causing a sea breeze to occur. c. A land breeze is forming and wind speed and direction is changing. d. The humidity is increasing because more condensation is occurring over land. <p>7.E.1.5 How do jet streams affect weather and climatic conditions?</p> <p><i>Student answers might include:</i></p> <p><i>The jet streams have a strong influence on weather patterns and thus short term climate (seasonal to annual basis). They do this by steering weather systems, whether high or low pressure systems, and by acting as effective blocks to the movement of upper level moisture and energy from north to south or vice versa. How they do this is quite complex; however, by observing the weather for a few months, one can notice that the jet streams can strengthen and weaken, change orientation, and change elevation and depth, sometimes very rapidly, sometimes more slowly.</i></p> <p><i>At times a jet stream will remain nearly stationary for weeks, resulting in nearly unchanging surface weather during the period. This might affect seasonal climate by preventing Gulf air from penetrating into the plains and midwest states or the southeastern states, causing drought (a frequent occurrence), or by funneling moisture and energy into those same areas to produce violent storms, flooding, etc.</i></p> <p><i>When jet streams move eastward over the U.S. in a more regular pattern, all areas tend to benefit from more consistent rainfall, resulting in improved crop yields in most parts of the country.</i></p> <p>7.E.1.6 Why would the Environmental Protection Agency seek to monitor atmospheric pollution and air quality?</p> <ol style="list-style-type: none"> a. to make sure the air pressure remains constant over time b. to make it rain in drought affected areas c. to maintain the respiratory health of humans d. to reduce the amount of oxygen released by the rainforests
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Science Grades 6-8 Assessment Examples

Structures and Functions of Living Organisms		
Essential Standards	Clarifying Objectives	Assessment Examples
7.L.1 Understand the processes, structures and functions of living organisms that enable them to survive, reproduce and carry out the basic functions of life.	7.L.1.1 Compare the structures and life functions of single-celled organisms that carry out all of the basic functions of life including: <ul style="list-style-type: none"> • Euglena • Amoeba • Paramecium • Volvox 	7.L.1.1 Which characteristic do volvox and euglena share? <ol style="list-style-type: none"> a. They both have eye spots. b. The both use flagella to move. c. They both have eye spots and use flagella to move. d. They have neither eye spots nor flagella.
	7.L.1.2 Compare the structures and functions of plant and animal cells, including major organelles (cell membrane, cell wall, nucleus, chloroplasts, mitochondria, and vacuoles).	7.L.1.2 How do materials move in and out of plant cells and animals cells? <ol style="list-style-type: none"> a. Plant cells and animal cells have cilia. b. Plant cells and animal cells have a cell wall. c. Plant cells and animal cells have a flagella. d. Plant cells and animal cells have a cell membrane.
	7.L.1.3 Summarize the hierarchical organization of multi-cellular organisms from cells to tissues to organs to systems to organisms.	7.L.1.3 Which of the following is organized from simplest to most complex? <ol style="list-style-type: none"> a. cells->organs->organ systems->tissues->the organism b. cells->tissues->organs->organ systems->the organism c. the organism->organ systems->organs->tissues->cells d. tissues->cells->organs->organ systems->the organism
	7.L.1.4 Summarize the general functions of the major systems of the human body (digestion, respiration, reproduction, circulation, and excretion) and ways that these systems interact with each other to sustain life.	7.L.1.4 How do the lungs function within the excretory system? <ol style="list-style-type: none"> a. the lungs exchange oxygen and carbon monoxide b. the lungs absorb carbon dioxide from the air c. the lungs help to release carbon dioxide while absorbing nutrients d. the lungs exchange oxygen and carbon dioxide and release waste products in cells.

Science Grades 6-8 Assessment Examples

Evolution and Genetics		
Essential Standards	Clarifying Objectives	Assessment Examples
7.L.2 Understand the relationship of the mechanisms of cellular reproduction, patterns of inheritance and external factors to potential variation among offspring.	7.L.2.1 Explain why offspring that result from sexual reproduction,(fertilization and meiosis) have greater variation than offspring that result from asexual reproduction(budding and mitosis)	7.L.2.1 Which best explains why sexual reproduction produces greater variations in the offspring? a. The DNA come from two genetically different parents. b. The DNA comes from one parent that is genetically identical. c. The sex cells are produced by mitosis. d. The sex cells undergo self fertilization.
	7.L.2.2 Infer patterns of heredity using information from Punnett squares and pedigree analysis.	7.L.2.2 If a tall plant(TT) is crossed with a short (tt) plant, all of the offspring will be: a. Tall b. Short c. Medium d. Combination
	7.L.2.3 Explain the impact of the environment and lifestyle choices on biological inheritance (to include common genetic diseases) and survival.	7.L.2.3 Which of the following prenatal activities could lead to low birth weights and higher frequencies of developing asthma? a. eating fast food 3 times a week b. smoking c. walking 2 miles a day d. not taking prenatal vitamins

