

**Science  
Standards of Learning  
Crosswalk between the  
2010 and 2003  
Standards**

**Virginia Department of Education  
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**Science Standards of Learning Crosswalk between the 2010 and 2003 Standards**

<b>Science Standards of Learning - Kindergarten</b>		
<b>2010</b>	<b>2003</b>	<b>Comments</b>
<b>K.1</b>	<b>K.1</b>	Additional descriptive text was included in the stem (The student will <i>demonstrate an understanding of scientific reasoning, logic and the nature of science by planning and conducting investigations in which</i> ).
<b>K.1a</b>	<b>K.1a</b>	Additional text was included (“ <i>basic characteristics or properties of objects are identified</i> ”).
<b>K.1b</b>	<b>K.1b</b>	
<b>K.1c</b>	<b>K.1d</b>	
<b>K.1d</b>	<b>K.1e</b>	The word, “attribute,” was replaced (a set of objects is separated into two groups based on a single physical <i>characteristic</i> ).
<b>K.1e</b>	<b>K.1f</b>	Additional descriptors were included (nonstandard units are used to measure <i>the length, mass, and volume</i> of common objects).
<b>K.1f</b>	<b>K.1i</b>	Additional text was added and minor edits were made to place emphasis on the skill aspect of the bullet ( <i>observations and predictions are made for an unseen member in a sequence of objects</i> ).
<b>K.1g</b>	<b>K.1g</b>	Additional text was included (a question is developed <i>and predictions are made</i> from one or more observations).
<b>K.1h</b>	<b>New Content</b>	New content was added ( <i>observations are recorded</i> ).
<b>K.1i</b>	<b>K.1h</b>	Details were moved to Curriculum Framework (using 10 or fewer units).
<b>K.1j</b>	<b>K.1j</b>	
<b>K.1k</b>	<b>K.1c</b>	
<b>K.2</b>	<b>K.2</b>	Minor grammatical changes were made in the stem (plural to singular subject and pronoun edits).
<b>K.2a</b>	<b>K.2a</b>	Details were moved to the Curriculum Framework (taste – tongue, touch – skin, smell – nose, hearing – ears, and sight – eyes).
<b>K.2b</b>	<b>K.2b</b>	Additional clarifying text was included (sensory descriptors <i>used to describe common objects and phenomena</i> ). Details were moved to the Curriculum Framework (sweet, sour, bitter, salty, rough/smooth, hard/soft, cold, warm, hot, loud/soft, high/low, bright/dull).
<b>K.3</b>	<b>K.3</b>	
<b>K.3a</b>	<b>K.3a</b>	Details were moved to the Curriculum Framework (attraction/nonattraction, push/pull, attract/repel, and metal/nonmetal). Additional descriptive text was included ( <i>magnetism and its effects</i> ).

Science Standards of Learning - Kindergarten		
2010	2003	Comments
<b>K.3b</b>	<b>K.3b</b>	Details were moved to the Curriculum Framework (refrigerator magnet, can opener, magnetized screwdriver, and magnetic games). Additional descriptive text was included ( <i>of magnetism</i> ).
<b>K.4</b>	<b>K.4</b>	
<b>K.4a</b>	<b>K.4a</b>	Details were moved to the Curriculum Framework (red, orange, yellow, green, blue, purple, white, and black). Additional descriptive text was included ( <i>of objects</i> ).
<b>K.4b</b>	<b>K.4b</b>	Details were moved to the Curriculum Framework (circle, triangle, square, and rectangle and flexible/stiff, straight/curved). Additional descriptive text was included ( <i>of objects</i> ).
<b>K.4c</b>	<b>K.4c</b>	Details were moved to the Curriculum Framework (rough/smooth and hard/soft). Additional descriptive text was included ( <i>of objects</i> ).
<b>K.4d</b>	<b>K.4d</b>	Details were moved to the Curriculum Framework (big/little, large/small, heavy/light, wide/thin, long/short). Additional descriptive text was included ( <i>of objects</i> ).
<b>K.4e</b>	<b>K.4e</b>	Details were moved to the Curriculum Framework (over/under, in/out, above/below, left/right, and fast/slow). Additional descriptive text was included ( <i>of objects</i> ).
<b>K.5</b>	<b>K.5</b>	
<b>K.5a</b>	<b>K.5a</b>	The word, “states” was changed to “ <i>phases</i> .” Details were moved to the Curriculum Framework (solid, liquid, gas).
<b>K.5b</b>	<b>K.5b</b>	There was minor rewording with no content change.
<b>K.6</b>	<b>New Content</b>	<i>K.6 The student will investigate and understand the differences between living organisms and nonliving objects. Key concepts include</i> <i>a) all things can be classified as living or nonliving; and</i> <i>b) living organisms have certain characteristics that distinguish them from nonliving objects including growth, movement, response to the environment, having offspring, and the need for food, air, and water.</i>
<b>K.7</b>	<b>K.6</b>	
<b>K.7a</b>	<b>K.6a</b>	The content of this bullet refocused from the needs of living things to the needs of animals only. Additional content includes having “adequate” food, “shelter” and “space”.
<b>K.7b</b>	<b>New Content</b>	New content was added ( <i>plants need nutrients, water, air, light, and a place to grow to survive</i> ).
<b>K.7c</b>	<b>K.6b</b>	The content was reordered for further clarification, but the content remains the same.
<b>K.7d</b>	<b>K.6c</b>	The content was the same with “and” changed to “or” (...but not identical to their parents <i>or</i> to one another).
<b>K.8</b>	<b>K.7</b>	

Science Standards of Learning - Kindergarten		
2010	2003	Comments
<b>K.9</b>	<b>K.8</b>	Additional text was included in the stem for clarity (The student will investigate and understand <i>that there are</i> simple repeating patterns in his/her daily life).
<b>K.9a</b>	<b>K.8a</b>	
<b>K.9b</b>	<b>K.8b</b>	
<b>K.9c</b>	<b>K.8c</b>	
<b>Removed</b>	<b>K.8d</b>	The content of the bullet was removed.
<b>K.10</b>	<b>K.9</b>	
<b>K.10a</b>	<b>K.9a</b>	
<b>K.10b</b>	<b>K.9b</b>	The word, “noted,” was changed to “ <i>observed.</i> ”
<b>K.11</b>	<b>K.10</b>	
<b>K.11a</b>	<b>K.10a</b>	
<b>K.11b</b>	<b>K.10b</b>	
<b>K.11c</b>	<b>K.10c</b>	The content is the same with minor wording changes (“preserve” was changed to <i>ensure</i> and the addition of “... <i>are available</i> for future use”).
<b>Removed 2003 Kindergarten Science SOL Content</b>		
K.8 d) home and school routines.		

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## Science Standards of Learning Crosswalk between the 2010 and 2003 Standards

Science Standards of Learning - Grade One		
2010	2003	Comments
<b>1.1</b>	<b>1.1</b>	Additional descriptive text was included to clarify and expand the intent of the stem ( <i>demonstrate an understanding of scientific reasoning, logic and the nature of science by planning and conducting</i> ).
<b>1.1a</b>	<b>1.1a</b>	The bullet was reworded (passive to active voice) with no content change.
<b>1.1b</b>	<b>New Content</b>	Content was repeated from K.1b and 2.1c ( <i>observations are made from multiple positions to achieve a variety of perspectives and are repeated to assure accuracy</i> ).
<b>1.1c</b>	<b>1.1c</b>	There was minor rewording with no content change (attributes changed to <i>characteristics</i> ).
<b>1.1d</b>	<b>1.1b</b>	
<b>1.1e</b>	<b>1.1e</b>	Additional measurement content ( <i>temperature</i> ) was included and content (“standard” units of measure stricken) was deleted.
<b>1.1f</b>	<b>1.1h</b>	
<b>1.1g</b>	<b>New Content</b>	New content was added ( <i>a question is developed from one or more observations</i> ).
<b>1.1h</b>	<b>1.1f</b>	Clarifying edits were made with no change in meaning.
<b>1.1i</b>	<b>1.1d</b>	Additional actions are included in the text beyond communicating data (data are <i>recorded, analyzed, and ...</i> ).
<b>1.1j</b>	<b>1.1g</b>	Additional wording was added ( <i>investigations</i> ) with no change of intent or meaning.
<b>1.2</b>	<b>1.2</b>	
<b>1.2a</b>	<b>1.2a</b>	
<b>1.2b</b>	<b>1.2b</b>	
<b>1.2c</b>	<b>1.2c</b>	
	<b>1.2d</b>	Details were moved to Curriculum Framework (the motion of objects may be observed in toys and in playground activities).
<b>1.3</b>	<b>1.3</b>	
<b>1.3a</b>	<b>1.3a</b>	
<b>1.3b</b>	<b>1.3b</b>	Clarifying edits were made with no change in meaning or intent (“common” deleted).
<b>1.3c</b>	<b>1.3c</b>	
<b>1.4</b>	<b>1.4</b>	An additional modifier was included in the text with no change in meaning in the stem (addition of <i>basic</i> to life needs).
<b>1.4a</b>	<b>1.4a</b>	A clarifying edit was made (“food” changed to <i>nutrients</i> ).
<b>1.4b</b>	<b>1.4b</b>	Details were moved to Curriculum Framework (seeds, roots, stems, leaves, blossoms, fruits).