Science Grades 6-8 Assessment Examples

Essential Standards • Grade 8 Science

Physical Science (P) Earth Science (E) Life Science (L)

Matter: Properties and Change (P)

8.P.1 Understand the properties of matter and changes that occur when matter interacts in an open and closed container.

Energy: Conservation and Transfer (P)

8.P.2 Understand the environmental implications associated with the various methods of obtaining, managing, and using energy resources.

Earth Systems, Structures & Processes (E)

8.E.1 Understand the hydrosphere and the impact of humans on local systems.

Earth History (E)

8.E.2 Understand the history of Earth and its life forms based on evidence of change recorded in fossil records and landforms.

Structures & Functions of Living Organisms (L)

8.L.1 Understand the structure and hazards caused by microscopic factors that affect living organisms.

Ecosystems (L)

8.L.2 Understand how organisms interact with and respond to the biotic and abiotic components of their environment.

Evolution and Genetics (L)

8.L.3 Understand the evolution of organisms and landforms based on evidence, theories and processes that impact the earth over time.

Molecular Biology (L)

8.L.4 Understand the nutritional value of various substances as it relates to their ability to serve as a source of energy and building materials for growth and repair of organisms.

Science Grades 6-8 Assessment Examples

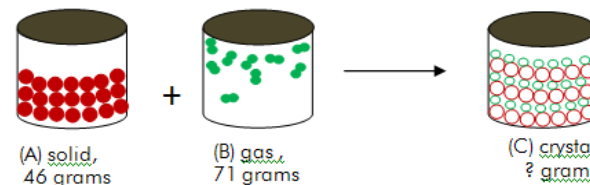
Matter: Properties and Change																		
Essential Standards	Clarifying Objectives	Assessment Examples																
<p>8.P.1 Understand the properties of matter and changes that occur when matter interacts in an open and closed container.</p>	<p>8.P.1.1 Classify matter as elements, compounds, or mixtures based on how the atoms are packed together in arrangements.</p>	<p>8.P.1.1 If a substance is composed of atoms arranged in one particular way, how is this substance best classified?</p> <ol style="list-style-type: none"> element compound mixture gas <p>8.P.1.1 The data table below represents observations made by a scientist during an investigation. Use this table to answer the questions that follow.</p> <table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th style="text-align: center;">Samples</th> <th style="text-align: center;">Physical Appearance</th> </tr> </thead> <tbody> <tr> <td>silver (Ag)</td> <td>silver, solid</td> </tr> <tr> <td>nitrogen (N)</td> <td>colorless, gas</td> </tr> <tr> <td>oxygen (O)</td> <td>colorless, gas</td> </tr> <tr> <td>copper (Cu)</td> <td>orange-red, solid</td> </tr> <tr> <td>silver nitrate (AgNO₃)</td> <td>colorless, powder</td> </tr> <tr> <td>water (H₂O)</td> <td>colorless, liquid</td> </tr> <tr> <td>silver nitrate + water</td> <td>colorless, liquid</td> </tr> </tbody> </table> <p>A scientist performed an investigation with samples listed in the data table above. She heated the 2 liquid samples until boiling. After a while, all of the liquid evaporated from Sample 1 and the container was empty. Later, all of the liquid evaporated from Sample 2 and a colorless powder remained.</p> <ol style="list-style-type: none"> Based on the information presented in the data table, which term best describes Sample 1? <ol style="list-style-type: none"> atom element mixture compound Which term best describes Sample 2? <ol style="list-style-type: none"> atom element mixture compound Which best explains why silver nitrate is a compound? <ol style="list-style-type: none"> Silver nitrate is a colorless powder. 	Samples	Physical Appearance	silver (Ag)	silver, solid	nitrogen (N)	colorless, gas	oxygen (O)	colorless, gas	copper (Cu)	orange-red, solid	silver nitrate (AgNO ₃)	colorless, powder	water (H ₂ O)	colorless, liquid	silver nitrate + water	colorless, liquid
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silver nitrate + water	colorless, liquid																	