Science Standards of Learning - Grade One		
2010	2003	Comments
1.4c	1.4c	Clarifying edits were made with no change in meaning in the bullet. Details were moved to Curriculum Framework (edible/nonedible, flowering/nonflowering, evergreen/deciduous).
1.5	1.5	Clarifying edits and word substitutions were made with no change in meaning in the stem.
1.5a	1.5a	Clarifying edits and word substitutions were made with no change in the meaning of the bullet ( <i>habitat</i> substituted for “a place to live”).
1.5b	1.5b	Clarifying edits and word substitutions were made with no change in the meaning of the bullet ( <i>animals, including humans, have many different physical characteristics</i> ). Details were moved to Curriculum Framework (body coverings, body shape, appendages, and methods of movement).
1.5c	1.5c	The bullet was reworded with additional clarifying text. There was no change in the meaning or intent (“other characteristics” changed to <i>animals can be classified according to a variety of characteristics</i> ). Details were moved to Curriculum Framework (wild/tame, water homes/land homes).
1.6	1.6	
1.6a	1.6a	A clarifying word substitution was made with no change in the meaning of the bullet (“heat” changed to <i>energy</i> ).
Removed	1.6b	Content was deleted (night and day are caused by the rotation of the Earth).
1.6b	New Content	New content was included ( <i>the sun’s relative position in the morning is east and in the late afternoon is west</i> ).
1.7	1.7	The stem was significantly edited and broadened to a more inclusive focus on “weather and seasonal changes.” The “plants and animals” component was incorporated as only one bullet of the standard.
Moved	1.7a	Details were moved to Curriculum Framework (plants (growth, budding, falling leaves, and wilting)).
Moved	1.7b	Details were moved to Curriculum Framework (animals (behaviors, hibernation, migration, body covering, and habitat)).
Moved	1.7c	Details were moved to Curriculum Framework (people (dress, recreation, and work)).
1.7a	New Content	New content was added ( <i>changes in temperature, light, and precipitation affect plants and animals, including humans</i> ).
1.7b	New Content	New content was added ( <i>there are relationships between daily and seasonal changes</i> ).
1.7c	New Content	New content was added ( <i>changes in temperature, light, and precipitation can be observed and recorded over time</i> ).
1.8	1.8	

<b>Science Standards of Learning - Grade One</b>		
<b>2010</b>	<b>2003</b>	<b>Comments</b>
<b>1.8a</b>	<b>1.8a</b>	Details were moved to Curriculum Framework (plants and animals, water, air, land, minerals, forests, and soil).
<b>1.8b</b>	<b>1.8b</b>	
<b>1.8c</b>	<b>1.8c</b>	
<b>Removed 2003 Grade One Science SOL Content</b>		
1.6 b) night and day are caused by the rotation of the Earth		

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**Science Standards of Learning Crosswalk between the 2010 and 2003 Standards**

<b>Science Standards of Learning – Grade Two</b>		
<b>2010</b>	<b>2003</b>	<b>Comments</b>
<b>2.1</b>	<b>2.1</b>	Additional descriptive text was included to clarify and expand the intent of the stem ( <i>demonstrate an understanding of scientific reasoning, logic and the nature of science by planning and conducting</i> ).
<b>2.1a</b>	<b>New Content</b>	New content was added ( <i>observations and predictions are made and questions are formed</i> ).
<b>2.1b</b>	<b>2.1a</b>	The (2003) bullet was split into two parts, with the first part (observation is differentiated from personal interpretation) becoming (2010) 2.1b. The second part was moved to 2.1j.
<b>2.1c</b>	<b>2.1b</b>	
<b>2.1d</b>	<b>2.1c</b>	A minor edit was made (“attributes” changed to <i>characteristics or properties</i> ) with no change in meaning or intent.
<b>2.1e</b>	<b>2.1e</b>	The bullet was reordered and edited with no change in meaning or intent. Metric and English measurement terminology was moved to the Curriculum Framework (centimeters, meters, liters, degrees Celsius, grams, kilograms, inches, feet, yards, cups, pints, quarts, gallons, degrees Fahrenheit, ounces, pounds).
<b>2.1f</b>	<b>New Content</b>	New content was added ( <i>time is measured using the proper tools</i> ).
<b>2.1g</b>	<b>2.1d</b>	Additional content was included with the bullet to expand the original intent (conditions are <i>identified</i> and <i>inferences are made</i> ).
<b>2.1h</b>	<b>2.1f</b>	Additional content was included ( <i>data are collected and recorded</i> ) with the original text, and certain content was deleted (picture graphs).
<b>2.1i</b>	<b>2.1g</b>	Additional text was added at the beginning of the bullet ( <i>data are analyzed</i> ) expanding the intent of the original content.
<b>2.1j</b>	<b>2.1a</b>	The (2003) 2.1a bullet was split into two parts, with the second part (conclusions are drawn) moved to this bullet with minor editing.
<b>2.1k</b>	<b>New Content</b>	New content was added ( <i>observations and data are communicated</i> ).
<b>2.1l</b>	<b>2.1h</b>	Additional clarifying text was added ( <i>designed and “constructed” and to clarify explanations and show relationships</i> ) with the content of the bullet unchanged.
<b>2.1m</b>	<b>New Content</b>	New content was added ( <i>current applications are used to reinforce science concepts</i> ).
<b>2.2</b>	<b>2.2</b>	
<b>2.2a</b>	<b>2.2a</b>	
<b>2.2b</b>	<b>2.2b</b>	Content was moved to Curriculum Framework (including the magnetic compass).
<b>2.3</b>	<b>2.3</b>	

Science Standards of Learning – Grade Two		
2010	2003	Comments
2.3a	New Content	New content was added ( <i>identification of distinguishing characteristics of solids, liquids, and gases</i> ).
2.3b	2.3a	Additional clarifying text was added ( <i>measurement of... solids and liquids</i> ) with the intent of the bullet unchanged.
2.3c	2.3b	The bullet was reworded and text added ( <i>with the addition or removal of energy</i> ). The overall intent is unchanged. Details were moved to Curriculum Framework (condensation, evaporation, melting, and freezing).
2.4	2.4	A content was clarified (“in their life cycles” changed to <i>as they mature and grow</i> ).
2.4a	2.4a	More inclusive terminology ( <i>animal life cycles</i> ) replaced specific content examples, which were moved to the Curriculum Framework (some animals, frogs and butterflies, undergo distinct stages during their lives, while others generally resemble their parents).
2.4b	2.4b	More inclusive terminology ( <i>plant life cycles</i> ) replaced specific content examples, which were moved to the Curriculum Framework (flowering plants undergo many changes, from the formation of the flower to the development of the fruit).
2.5	2.5	
2.5a	2.5a	
2.5b	New Content	New content was added ( <i>an animal’s habitat includes adequate food, water, shelter or cover, and space</i> ).
2.5c	2.5b	
2.5d	New Content	New content was added ( <i>fossils provide information about living systems that were on Earth years ago</i> ).
2.6	2.6	
2.6a	2.6a	Related content was added ( <i>identification of common storms and other weather phenomena</i> ) and existing content was moved to the Curriculum Framework (temperature, wind, precipitation, drought, flood, and storms).
2.6b	2.6b	Additional clarifying text was included (“recording” and <i>interpreting “weather data”</i> ).
2.6c	New Content	New content was added ( <i>the importance and uses of tracking weather data over time</i> ).
2.7	2.7	
2.7a	2.7a	Additional clarifying text was included ( <i>weather and seasonal changes</i> ) with the intent of the bullet unchanged. Content examples were moved to the Curriculum Framework (migration, hibernation, camouflage, adaptation, dormancy).
2.7b	2.7b	
2.8	2.8	
2.8a	2.8a	Additional clarifying text was included ( <i>are identified and classified</i> ) with the intent of the bullet unchanged. Content

<b>Science Standards of Learning – Grade Two</b>		
<b>2010</b>	<b>2003</b>	<b>Comments</b>
		examples were moved to the Curriculum Framework (fiber, cotton, oil, spices, lumber, rubber, medicines, and paper).
<b>2.8b</b>	<b>2.8b</b>	
<b>2.8c</b>	<b>2.8c</b>	New content ( <i>oxygen</i> ) was added to the existing bullet. Other content in the existing bullet (and prevent soil from washing away) was moved to bullet 2.8d and reworded.
<b>2.8d</b>		Text from (2003) 2.8c was reworded (“prevent soil from washing away” changed to <i>plants can help reduce erosion</i> ).

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## Science Standards of Learning Crosswalk between the 2010 and 2003 Standards

Science Standards of Learning – Grade Three		
2010	2003	Comments
<b>3.1</b>	<b>3.1</b>	Additional descriptive text was included to clarify and expand the intent of the stem ( <i>demonstrate an understanding of scientific reasoning, logic and the nature of science by planning and conducting</i> ).
<b>3.1a</b>	<b>3.1a</b>	Part of the content of this bullet (predictions) was moved to 3.1b. Additional action was included with the remaining content ( <i>observations... and repeated to ensure accuracy</i> ).
<b>3.1b</b>		The content of this bullet (predictions) was moved from 3.1a and expanded ( <i>predictions are formulated using a variety of sources of information</i> ).
<b>3.1c</b>	<b>3.1b</b>	Additional terminology was included ( <i>properties added with “characteristics”</i> ).
<b>3.1d</b>	<b>3.1k</b>	
<b>3.1e</b>	<b>3.1d, e, f, h</b>	Content was moved and recombined into a single metric measurement bullet ( <i>length, volume, mass and temperature are estimated and measured in metric and standard English units using proper tools and techniques</i> ).
<b>3.1f</b>	<b>3.1i</b>	Additional clarifying text related to the measurement of time was included ( <i>using proper tools and techniques</i> ). The intent of the bullet is unchanged.
<b>3.1g</b>	<b>3.1c</b>	
<b>3.1h</b>	<b>3.1g</b>	An additional action ( <i>analyze</i> ) was included with the existing treatment of data ( <i>gather, chart, and graph</i> ). The types of graphs were moved to the Curriculum Framework ( <i>line plot, picture graph, and bar graph</i> ).
<b>3.1i</b>	<b>New Content</b>	New content was added ( <i>unexpected or unusual quantitative data are recognized</i> ).
<b>3.1j</b>	<b>3.1j</b>	
<b>3.1k</b>	<b>New Content</b>	New content was added ( <i>data are communicated</i> ).
<b>3.1l</b>	<b>New Content</b>	New content was added ( <i>models are designed and built</i> ).
<b>3.1m</b>	<b>New Content</b>	New content was added ( <i>current applications are used to reinforce science concepts</i> ).
<b>3.2</b>	<b>3.2</b>	
<b>3.2a</b>	<b>3.2b</b>	Additional descriptive text ( <i>purpose</i> ) was added to “function.”
<b>3.2b</b>	<b>3.2a</b>	Content examples were moved to the Curriculum Framework ( <i>lever, screw, pulley, wheel and axle, inclined plane, and wedge</i> ).
<b>3.2c</b>	<b>3.2c</b>	Content examples were moved to the Curriculum Framework ( <i>scissors, wheelbarrow, and bicycle</i> ).
<b>3.2d</b>	<b>3.2d</b>	

Science Standards of Learning – Grade Three		
2010	2003	Comments
3.3	3.3	
3.3 a	3.3a	
Moved to Grade Five	3.3b	Content was moved to the Grade 5 Curriculum Framework (materials are composed of parts that are too small to be seen without magnification).
3.3b	3.3c	The content was edited for further clarification with minor word changes, but the content remains the same.
3.3c		New content was added ( <i>visible physical changes are identified</i> ).
3.4	3.4	The stem was edited (“behavioral and physical” stricken from “adaptations” and moved to 3.4a and 3.4b respectively). There was additional minor editing, which did not change the intent or meaning of the standard.
3.4a	3.4a	The content was moved from the stem (behavioral adaptations). Content examples were moved to the Curriculum Framework (methods of gathering and storing food, finding shelter, defending themselves, and rearing young).
3.4b	3.4b	Content was moved from the stem (physical adaptations). Content examples were moved to the Curriculum Framework (hibernation, migration, camouflage, mimicry, instinct, and learned behavior).
3.5	3.5	
3.5a	3.5a	
3.5b	3.5b	
3.5c	3.5c	
3.6	3.6	Terminology was modified with no substantive change in the intent of the bullet (“environments” changed to <i>ecosystems</i> ).
3.7a	3.6a	Terminology was modified (“water-related environments” changed to <i>aquatic ecosystems</i> ) with no substantive change in the intent of the bullet. Content examples were moved to the Curriculum Framework (pond, marshland, swamp, stream, river, and ocean environments).
3.6b	3.6b	Terminology was modified (“dry-land environments” changed to <i>terrestrial ecosystems</i> ) with no substantive change in the intent of the bullet. Content examples were moved to the Curriculum Framework (desert, grassland, rain forest, and forest environments).
3.6c	3.6c	
3.6d	3.6d	New content was added ( <i>the human role in conserving limited resources</i> ).
3.7	3.7	
3.7a	3.7a	
3.7b	3.7b	
3.7c	3.7c	

Science Standards of Learning – Grade Three		
2010	2003	Comments
3.7d	3.7d	
3.8	3.8	
3.8a	3.8a	Minor clarifications were added with no content change.
3.8b	3.8b	Part of the content of the bullet (plant life cycles) was moved to 3.8c.
3.8c	3.8c	Content was moved from 3.8b (plant life cycles).
3.9	3.9	
3.9a	New Content	New content was added ( <i>there are many sources of water on Earth</i> ).
3.9b	3.9a	
3.9c	3.9b	Minor edits were made with no content change. Content examples were moved to the Curriculum Framework (evaporation, condensation, precipitation).
3.9d	3.9c	
3.9e	3.9d	The bullet was reworded with no content change.
3.10	3.10	
3.10a	3.10a	
3.10b	3.10b	
3.10c	3.10c	
3.10d	3.10d	
3.11	3.11	
3.11a	3.11a	Minor edits were made with no substantive content change.
3.11b	3.11b	A portion of the content of 3.11d (renewable energy) was moved to this bullet with the list of examples moved to the Curriculum Framework (sunlight, water, wind).
3.11c	3.11c	A portion of the content of 3.11d (nonrenewable energy) was moved to this bullet with the examples moved to the Curriculum Framework where appropriate (fossil fuels; coal, oil, natural gas; and wood).
Moved	3.11d	The content was moved to 3.11b and 3.11c.

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## Science Standards of Learning Crosswalk between the 2010 and 2003 Standards

Science Standards of Learning – Grade Four		
2010	2003	Comments
4.1	4.1	Additional descriptive text was included to clarify and expand the intent of the stem ( <i>demonstrate an understanding of scientific reasoning, logic and the nature of science by planning and conducting</i> ).
4.1a	4.1a	
4.1b	New Content	New content was added ( <i>objects or events are classified and arranged according to characteristics or properties</i> ).
4.1c	4.1d	Measurement content was moved from 4.1e ( <i>metric units</i> ) and terminology was modified (“linear distance” changed to <i>length</i> ). The content of the bullet is unchanged.
4.1d	New Content	New content was added ( <i>appropriate instruments are selected and used to measure elapsed time</i> ).
Moved	4.1e	The content (metric measures) was moved to 4.1c.
4.1e	4.1h	The wording of the bullet was substantially changed with specific actions added ( <i>inferences</i> and <i>drawing conclusions</i> ) and the content broadened ( <i>from a variety of sources</i> rather than just types of graphs).
4.1f	New Content	New content was added ( <i>independent and dependent variables are identified</i> ).
4.1g	4.1c	Unnecessary terminology was deleted. The intent of the bullet is unchanged.
4.1h	4.1b	Terminology was changed with no change in the meaning or intent of the bullet.
4.1i	4.1f	Additional actions with data ( <i>collected, recorded, analyzed</i> ) are included with the use of bar graphs.
4.1j	4.1g	
4.1k	New Content	New content was added ( <i>data are communicated with simple graphs, pictures, written statements, and numbers</i> ).
4.1l	New Content	New content was added ( <i>models are constructed to clarify explanations, demonstrate relationships, and solve needs</i> ).
4.1m	New Content	New content was added ( <i>current applications are used to reinforce science concepts</i> ).
4.2	4.2	
4.2a	4.2a	
4.2b	4.2b	Clarifying edits and additional description was included ( <i>changes in motion are related to force and mass</i> ). The intent of the bullet is unchanged.
4.2	4.2c	
4.2c	4.2d	
4.3	4.3	
4.3a	4.3a	

Science Standards of Learning – Grade Four		
2010	2003	Comments
4.3b	4.3b	Details of circuits (open/closed, parallel/series) were moved to Curriculum Framework.
4.3c	4.3c	
4.3	4.3d	Text was reworded and modified, but the intent is unchanged (“mechanical energy” changed to <i>motion</i> ).
4.3e	4.3e	
4.3f	4.3f	
4.4	4.4	
4.4a	4.4a	Details were moved to Curriculum Framework (leaves, stems, roots, and flowers). Additional content was included ( <i>the function of each structure</i> ).
4.4b	4.4b	Details were moved to Curriculum Framework (pollination, stamen, pistil, sepal, embryo, spore, and seed).
4.4c	4.4c	Details were moved to Curriculum Framework (sunlight, chlorophyll, water, carbon dioxide, oxygen, and sugar).
	4.4d	Details were moved to Curriculum Framework ( <i>dormancy</i> ).
4.4d		New content was added ( <i>adaptations allow plants to satisfy life needs and respond to the environment</i> ).
4.5	4.5	Clarifying content was added to the stem ( <i>including humans</i> ) and certain text was modified (“environment” changed to <i>components in the ecosystem</i> ). The intent is unchanged.
4.5a	4.5a	Specific “adaptation” details (behavioral and structural) were deleted from the bullet.
4.5b	4.5b	The intent of the bullet is the same, but the content was expanded ( <i>populations and ecosystems and how they interrelate</i> ).
4.5c	4.5c	
4.5d	4.5d	
4.5e	4.5e	Clarifying text was added, but the intent of the bullet is unchanged ( <i>changes in an organism’s niche at various stages in its life cycle</i> ).
4.5f	4.5f	
4.6	4.6	
4.6a	4.6a	Details were moved to Curriculum Framework (fronts, clouds, and storms).
4.6b	4.6b	Details were moved to Curriculum Framework (air pressure – barometer, wind speed – anemometer, rainfall – rain gauge, and temperature – thermometer).
4.6c	<b>New Content</b>	New content was added ( <i>use of weather measurements and weather phenomena to make weather predictions</i> ).