Science Grades 6-8 Assessment Examples

	<p>8.P.1.2 Explain how the physical properties of elements and their reactivity have been used to produce the current model of the periodic table of elements.</p> <p>8.P.1.3 Compare physical changes such as size, shape and state to chemical changes that are the result of a chemical reaction to include changes in temperature, color, formation of a gas or precipitate.</p> <p>8.P.1.4 Explain how the idea of atoms and a balanced chemical equation support the law of conservation of mass.</p>	<p>b. Silver nitrate does not chemically react with water. c. Silver nitrate forms a colorless liquid when mixed with water. d. Silver nitrate forms when three elements chemically combine.</p> <p>8.P.1.2 In the current model of the Periodic Table of Elements, the elements have been placed in groups or families. Why have the elements been organized in such a way?</p> <p>a. Elements in each group have similar densities. b. Elements in each group all have similar boiling points. c. Elements in each group have similar physical and chemical properties. d. Elements in each group have the ability to chemically react with the other elements within that group.</p> <p>8.P.1.3 A science teacher mixes calcium chloride and vinegar in a test tube. He passes the test tube around for his students to feel. The students notice that the test tube is hot. The science teacher asks the students to decide if the mixing of the two chemicals involved a physical or chemical change. He also asks the students to justify their answer. Which student gave the correct response?</p> <p>a. Student 1: The change was physical because a temperature change occurred. b. Student 2: The change was chemical because a temperature change occurred. c. Student 3: The change was physical because the two chemicals mixed d. Student 4: The change was chemical because the two chemicals mixed</p> <p>8.P.1.4 Sodium and chlorine can react chemically to form table salt. How does the mass of the table salt formed in this reaction compare to the mass of the sodium and chlorine before the reaction takes place?</p> <p>a. The mass of the table salt formed is less than the sodium and chlorine. b. The mass of the table salt formed is greater than the sodium and chlorine. c. The mass of the table salt formed is twice the mass of the sodium and chlorine. d. The mass of the table salt formed is the same as the mass of the sodium and chlorine.</p>
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Science Grades 6-8 Assessment Examples

8.P.1.4 A scientist performed an investigation using the following substances:



Based on the investigation and the packing of sample C, which measurement would most likely be the mass of the crystal?

- a. 25 grams
- b. 71 grams
- c. 110 grams
- d. 117 grams**

Constructed response:

Explain your choice based on the law of conservation of mass and evidence from the presented data.

8.P.1.4 A teacher conducted an investigation in class to determine if the contents of a closed container either loses or gains mass after a chemical reaction takes place. He placed 40 mL of water into a bottle, added one alka-seltzer tablet and quickly closed the bottle with a balloon.

The data table shows observations made before the reaction:

Materials	Physical Appearance	Mass (g)
Bottle	clear	92 (g)
40mL water	clear, liquid	40 (g)
Seltzer tablet	white, solid	1 (g)
Balloon	rubber, deflated	1 (g)
Total mass of system		134 (g)

After a while, bubbles started to appear and the balloon inflated as shown in figure 2.