<b>Science Standards of Learning – Grade Four</b>		
<b>2010</b>	<b>2003</b>	<b>Comments</b>
<b>4.7</b>	<b>New Content</b>	A new standard was added. <i>The student will investigate and understand the organization of the solar system. Key concepts include</i> <i>a) the planets in the solar system;</i> <i>b) the order of the planets in the solar system; and</i> <i>c) the relative sizes of the planets.</i>
<b>4.8</b>	<b>4.7</b>	
<b>4.8a</b>	<b>4.7a</b>	Details were moved to Curriculum Framework (revolution and rotation).
<b>4.8b</b>	<b>4.7b</b>	Part of the content of the bullet was moved to 4.8c (phases of the moon).
<b>4.8c</b>		Content was moved from 4.7b ( <i>causes for the</i> phases of the moon).
<b>4.8d</b>	<b>4.7c</b>	Minor edits were made (struck “the” from “the Earth,” “the moon,” and “the sun”).
<b>4.8e</b>	<b>4.7d</b>	
<b>4.9</b>	<b>4.8</b>	
<b>4.9a</b>	<b>4.8a</b>	
<b>4.9b</b>	<b>4.8b</b>	
<b>4.9c</b>	<b>4.8c</b>	
<b>4.9d</b>	<b>4.8d</b>	

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## Science Standards of Learning Crosswalk between the 2010 and 2003 Standards

Science Standards of Learning – Grade Five		
2010	2003	Comments
5.1	5.1	Additional descriptive text was included to clarify and expand the intent of the stem ( <i>demonstrate an understanding of scientific reasoning, logic and the nature of science by planning and conducting</i> ). The “nature of science” was moved from 5.1h.
5.1a	5.1a	Broadening and clarifying language was added with no content change.
5.1b	5.1b	Additional related text and content was moved from 5.1d (accurate measurements and tools). The use of metric measures occurs in 3.1 and 4.1 and is restated here. Implicit terminology (the use of thermometers from 5.1d) is made explicit ( <i>temperature</i> ).
5.1c	5.1c	Measurement of and <i>estimating</i> “elapsed time” became the central focus of the bullet after “length, mass, and volume” became the exclusive content of 5.1b.
Moved	5.1d	Measurement content was moved to 5.1b. Details were moved to the Curriculum Framework (thermometer, meter stick, balance, graduated cylinder).
5.1d	New Content	New content was added ( <i>hypotheses are formed from testable questions</i> ).
5.1e	5.1g	More appropriate terminology was added (“manipulated and responding” were replaced by <i>independent</i> and <i>dependent</i> ).
5.1f	New Content	New content was added ( <i>constants in an experimental situation are identified</i> ).
5.1g	5.1e	The bullet was reworded with additional clarifying text, but there was no significant content change. Certain details were moved to Curriculum Framework (graphs, charts, diagrams).
5.1h	5.1f	The bullet was reworded with additional clarifying text. Certain terminology was changed (“extrapolated” was changed to <i>generated</i> ).
Moved	5.1h	Content was moved to the 5.1 stem (“nature of science”).
5.1i	New Content	New content was added ( <i>inferences are made and conclusions are drawn</i> ).
5.1j	New Content	New content was added ( <i>models are constructed to clarify explanations, demonstrate relationships, and solve needs</i> ).
5.1k	New Content	New content was added ( <i>current applications are used to reinforce science concepts</i> ).
5.2	5.2	Minor edits were made in the stem with no significant change in meaning of the stem (how sound is <i>created</i> ).
5.2a	New Content	New content was added ( <i>compression waves</i> ).
5.2b	5.2a	Additional content was included ( <i>compression, frequency, amplitude</i> ).

Science Standards of Learning – Grade Five		
2010	2003	Comments
5.2c	5.2b	
5.2d	5.2c	Details were moved to the Curriculum Framework ( <i>voice, sonar, animal sounds, and musical instruments</i> ).
5.3	5.3	
5.3a	5.3a	Content (visible spectrum) was moved to 5.3b. New terminology ( <i>transverse waves</i> ) replaced existing term (light waves).
5.3b		Content was moved from 5.3a (visible spectrum).
5.3c	5.3d	Content was moved to the Curriculum Framework (mirrors).
5.3d	5.3c	
5.3e	5.3b	
Removed	5.3e	Content was deleted (historical contributions in understanding light.)
5.4	5.4	
5.4a	New Content	New content was added ( <i>distinguishing properties of each phase of matter</i> ).
5.4b	5.4a	Part of the content (molecules and compounds) was moved to 5.4d.
5.4c	5.4c	Certain terminology was replaced (“heat” changed to <i>temperature</i> ).
5.4d		Content was moved from 5.4a (molecules and compounds).
5.4e	5.4b	
5.5	5.5	Additional descriptive text was included in the stem with no change in the meaning of the bullet.
5.5a	5.5a	
Moved	5.5b	Content was moved to the Curriculum Framework (kingdoms of living things).
5.5b	New Content	New content was added ( <i>classification of organisms using physical characteristics, body structures, and behavior of the organism</i> ).
5.5c	New Content	New content was added ( <i>traits of organisms that allow them to survive in their environment</i> ).
Moved	5.5c	Content was moved to the Curriculum Framework (vascular and nonvascular plants).
Moved	5.5d	Content was moved to the Curriculum Framework (vertebrates and invertebrates).
5.6	5.6	
5.6a	5.6a	Content was moved to the Curriculum Framework (continental shelf, slope, rise).
5.6b	5.6b	Content was moved to the Curriculum Framework (depth, salinity, major currents).

Science Standards of Learning – Grade Five		
2010	2003	Comments
5.6c	5.6c	Terminology was replaced (“biological” to <i>ecological</i> ) with no change of meaning. Content was moved to the Curriculum Framework (ecosystems).
5.7	5.7	
5.7a	5.7a	Part of the content (the rock cycle) was moved 5.7b.
5.7b		Content was moved from 5.7a with additional descriptive terminology (the rock cycle <i>and how transformations between rocks occur</i> ).
5.7c	5.7b	
5.7d	5.7c	
5.7e	5.7d	Additional clarifying text was included ( <i>changes in the Earth’s crust due to plate tectonics</i> ). Content was moved to the Curriculum Framework (earthquakes and volcanoes).
5.7 f	5.7e	New content was added ( <i>deposition</i> ).
5.7g	5.7f	
<b>Removed 2003 Grade Five Science SOL Content</b> 5.3 e) historical contributions in understanding light		

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## Science Standards of Learning Crosswalk between the 2010 and 2003 Standards

Science Standards of Learning – Grade Six		
2010	2003	Comments
<b>6.1</b>	<b>6.1</b>	Additional descriptive text was included to clarify and expand the intent of the stem ( <i>demonstrate an understanding of scientific reasoning, logic and the nature of science by planning and conducting</i> ). The “nature of science” was moved from 6.1j.
<b>6.1a</b>	<b>6.1a</b>	
<b>Moved to Life Science</b>	<b>6.1b</b>	The content was deleted from 6 <sup>th</sup> grade and moved to LS.1b.
<b>6.1b</b>	<b>6.1c</b>	
<b>6.1c</b>	<b>6d</b>	
<b>6.1d</b>	<b>6.1e</b>	Terminology (“manipulated” and “responding”) was deleted, but the meaning of the bullet is unchanged.
<b>6.1e</b>	<b>6.1f</b>	
<b>6.1f</b>	<b>6.1g</b>	
<b>6.1g</b>	<b>6.1h</b>	A minor content clarification (addition of “metric” <i>tools</i> ) was made.
<b>6.1h</b>	<b>6.1i</b>	A minor edit (“organize” changed to <i>analyze</i> ), and certain content details were moved to Curriculum Framework (graphs, charts, and diagrams).
<b>6.1i</b>	<b>6.1j</b>	Additional content ( <i>simulations</i> ) was included, and the intent of the bullet was broadened ( <i>illustrate and explain phenomena and systems</i> ). The “nature of science” was moved to the 6.1 stem.
<b>6.1j</b>	<b>New Content</b>	New content was added ( <i>current applications are used to reinforce science concepts</i> ).
<b>6.2</b>	<b>6.2</b>	
<b>6.2a</b>	<b>6.2a</b>	
<b>6.2b</b>	<b>6.2b</b>	
<b>6.2c</b>	<b>6.2c</b>	Details were moved to Curriculum Framework (fossil fuels including petroleum, natural gas, and coal).
<b>6.2d</b>	<b>6.2d</b>	Details were moved to Curriculum Framework (wood, wind, hydro, geothermal, tidal, and solar).
<b>6.2e</b>	<b>6.2e</b>	Details were moved to Curriculum Framework (heat/light to mechanical, chemical, and electrical energy).
<b>6.3</b>	<b>6.3</b>	
<b>6.3a</b>	<b>6.3a</b>	
<b>6.3b</b>	<b>6.3b</b>	
<b>6.3c</b>	<b>6.3c</b>	
<b>6.3d</b>	<b>6.3d</b>	
<b>6.3e</b>	<b>6.3e</b>	A minor terminology change was made (“heat” to <i>thermal</i> ).
<b>6.4</b>	<b>6.4</b>	
<b>6.4a</b>	<b>6.4a</b>	There was minor rewording with no content change.

Science Standards of Learning – Grade Six		
2010	2003	Comments
6.4b	6.4b	There was minor rewording with no content change.
6.4c	6.4c	
6.4d	6.4d	The bullet was edited to provide a clearer focus on <i>electrical forces (bonds)</i> in the formation of <i>new substances</i> .
6.4e	6.4e	
6.4f	6.4f	
6.4g	6.4g	
6.5	6.5	
6.5a	6.5a	
6.5b	6.5b	A minor terminology change was made (“states” to <i>phases</i> ).
6.5c	6.5c	
6.5d	6.5d	A minor terminology change was made (“heat” to <i>thermal</i> ).
Removed	6.5e	Content was deleted (the origin and occurrence of water on Earth).
6.5e	6.5f	
6.5f	6.5g	
6.6	6.6	
6.6a	6.6a	
6.6b	6.6b	A minor edit (deleted “air”) was made with no change in content.
6.6c	6.6c	A minor edit was made ( <i>atmospheric</i> added) with no change in content.
6.6d	6.6d	Content was moved from 6.6g (and the importance of protecting and maintaining air quality).
6.6e	6.6e	
6.6f	6.6f	
Moved	6.6g	The content was appended to 6.6d.
6.7	6.7	
6.7a	6.7a	
6.7b	6.7b	
6.7c	6.7c	
6.7d	6.7d	
6.7e	6.7e	
6.7f	6.7f	
6.7g	6.7g	
6.8	6.8	A clarifying edit was made in the stem with no content change (“relationships” to <i>interactions</i> ).
6.8a	6.8a	There was a content addition ( <i>dwarf planets</i> ) to the bullet.
6.8b	6.8b	
6.8c	6.8c	
6.8d	6.8d	
6.8e	6.8e	
6.8f	6.8f	
6.8g	6.8g	

<b>Science Standards of Learning – Grade Six</b>		
<b>2010</b>	<b>2003</b>	<b>Comments</b>
<b>6.8h</b>	<b>6.8h</b>	
<b>6.8i</b>	<b>6.8i</b>	
<b>6.9</b>	<b>6.9</b>	
<b>6.9a</b>	<b>6.9a</b>	Details were moved to Curriculum Framework (water, air, soil, plant life, animal life).
<b>6.9b</b>	<b>6.9b</b>	Details were moved to Curriculum Framework (coal, oil, natural gas, nuclear power, mineral resources).
<b>6.9c</b>	<b>6.9c</b>	
<b>6.9d</b>	<b>6.9d</b>	
<b>Removed 2003 Grade Six Science SOL Content</b> 6.5 e) the origin and occurrence of water on Earth		

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## Science Standards of Learning Crosswalk between the 2010 and 2003 Standards

Science Standards of Learning – Life Science		
2010	2003	Comments
<b>LS.1</b>	<b>LS.1</b>	Additional descriptive text was included to clarify and expand the intent of the stem ( <i>demonstrate an understanding of scientific reasoning, logic and the nature of science by planning and conducting</i> ). The “nature of science” was moved from LS.1j.
<b>LS.1a</b>	<b>LS.1a</b>	
<b>Removed</b>	<b>LS.1b</b>	The content was deleted (variables are defined).
<b>LS.1b</b>	<b>New Content</b>	New content was added ( <i>a classification system is developed based on multiple attributes</i> ).
<b>Removed</b>	<b>LS.1c</b>	Inherent content was deleted (metric units (SI---International System of Units are used).
<b>LS.1c</b>	<b>New Content</b>	New content was added ( <i>triple beam and electronic balances, thermometers, metric rulers, graduated cylinders and probeware are used to gather data</i> ).
<b>LS.1d</b>	<b>LS.1d</b>	Additional clarifying text was included (models <i>and simulations</i> are constructed <i>and used...</i> ).
<b>LS.1e</b>	<b>LS.1e</b>	
<b>LS.1f</b>	<b>LS.1f</b>	
<b>LS.1g</b>	<b>LS.1g</b>	
<b>LS.1h</b>	<b>LS.1h</b>	The content was substantially reworded for clarification and emphasis was broadened (“continuous line graphs” changed to <i>graphical representations</i> ).
<b>LS.1i</b>	<b>LS.1i</b>	The content emphasis was narrowed (“interpretations...of data” to <i>patterns... in data</i> ).
<b>Moved</b>	<b>LS.1j</b>	The “nature of science” was incorporated into the LS.1 stem.
<b>LS.1j</b>	<b>New Content</b>	New content was added ( <i>current applications are used to reinforce life science concepts</i> ).
<b>LS.2</b>	<b>LS.2</b>	
<b>LS.2a</b>	<b>LS.2a</b>	Details were moved to Curriculum Framework (cell membrane, cell wall, cytoplasm, vacuole, mitochondrion, endoplasmic reticulum, nucleus, and chloroplast).
<b>LS.2b</b>	<b>LS.2b</b>	
<b>LS.2c</b>	<b>LS.2c</b>	
<b>LS.2d</b>	<b>LS.2d</b>	Details were moved to Curriculum Framework (mitosis and meiosis).
<b>LS.3</b>	<b>LS.3</b>	
<b>LS.3a</b>	<b>LS.3a</b>	
<b>LS.3b</b>	<b>LS.3b</b>	The content was reorganized and streamlined for clarity, but the intent is the same (“cells, tissues, organs, and systems” changed to <i>patterns of cellular organization</i> and “respiration, removal of wastes, growth, reproduction, digestion, and cellular transport” changed to <i>life processes</i> ).

Science Standards of Learning – Life Science		
2010	2003	Comments
Removed	LS.4	The content was deleted (The student will investigate and understand that the basic needs of organisms must be met in order to carry out life processes).
Removed	LS.4a	The content was deleted (plant needs).
Removed	LS.4b	The content was deleted (animal needs)
	LS.4c	The content (factors that influence life processes) is represented in LS.3 and LS.5.
LS.4	LS.5	
LS.4a	New Content	New content was added ( <i>the distinguishing characteristics of domains of organisms</i> ).
LS.4b	LS.5a	
LS.4c	LS.5b	Terminology is corrected for plant groups ( <i>divisions</i> rather than “phyla”).
LS.4d	LS.5c	There was a minor text addition with no change in meaning.
LS.5	LS.6	
LS.5a	LS.6a	
LS.5b	LS.6b	
LS.5c	LS.6c	
LS.6	LS.7	
LS.6a	LS.7a	
LS.6b	LS.7b	
LS.6c	LS.7c	
LS.7	LS.8	
LS.7a	LS.8a	
LS.7b	LS.8b	
LS.8	LS.9	
LS.8a	LS.9a	
LS.8b	LS.9b	
LS.8c	LS.9c	
LS.8d	LS.9d	
LS.8e	LS.9e	
LS.9	LS.10	
LS.9a	LS.10a	
LS.9b	LS.10b	
LS.9c	LS.10c	
LS.10	LS.11	The stem was partially reorganized, with no change in content or meaning.
LS.10a	LS.11a	
LS.10b	LS.11b	
LS.10c	LS.11c	
LS.11	LS.12	
LS.11a	LS.12a	
LS.11b	LS.12b	

Science Standards of Learning – Life Science		
2010	2003	Comments
LS.11c	LS.12c	
LS.11d	LS.12d	
LS.11e	LS.12e	Details were moved to Curriculum Framework (water supply, air quality, energy production, and waste management).
LS.12	LS.13	
LS.12a	LS.13a	Additional content was added ( <i>structure</i> and role of DNA).
LS.12b	LS.13b	
LS.12c	LS.13c	
Removed	LS.13d	Content was deleted (factors affecting the expression of traits).
LS.12d	LS.13e	
LS.12e	LS.13f	
LS.12f	LS.13g	
<p><b>Removed 2003 Life Science SOL Content</b></p> <p>LS.1 b) variables are defined</p> <p>LS.1 c) metric units (SI---International System of Units are used</p> <p>LS.4 The student will investigate and understand that the basic needs of organisms must be met in order to carry out life processes. Key concepts include</p> <p>a) plant needs;</p> <p>b) animal needs; and</p> <p>c) factors that influence life processes.</p> <p>LS.13 d) factors affecting the expression of traits</p>		

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## Science Standards of Learning Crosswalk between the 2010 and 2003 Standards