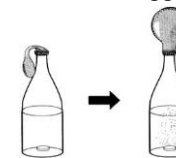


figure 2

Science Grades 6-8 Assessment Examples

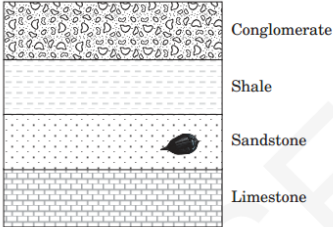
		<p>Once the contents of the container completely reacted, the teacher measured the mass of the entire system shown in figure 2. He shared his results with the class.</p> <p>Which statement <i>best</i> describes the mass and explanation the teacher may have given?</p> <ol style="list-style-type: none"> 140 grams because the gas produced in the water added more mass to the container 120 grams because the gas produced in the water made the container lighter 134 grams because the number of atoms before the reaction is the same number of atoms after the reaction 134 grams because nothing could get into the container and nothing could get out of the container
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Energy: Conservation and Transfer		
Essential Standards	Clarifying Objectives	Assessment Examples
<p>8.P.2 Explain the environmental implications associated with the various methods of obtaining, managing, and using energy resources.</p>	<p>8.P.2.1 Explain the environmental consequences of the various methods of obtaining, transforming and distributing energy.</p> <p>8.P.2.2 Explain the implications of the depletion of renewable and nonrenewable energy resources and the importance of conservation.</p>	<p>8.P.2.1 Which is a concern related to the production of electricity using nuclear power?</p> <ol style="list-style-type: none"> Nuclear power produces too much excess heat and causes global warming. Nuclear power produces radioactive wastes that are difficult to eliminate. Nuclear power is not as efficient in producing electricity as are other forms of energy. Nuclear power plants take up too much space for the amount of electricity they produce. <p>8.P.2.2 The U.S.A. and other countries are often promoting the conservation of electricity and fossil fuels. Which is an advantage of these conservation efforts?</p> <ol style="list-style-type: none"> Conservation will allow electricity to be produced more cheaply. Conservation will help scientists find more uses for nonrenewable resource. Conservation will give scientists more time to find renewable alternatives to produce electricity. Conservation will provide all people on Earth access to electricity.

Science Grades 6-8 Assessment Examples

Earth Systems, Structures and Processes		
Essential Standards	Clarifying Objectives	Assessment Examples
8.E.1 Understand the hydrosphere and the impact of humans on local systems and the effects of the hydrosphere on humans.	8.E.1.1 Explain the structure of the hydrosphere including: <ul style="list-style-type: none"> • Water distribution on earth • Local river basin and water availability 	8.E.1.1 To represent the distribution of water on earth, a teacher filled a 2-liter bottle with 2000 mL of water. She then made a mark at the 1944 mL point. What should be written at the 1944 mL level to distinguish the type of water to that point? <ol style="list-style-type: none"> Water from glaciers & icebergs Ground water Ocean water Water from ponds, rivers, lakes & streams
	8.E.1.2 Summarize evidence that Earth’s oceans are a reservoir of nutrients, minerals, dissolved gases, and life forms: <ul style="list-style-type: none"> • Estuaries • Marine ecosystems • Upwelling • Behavior of gases in the marine environment • Value and sustainability of marine resources • Deep ocean technology and understandings gained 	8.E.1.2 How are estuaries connected to oceanic organisms? <ol style="list-style-type: none"> Estuaries provide a nursery grounds for oceanic organisms Estuaries provide sunlight for oceanic organisms. Estuaries provide primary food for oceanic organisms. Estuaries provide excess dissolved oxygen for oceanic organisms.
	8.E.1.3 Predict the safety and potability of water supplies in North Carolina based on physical and biological factors, including: <ul style="list-style-type: none"> • Temperature • Dissolved oxygen • pH • Nitrates and phosphates • Turbidity • Bio-indicators 	8.E.1.3 How would excessive increases in nitrate and phosphorous concentration affect freshwater systems? <ol style="list-style-type: none"> It would cause excessive algal blooms. It would cause increased dissolved oxygen. It would cause increased water clarity. It would cause extremely cold water.
	8.E.1.4 Conclude that the good health of humans requires: <ul style="list-style-type: none"> • Monitoring of the hydrosphere • Water quality standards • Methods of water treatment • Maintaining safe water quality • Stewardship 	8.E.1.4 If your community was planning to build a new sanitary landfill, what would be the most important environmental consideration in locating the landfill? <ol style="list-style-type: none"> cost of the land location of the groundwater proximity to an industrial park accessibility to a major highway

Science Grades 6-8 Assessment Examples

Earth History		
Essential Standards	Clarifying Objectives	Assessment Examples
<p>8.E.2 Understand the history of Earth and its life forms based on evidence of change recorded in fossil records and landforms.</p>	<p>8.E.2.1 Infer the age of Earth and relative age of rocks and fossils from index fossils and ordering of rock layers (relative dating and radioactive dating).</p>	<p>8.E.2.1 This diagram shows a cross section of land that has not been overturned and includes a fossil.</p> <div style="text-align: center;">  <p style="text-align: right; margin-right: 20px;"> Conglomerate Shale Sandstone Limestone </p> </div> <p>What can be concluded about the age of the fossil?</p> <ol style="list-style-type: none"> It is younger than the shale. It is older than the shale. It is older than the sandstone. It is younger than the sandstone.
	<p>8.E.2.2 Explain the use of fossils, ice cores, composition of sedimentary rocks, faults, and igneous rock formations found in rock layers as evidence of the history of the Earth and its changing life forms.</p>	<p>8.E.2.2 An index fossil is found in the same sedimentary layer as another fossil. What would this reveal about the other fossil?</p> <ol style="list-style-type: none"> The relative age of the fossil. That the two fossils are from the same species. The fossil is older than the index fossil. The fossil is younger than the index fossil.


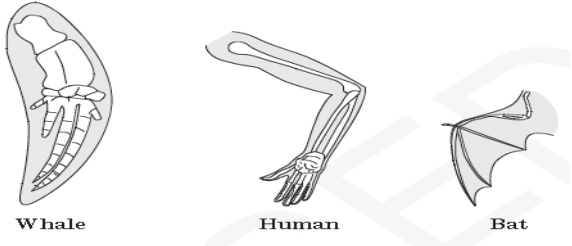
Science Grades 6-8 Assessment Examples

Structures and Functions of Living Organisms		
Essential Standards	Clarifying Objectives	Assessment Examples
8.L.1 Understand the hazards caused by agents of diseases that effect living organisms.	8.L.1.1 Summarize the basic characteristics of viruses, bacteria, fungi and parasites relating to the spread, treatment and prevention of disease.	8.L.1.1 How are viruses, bacteria and parasites alike? a. They are unicellular and can cause disease. b. They are multi-cellular and can cause disease. c. They are non-living and can cause disease. d. They can infect a host and cause disease.
	8.L.1.2 Explain the difference between epidemic and pandemic as it relates to the spread, treatment and prevention of disease.	8.L.1.2 Several people contract the same flu-like symptoms in a particular city. Other cases with the same symptoms show up across the state but the concentration remains localized in a few original cities. Some cases turn up elsewhere in the nation but doesn't catch on everywhere. In the cities where the flu-like symptoms rate remains more than you would expect to normally see would be an example of an epidemic. How could this scenario turn into a pandemic? 8.L.1.2 Which is a major difference between an epidemic and a pandemic? a. An epidemic is caused by toxins but a pandemic is caused by viruses. b. An epidemic results in more deaths than a pandemic. c. An epidemic affects fewer people than a pandemic. d. An epidemic spreads father around the world than a pandemic.
8.L.2 Understand how biotechnology is used to affect living organisms	8.L.2.1 Summarize aspects of biotechnology including: <ul style="list-style-type: none"> • Specific genetic information available • Careers • Economic benefits to North Carolina • Ethical issues • Implications for agriculture 	8.L.2.1 Strawberries have been genetically modified to resist frost. How is this a benefit for growers in North Carolina? a. a longer growing season b. a pest resistant berry c. a larger berry d. easier harvesting

Science Grades 6-8 Assessment Examples

Ecosystems		
Essential Standards	Clarifying Objectives	Assessment Examples
<p>8.L.3 Understand how organisms interact with and respond to the biotic and abiotic components of their environment.</p>	<p>8.L.3.1 Explain how factors such as food, water, shelter and space affect populations in an ecosystem.</p> <p>8.L.3.2 Summarize the relationships among producers, consumers, and decomposers including the positive and negative consequences of such interactions including</p> <ul style="list-style-type: none"> • Coexistence and cooperation • Competition (predator/prey) • Parasitism • Mutualism <p>8.L.3.3 Explain how the flow of energy within food webs is interconnected with the cycling of matter (including water, nitrogen, carbon dioxide and oxygen).</p>	<p>8.L.3.1 Which of the following limiting factors will most likely prevent further population growth within an ecosystem?</p> <ol style="list-style-type: none"> a. excess water supply b. food supply to the area c. transportation availability d. recycling of human goods <p>8.L.3.2 A tick has caused a dog to be diagnosed with Lyme disease. What type of relationship would this suggest exists between the tick and the dog?</p> <ol style="list-style-type: none"> a. mutualistic b. parasitic c. commensal d. adaptive <p>8.L.3.3 In a food web, energy flows from producer to consumers. What else flows from producers to consumers?</p> <ol style="list-style-type: none"> a. soil and rock b. carbon and oxygen c. light and sound d. chlorophyll and nitrogen <p>8.L.3.3 Today, in many parts of the world people suffer from not having enough food. One way that plant scientists could increase the amount of green plant food that is available for consumption by humans might be through the development of plants with larger leaves that would capture more solar energy to be converted into food. Which cycle of matter would most likely be affected by such an increase in leaf size?</p> <ol style="list-style-type: none"> a. phosphorous b. water c. carbon dioxide d. oxygen