Science Standards of Learning – Physical Science		
2010	2003	Comments
PS.1	PS.1	Additional descriptive text was included to clarify and expand the intent of the stem ( <i>demonstrate an understanding of scientific reasoning, logic and the nature of science by planning and conducting</i> ). The “nature of science” was moved from PS.1n.
PS.1a	PS.1a	
PS.1b	PS.1b	Inherent content was deleted (and reported using metric units SI—International System of Units).
PS.1c	PS.1c	
PS.1d	PS.1d	Additional content was included ( <i>probeware</i> ).
PS.1e	PS.1e	
Removed	PS.1f	The content of the bullet was deleted (research skills are utilized using a variety of resources).
PS.1f	PS.1g	
PS.1g	PS.1h	
PS.1h	PS.1i	
PS.1i	PS.1j	Terminology was changed to comport with mathematics instruction (scattergrams to <i>scatterplots</i> ). The terms are synonyms.
PS.1j	PS.1k	
PS.1k	PS.1l	
PS.1l	PS.1m	
Moved	PS.1n	The content of the bullet was moved to the PS.1 stem.
PS.1m	New Content	New content was added ( <i>models and simulations are constructed and used to illustrate and explain phenomena</i> ).
PS.1n	New Content	New content was added ( <i>current applications of physical science concepts are used</i> ).
PS.2	PS.2	
PS.2a	PS.2a	
PS.2b	PS.2b	
PS.2c	PS.2c	
Moved	PS.2d	The content of the bullet was moved to the PS.2f.
PS.2d	PS.2e	Details were moved to the Curriculum Framework (shape, density, solubility, odor, melting point, boiling point).
PS.2e	PS.2f	Details were moved to the Curriculum Framework (acidity, basicity, combustibility, reactivity).
PS.2f	New Content	New content was added ( <i>characteristics of types of matter based on physical and chemical properties</i> ).
PS.3	PS.3	
PS.3a	PS.3a	
PS.3b	PS.3b	

Science Standards of Learning – Physical Science		
2010	2003	Comments
PS.4	PS.4	
PS.4a	PS.4a	
PS.4b	PS.4b	
PS.4c	PS.4c	Additional terminology was included and key content was made explicit ( <i>formation of compounds through ionic and covalent bonding</i> ), but the intended content is the same.
PS.5	PS.5	
PS.5a	PS.5a	
Moved	PS.5b	The content (nuclear reactions) was moved to PS.5c, and the details were moved to the Curriculum Framework (products of fusion and fission and the effect of these products on humans and the environment).
PS.5b	PS.5c	Details were moved to the Curriculum Framework (types of reactions, reactants, and products; and balance equations).
PS.5c		The content (nuclear reactions) was moved from PS.5b. Details were moved to the Curriculum Framework (products of fusion, fission and the effect of these products on humans and the environment).
PS.6	PS.6	Unnecessary terminology was deleted from the stem (states), but the stem content is unchanged.
PS.6a	PS.6a	
PS.6b	PS.6b	The revised content of PS.6c ( <i>thermal, radiant, and nuclear energy</i> ) was moved and added to the existing content of PS.6b.
Moved	PS.6c	The terminology, “heat, light, and sound” was replaced ( <i>thermal, radiant, and nuclear energy</i> ), and the revised content was moved and added to the existing content of PS.6b.
PS.7	PS.7	More appropriate terminology replaced the existing wording ( <i>thermal energy</i> replacing “heat”).
PS.7a	PS.7a	
PS.7b	PS.7b	
PS.7c	PS.7c	
PS.7d	PS.7d	More appropriate terminology replaced the existing wording ( <i>thermal energy</i> replacing “heat”), and details were moved to the Curriculum Framework (heat engines, thermostats, refrigeration, and heat pumps).
PS.8	PS.8	Clarifying terminology was included ( <i>waves</i> ). Redundant content (also found in PS.8d) was removed from the stem (technological applications of sound waves).
PS.8a Additional Content	PS.8a	Additional content was included ( <i>rarefaction, and compression</i> ).
PS.8b	PS.8b	

Science Standards of Learning – Physical Science		
2010	2003	Comments
PS.8c	PS.8c	More appropriate terminology replaced the existing wording ( <i>compression</i> replacing “mechanical”).
PS.8d	PS.8d	
PS.9	PS.9	The stem was reworded for clarification and broader focus ( <i>characteristics of transverse waves</i> ). Part of the stem was moved to PS.9e (technological applications of light).
PS.9a	New Content	New content was added ( <i>wavelength, frequency, speed, amplitude, crest, and trough</i> ).
PS.9b	PS.9a	Details were moved to the Curriculum Framework ( <i>reflection, refraction, diffraction, and interference</i> ).
PS.9c	PS.9b	
PS.9d	PS.9c	
PS.9e	Moved	Part of the original stem was moved (technological applications of light).
PS.10	PS.10	Part of the stem was moved to PS.10d (technological applications).
PS.10a	PS.10a	
PS.10b	PS.10b	
PS.10c	PS.10c	
PS.10d	PS.10d	Part of the stem was moved (technological applications) with the addition of clarifying terminology also from the stem (work, force and motion). The content is unchanged. Details were moved to the Curriculum Framework (simple machines, compound machines, powered vehicles, rockets, and restraining devices).
PS.11	PS.11	
PS.11a	PS.11a	
PS.11b	PS.11b	The emphasis of the bullet was changed and narrowed ( <i>relationship between a magnetic field and an electric current</i> ).
PS.11c	PS.11c	Content was moved from PS.11b (electromagnets). Additional content was added ( <i>and their uses</i> ).
PS.11d	New Content	New content was added ( <i>conductors, semiconductors, and insulators</i> ).
<b>Removed 2003 Physical Science SOL Content</b>		
PS.1 f) research skills are utilized using a variety of resources.		

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## Science Standards of Learning Crosswalk between the 2010 and 2003 Standards

Science Standards of Learning – Earth Science		
2010	2003	Comments
<b>ES.1</b>	<b>ES.1</b>	
<b>ES.1a</b>	<b>ES.1a</b>	
<b>ES.1b</b>	<b>ES.1b</b>	More inclusive terminology was added (global positioning systems (GPS) was changed to <i>geospatial technologies</i> ).
<b>ES.1c</b>	<b>ES.1c</b>	The term, “map” was moved from this bullet to ES.1d. Content was moved from ES.3b (imagery and models) and added to ES.1c.
<b>ES.1d</b>		Content was moved from ES.1c and ES.3a, c, and d ( <i>maps and globes are read and interpreted, including location by latitude and longitude</i> ).
<b>ES.1e</b>	<b>ES.1d</b>	
<b>Moved</b>	<b>ES.1e</b>	Content (the nature of science) was moved to the ES.2 stem.
<b>ES.1f</b>	<b>New Content</b>	New content was added ( <i>current applications are used to reinforce Earth science concepts</i> ).
<b>ES.2</b>	<b>ES.2</b>	“The nature of science” from ES.1e was incorporated into the stem.
<b>ES.2a</b>	<b>ES.2a</b>	There was a minor wording change with no content change.
<b>ES.2b</b>	<b>ES.2b</b>	There was a minor wording change with no content change.
<b>Removed</b>	<b>ES.2c</b>	Content was removed (comparing different scientific explanations for a set of observations about the Earth).
<b>ES.2c</b>	<b>ES.2d</b>	There was a minor wording change with no content change.
<b>ES.2d</b>	<b>ES.2e</b>	There was a minor wording change with no content change.
<b>Moved</b>	<b>ES.3</b>	The standard was eliminated, and the key content was moved to bullets in ES.1.
<b>Moved</b>	<b>ES.3a</b>	Terminology (maps) was moved to ES.1d, and details (bathymetric, geologic, topographic, and weather) were moved to the Curriculum Framework.
<b>Moved</b>	<b>ES.3b</b>	Terminology (imagery) was moved to ES.1c, and details (aerial photography and satellite images) were moved to the Curriculum Framework.
	<b>ES.3c</b>	Details were moved to Curriculum Framework (direction and measurements of distance).
<b>Moved</b>	<b>ES.3d</b>	Terminology (latitude and longitude) was moved to ES.1d, and details were moved to the Curriculum Framework (topographic profiles).
<b>ES.3</b>	<b>ES.4</b>	There was minor rewording with no content change (drop “the” from Earth).
<b>ES.3</b>	<b>ES.4a</b>	There was minor rewording with no content change (drop “the” from Earth).
<b>ES.3b</b>	<b>ES.4b</b>	
<b>ES.3c</b>	<b>ES.4c</b>	

Science Standards of Learning – Earth Science		
2010	2003	Comments
ES.3d	ES.4d	There was minor rewording with no content change (space program to <i>space exploration</i> ).
ES.4	ES.5	
ES.4a	ES.5a	
ES.4b	ES.5b	
ES.5	ES.6	
ES.5a	ES.6a	Details were moved to the Curriculum Framework (intrusive and extrusive).
ES.5b	ES.6b	Details were moved to the Curriculum Framework (clastic and chemical).
ES.5c	ES.6c	Details were moved to the Curriculum Framework (foliated and unfoliated).
ES.6	ES.7	
ES.6a	ES.7a	
ES.6b	ES.7b	
ES.6c	ES.7c	
Removed	ES.7d	The content was deleted (making informed judgments related to resource use and its effects on Earth systems).
ES.6d	ES.7e	
ES.7	ES.8	
Moved to Curriculum Framework	ES.8a	The content of the bullet was moved to the Curriculum Framework (how geologic processes are evidenced in the physiographic provinces of Virginia including the Coastal Plain, Piedmont, Blue Ridge, Valley and Ridge, and Appalachian Plateau).
ES.7a	ES.8b	The clarifying adjective, “geologic,” was added. Details were moved to the Curriculum Framework (faulting, folding, volcanism, metamorphism, weathering, erosion, deposition, and sedimentation).
ES.7b	ES.8c	Details were moved to the Curriculum Framework (subduction, rifting and sea floor spreading, and continental collision).
ES.8	ES.9	
ES.8a	ES.9a	
ES.8b	ES.9b	
ES.8c	ES.9c	The emphasis of the bullet was changed (“identification” to <i>relationships between</i> ). The content was reordered and terminology was updated ( <i>saturated and unsaturated zones</i> ).
ES.8d	ES.9d	There was minor editing with no content change (“other” was deleted).
ES.8e	ES.9e	
ES.8f	ES.9f	
ES.9	ES.10	A minor edit was made in stem with no change of content or emphasis (deletion of article “the”).

Science Standards of Learning – Earth Science		
2010	2003	Comments
ES.9a	ES.10a	
ES.9b	ES.10b	
ES.9c	ES.10c	
ES.9d	ES.10d	
ES.10	ES.11	
ES.10a	ES.11a	Minor edits were made with no content or emphasis change.
ES.10b	ES.11b	
ES.10c	ES.11c	Details were moved to the Curriculum Framework (density differences, energy transfer, weather, and climate).
ES.10d	ES.11d	Details were moved to the Curriculum Framework (continental margins, trenches, mid-ocean ridges, and abyssal plains).
ES.10e	ES.11e	
ES.11	ES.12	
ES.11	ES.12a	A clarifying edit was made with no content change. (The word, <i>composition</i> , was added.)
ES.11bc	ES.12b	
Removed	ES.12c	Content was deleted (comparison of the Earth’s atmosphere to that of other planets).
ES.11c	ES.12d	
ES.11d	ES.12e	The content emphasis was changed slightly (“atmospheric compositional changes” to changes <i>to the atmosphere and climate</i> ).
ES.12	ES.13	A minor edit was made in stem with no change of content or emphasis. (Deletion of article “the”)
ES.12a	ES.13a	
ES.12b	ES.13b	
ES.12c	ES.13c	
ES.12d	ES.13d	Additional content was included ( <i>conduction</i> ).
ES.13	ES.14	
Removed	ES.14a	Content was deleted (nebulae).
ES.13a		Content was moved from former ES.14e (cosmology including the Big Bang Theory).
ES.13b	ES.14b	Content was incorporated from ES.14c (stellar evolution) and ES.14d (galaxies).
Moved	ES.14c	Content was moved to ES.13b (stellar evolution).
Moved	ES.14d	Content was moved to ES.13b (galaxies).

<b>Science Standards of Learning – Earth Science</b>		
<b>2010</b>	<b>2003</b>	<b>Comments</b>
<b>Moved</b>	<b>ES.14e</b>	Content was moved to ES.13a (cosmology including the Big Bang Theory).
<p><b>Removed 2003 Earth Science SOL Content</b>            ES.2 c) comparing different scientific explanations for a set of observations about the Earth            ES.7 d) making informed judgments related to resource use and its effects on Earth systems            ES.12 c) comparison of the Earth’s atmosphere to that of other planets            ES.14 a) nebulae</p>		

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## Science Standards of Learning Crosswalk between the 2010 and 2003 Standards

<b>Science Standards of Learning - Biology</b>		
<b>2010</b>	<b>2003</b>	<b>Comments</b>
<b>BIO.1</b>	<b>BIO.1</b>	The standard stem was reworded. Terminology was moved from the deleted bullet, BIO.1m (nature of science) and included in the stem ( <i>demonstrate an understanding of scientific reasoning, logic and the nature of science by planning and conducting...</i> ).
<b>BIO.1a</b>	<b>BIO.1a</b>	
<b>BIO.1b</b>	<b>BIO.1b</b>	
<b>BIO.1c</b>	<b>BIO.1c</b>	
<b>BIO.1d</b>	<b>BIO.1d</b>	
<b>BIO.1e</b>	<b>BIO.1e</b>	
<b>BIO.1f</b>	<b>BIO.1f</b>	
<b>BIO.1g</b>	<b>BIO.1g</b>	
<b>BIO.1h</b>	<b>BIO.1h</b>	
<b>BIO.1i</b>	<b>BIO.1i</b>	Additional content was added to the bullet ( <i>modeling concepts, and simulating experimental conditions</i> ).
<b>BIO.1j</b>	<b>BIO.1j</b>	
<b>BIO.1k</b>	<b>BIO.1k</b>	Additional content was added to the bullet ( <i>law</i> ).
<b>BIO.1l</b>	<b>BIO.1l</b>	
<b>Moved</b>	<b>BIO.1m</b>	Content was moved to the BIO.1 stem (nature of science).
<b>BIO.1m</b>	<b>New Content</b>	New content was added ( <i>current applications of biological concepts are used</i> ).
<b>Stem Eliminated</b>	<b>BIO.2</b>	Bullets a-d of standard BIO.2 were moved to other standards as indicated below. The stem was eliminated.
<b>Moved</b>	<b>BIO.2a</b>	The content of the bullet was moved to BIO.3a.
<b>Moved</b>	<b>BIO.2b</b>	The content of the bullet was moved to BIO.7e.
<b>Moved</b>	<b>BIO.2c</b>	The content of the bullet was moved to BIO.4f.
<b>Moved</b>	<b>BIO.2d</b>	The content of the bullet was moved to BIO.5e.
<b>Removed</b>	<b>BIO.2e</b>	The content of the bullet was deleted (the collaborative efforts of scientists, past and present).
<b>BIO.2</b>	<b>BIO.3</b>	
<b>BIO.2a</b>	<b>BIO.3a</b>	
<b>BIO.2b</b>	<b>BIO.3b</b>	
<b>BIO.2c</b>	<b>BIO.3c</b>	
<b>BIO.2d</b>	<b>BIO.3d</b>	
<b>BIO.3</b>	<b>BIO.4</b>	
<b>BIO.3a</b>	<b>Moved from BIO.2a</b>	Content was moved from BIO.2a (evidence supporting the cell theory).
<b>BIO.3b</b>	<b>BIO.4a</b>	
<b>Removed</b>	<b>BIO.4b</b>	Content was deleted (exploring the diversity and variation of eukaryotes).
<b>BIO.3c</b>	<b>BIO.4c</b>	Additional clarifying text was included (...activities of <i>the organelles in a single cell...</i> ).

Science Standards of Learning - Biology		
2010	2003	Comments
BIO.3d	BIO.4d	Details were moved to the Curriculum Framework (diffusion, osmosis, and active transport).
BIO.3e	New Content	New content was added ( <i>the impact of surface area to volume ratio on cell division, material transport, and other life processes</i> ).
BIO.4	BIO.5	Classification terminology was substantially updated to include the three recognized domains ( <i>Archaea, Bacteria, and Eukarya</i> ).
Moved	BIO.5a	Content (how their structures and functions vary among and within the kingdoms) was moved to BIO.4c.
BIO.4a	BIO.5b	
Removed	BIO.5c	Content was removed (analyses of their external and internal responses to the environment).
BIO.4b	BIO.5d	
BIO.4c	BIO.5a	New content was built into the content moved from BIO.5a (how <i>the structures and functions vary among and within the Eukarya kingdoms of protists, fungi, plants, and animals, including humans</i> ).
BIO.4d	BIO.5e	Part of the original content was removed (life functions).
BIO.4e	BIO.5f	
BIO.4f	Moved from BIO.2c	Content was moved from BIO.2c (evidence supporting the germ theory of infectious disease).
BIO.5	BIO.6	
BIO.5a	BIO.6a	
BIO.5b	BIO.6b	
BIO.5c	BIO.6c	
BIO.5d	BIO.6d	
BIO.5e	Moved from BIO.2d	Content was moved from BIO.2d (historical development of the structural model of DNA).
BIO.5f	BIO.6e	Details were moved to the Curriculum Framework (mutation, recombination, deletions, additions to DNA).
BIO.5g	BIO.6f	Details were moved to the Curriculum Framework (DNA and RNA).
BIO.5h	BIO.6g	
BIO.5i	BIO.6h	
BIO.5j	BIO.6i	
BIO.6	BIO.7	
BIO.6a	BIO.7a	
BIO.6b	BIO.7b	
BIO.6c	BIO.7c	
BIO.6d	BIO.7d	
BIO.6e	BIO.7e	
BIO.7	BIO.8	
BIO.7a	BIO.8a	

Science Standards of Learning - Biology		
2010	2003	Comments
BIO.7b	BIO.8b	
BIO.7c	BIO.8c	
BIO.7d	BIO.8d	
BIO.7e	BIO.8e and text from BIO.2b	Additional clarifying terminology was added ( <i>scientific evidence and explanations</i> for biological evolution). The content of BIO.2b is substantially restated in this bullet.
BIO.10	BIO.9	
BIO.10a	BIO.9a	
BIO.10b	BIO.9b	
BIO.10c	BIO.9c	
BIO.10d	BIO.9d	
BIO.10e	BIO.9e	Details were moved to the Curriculum Framework (the Chesapeake Bay and its tributaries).
<p><b>Removed 2003 Biology SOL Content</b>            BIO.2 was removed as a stand-alone standard and the specific content was distributed among related standards, with the exception of bullet BIO.2 e) the collaborative efforts of scientists, past and present.            BIO.4 b) exploring the diversity and variation of eukaryotes            BIO.5 c) analyses of their external and internal responses to the environment</p>		

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## Science Standards of Learning Crosswalk between the 2010 and 2003 Standards