Science Grades 6-8 Assessment Examples

Evolution and Genetics		
Essential Standards	Clarifying Objectives	Assessment Examples
8.L.4 Understand the evolution of organisms and landforms based on evidence, theories and processes that impact the earth over time.	8.L.4.1 Summarize the use of evidence drawn from geology, fossils, and comparative anatomy to form the basis for biological classification systems and of the theory of evolution.	<p>8.L.4.1 The shaded areas of this diagram represent where fossils of a land-dwelling animal were found on the continents of South America and Africa.</p>  <p>What does this evidence suggest?</p> <ol style="list-style-type: none"> The animals swam from one continent to the other. The two continents were once connected by a land bridge. The animals developed on the two continents at the same time. The two continents were once joined as part of a larger continent.
	8.L.4.2 Explain the relationship between genetic variation and an organism's ability to adapt to its environment.	<p>8.L.4.1 Differences in bone arrangements shown below, supports the hypothesis that these organisms:</p>  <ol style="list-style-type: none"> are member of the same species live in the same environment have adapted to live in different environments all contain the same genetic information.
		<p>8.L.4.2 Darwin observed many birds that had many different beak shapes and sizes. There were few beaks that were similar because of...</p> <ol style="list-style-type: none"> competition for the same type of food competition for a specific concentration of oxygen in the atmosphere the presence of an excessive number of autotrophs the presence of a disease that attacks birds with similar beak

Science Grades 6-8 Assessment Examples

Molecular Biology																					
Essential Standards	Clarifying Objectives	Assessment Examples																			
8.L.5 Understand the composition of various substances as it relates to their ability to serve as a source of energy and building materials for growth and repair of organisms.	8.L.5.1 Summarize how food provides the energy and the molecules required for building materials, growth and survival of all organisms (to include plants).	8.L.5.1 When an animal eats food, the food and other nutrients must enter each cell in the animal's body so the cells can carry out their functions. How do the food molecules and nutrients enter the cell? <ol style="list-style-type: none"> through the nucleus through the plasma membrane through the chlorophyll in the cell through other specialized cells 																			
	8.L.5.2 Explain the relationship among a healthy diet, exercise, and the general health of the body (emphasis on the relationship between respiration and digestion).	8.L.5.2 <i>NAEP item</i> You notice as you run up a flight of stairs to your next class that your heart is pounding and your breathing is deeper and more rapid than when you started. After a short time setting in class, your respiration rate and heart rate seem to return to normal. You know that during exercise, your heart rate, respiration, blood pressure, and ability to hold your breath (maximum breath-holding time) change. You gather the data shown in the table below. <table border="1" data-bbox="1161 735 1976 1045"> <thead> <tr> <th></th> <th>Pulse or heart rate (beats/min)</th> <th>Respiration rate (breaths/min)</th> <th>Blood pressure (diastolic/systolic)</th> <th>Maximum Breath-holding time</th> </tr> </thead> <tbody> <tr> <td>Normal (standing)</td> <td>75</td> <td>12</td> <td>110/80</td> <td>55</td> </tr> <tr> <td>Walking up stairs</td> <td>90</td> <td>15</td> <td>120/80</td> <td>45</td> </tr> <tr> <td>Running up stairs</td> <td>110</td> <td>20</td> <td>130/80</td> <td>30</td> </tr> </tbody> </table> <p>As you exercise, why does respiration rate increase?</p> <ol style="list-style-type: none"> Your systolic blood pressure is increasing. Your diastolic blood pressure is decreasing. You are sweating and need more water vapor. More oxygen is needed to utilize the body's stored energy. 		Pulse or heart rate (beats/min)	Respiration rate (breaths/min)	Blood pressure (diastolic/systolic)	Maximum Breath-holding time	Normal (standing)	75	12	110/80	55	Walking up stairs	90	15	120/80	45	Running up stairs	110	20	130/80
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Walking up stairs	90	15	120/80	45																	
Running up stairs	110	20	130/80	30																	
		8.L.5.2 How do the cells of the body respond when a person, over time, has a poor diet and little exercise? <ol style="list-style-type: none"> They stop reproducing. They reduce their rate of respiration. They stop absorbing nutrients. They increase their production of protein 																			