Science Standards of Learning - Chemistry		
2010	2003	Comments
<b>CH.1</b>	<b>CH.1</b>	
<b>CH.1a</b>	<b>CH.1a</b>	
<b>CH.1b</b>	<b>CH.1b</b>	
<b>CH.1c</b>	<b>CH.1c</b>	
<b>CH.1d</b>	<b>CH.1d</b>	
<b>CH.1e</b>	<b>CH.1e</b>	
<b>CH.1f</b>	<b>CH.1f</b>	
<b>CH.1g</b>	<b>CH.1g</b>	A minor wording change was made with no content change.
<b>CH.1h</b>	<b>CH.1h</b>	A minor wording change was made and additional content was added ( <i>and using simulations to model concepts</i> ).
<b>CH.1i</b>	<b>CH.1i</b>	Redundant content was removed (the nature of science).
<b>CH.1j</b>	<b>New Content</b>	New content was added ( <i>the use of current applications to reinforce chemistry concepts</i> ).
<b>CH.2</b>	<b>CH.2</b>	
<b>CH.2a</b>	<b>CH.2a</b>	
<b>CH.2b</b>	<b>CH.2b</b>	
<b>CH.2c</b>	<b>CH.2c</b>	
<b>CH.2d</b>	<b>CH.2d</b>	
<b>CH.2e</b>	<b>CH.2e</b>	Part of the content (series) was removed.
<b>CH.2f</b>	<b>CH.2f</b>	
<b>CH.2g</b>	<b>CH.2g</b>	
<b>CH.2h</b>	<b>CH.2h</b>	
<b>CH.2i</b>	<b>CH.2i</b>	
<b>CH.3</b>	<b>CH.3</b>	
<b>CH.3a</b>	<b>CH.3a</b>	
<b>CH.3b</b>	<b>CH.3b</b>	
<b>CH.3c</b>	<b>CH.3c</b>	Details were moved to Curriculum Framework (molecular, structural, and empirical; and Lewis diagrams).
<b>CH.3d</b>	<b>CH.3d</b>	Details were moved to Curriculum Framework (ionic and covalent).
<b>CH.3e</b>	<b>CH.3e</b>	Details were moved to Curriculum Framework (synthesis, decomposition, single and double replacement, oxidation reduction, combustion, neutralization, exothermic, and endothermic).
<b>CH.3f</b>	<b>CH.3f</b>	Related content was moved from CH.4f (chemical equilibrium) and added to the existing bullet. Details were moved to Curriculum Framework (activation energy, catalysis, and degree of randomness).
<b>CH.4</b>	<b>CH.4</b>	Minor rewording changes were made in the stem with no content change. (Terminology, “ <i>chemical</i> ,” was added to “quantities” and “in a chemical reaction” was deleted).

Science Standards of Learning - Chemistry		
2010	2003	Comments
CH.4a	CH.4a	
CH.4b	CH.4b	
Moved	CH.4c	Content (partial pressure) was moved to CH.5b.
Moved	CH.4d	Content (gas laws) was moved to CH.5b.
CH.4c	CH.4e	
Moved	CH.4f	Content (chemical equilibrium) was moved to CH.3f.
CH.4d	CH.4g	
CH.5	CH.5	
CH.5a	CH.5a	
CH.5b		Content was moved from CH.4c (partial pressure) and CH.4d (gas laws).
CH.5c	CH.5b	
CH.5d	CH.5c	
CH.5e	CH.5d	
CH.5f	CH.5e	
CH.5g	CH.5f	
CH.6a-b	New Content	New content was added. <i>CH.6 The student will investigate and understand how basic chemical properties relate to organic chemistry and biochemistry. Key concepts include</i> <i>a) unique properties of carbon that allow multi-carbon compounds; and</i> <i>b) uses in pharmaceuticals and genetics, petrochemicals, plastics, and food.</i>
<b>Removed 2003 Chemistry SOL Content</b> Minor content in CH.2e was removed (series).		

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## Science Standards of Learning Crosswalk between the 2010 and 2003 Standards

Science standards of Learning - Physics		
2010	2003	Comments
<b>PH.1</b>	<b>PH.1</b>	New content was added to the stem (The student will plan and conduct investigations <i>using experimental design and product design processes</i> ). Additional minor edits were made with no content change.
<b>PH.1a</b>	<b>PH.1a</b>	
<b>PH.1b</b>	<b>PH.1b</b>	Details were moved to Curriculum Framework (mass, volume, temperature, heat exchange, energy transformations, motion, fields, and electric charge).
<b>PH.1c</b>	<b>PH.1c</b>	
<b>Removed</b>	<b>PH.1d</b>	The content was deleted (metric units are used in all measurements and calculations).
<b>PH.1d</b>	<b>PH.1e</b>	
<b>PH.1e</b>	<b>PH.1f</b>	
<b>PH.1f</b>	<b>New Content</b>	New content was added ( <i>models and simulations are used to visualize and explain phenomena, to make predictions from hypotheses and to interpret data</i> ).
<b>Removed</b>	<b>PH.1g</b>	The content of the bullet was removed (data gathered from non-SI instruments are incorporated through appropriate conversions).
<b>PH.1g</b>	<b>PH.1h</b>	
<b>PH.2</b>	<b>PH.2</b>	
<b>PH.2a</b>	<b>PH.2a</b>	
<b>PH.2b</b>	<b>PH.2b</b>	
<b>PH.2c</b>	<b>PH.2c</b>	
<b>PH.2d</b>	<b>PH.2d</b>	
<b>PH.2e</b>	<b>PH.2e</b>	The bullet was reworded with no content change.
<b>PH.3</b>	<b>PH.3</b>	Additional text was included in the stem for clarity (nature of science), but the content of the stem remains the same.
<b>PH.3a</b>	<b>PH.3a</b>	
<b>PH.3b</b>	<b>PH.3b</b>	
<b>PH.3c</b>	<b>PH.3c</b>	
<b>PH.3d</b>	<b>PH.3d</b>	
<b>PH.3e</b>	<b>PH.3e</b>	The “nature of science” was deleted from the bullet and added in the PH.3 stem.
<b>PH.4</b>	<b>PH.4</b>	
<b>PH.4a</b>	<b>PH.4a</b>	
<b>PH.4b</b>	<b>PH.4b</b>	
<b>PH.5</b>	<b>PH.5</b>	
<b>PH.5a</b>	<b>PH.5a</b>	
<b>PH.5b</b>	<b>PH.5b</b>	
<b>PH.5c</b>	<b>PH.5c</b>	

Science standards of Learning - Physics		
2010	2003	Comments
PH.5d	PH.5d	
PH.5e	PH.5e	
PH.5f	PH.5f	
PH.5g	PH.5g	
PH.6	PH.6	
PH.6a	PH.6a	
PH.6b	PH.6b	
Moved	PH.6c	The content (electric power) was moved to PH.13.
PH.6c	New Content	New content was added (mass/energy equivalence).
Removed	PH.7 a-f	The content was removed. (See the full text at the end of the crosswalk.)
PH.7	PH.8	
PH.7a	PH.8a	The bullet was edited and updated with the content remaining substantively similar. Certain terminology was changed (“transformation” to <i>transfer</i> , “forms” to <i>systems</i> , and “electrical” to <i>electromagnetic</i> ).
PH.7b	PH.8b	
PH.8	PH.9	Wording was deleted (how to use models of transverse and longitudinal waves to interpret), but the content emphasis on “wave phenomena” remains the same.
PH.8a	PH.9a	Details were moved to the Curriculum Framework (period, wavelength, frequency, amplitude, and phase).
PH.8b	PH.9b	Details were moved to the Curriculum Framework (reflection, refraction, diffraction, interference, polarization, Doppler effect).
PH.8c	PH.9c	
PH.9	PH.10	
PH.9a	PH.10a	New content was added (the properties and behaviors <i>and relative size</i> of radio waves, microwaves, infrared).
PH.9b	New Content	New content was added ( <i>wave/particle dual nature of light</i> ).
PH.9c	PH.10b	The wording was changed (“wave properties of each band” to <i>respective wavelengths</i> ), but the content remains the same.
Removed	PH.11a-d	The complete standard was removed. (See the full text at the end of the crosswalk.)
PH.10	PH.12	
PH.10a	PH.12a	
PH.10b	PH.12b	The specific examples in the bullet (operating principles of motors, generators, transformers, and cathode ray tubes) were deleted, and more inclusive terminology was added ( <i>technological applications</i> ).
PH.11	PH.13	An additional action was added to the stem (diagram, construct, <i>and analyze</i> ).

Science standards of Learning - Physics		
2010	2003	Comments
PH.11a	PH.13a	
PH.11b	PH.13b	
Removed	PH.13c	Content was removed (circuit components including resistors, batteries, generators, fuses, switches, and capacitors).
PH.11c	New Content	New content was added ( <i>electrical power</i> ).
PH.11d	New Content	New content was added ( <i>alternating and direct currents</i> ).
PH.12	PH.14	A wording change was made to the stem ( <i>may include</i> ).
PH.12a	PH.14a	
PH.12b	PH.14b	
PH.12c	PH.14c	
PH.12d	PH.14d	
PH.12e	PH.14e	
PH.12f	PH.14f	
PH.12g	PH.14g	
PH.12h	New Content	New content was added ( <i>nanotechnology</i> ).
PH.12i	PH.14h	
PH.12j	PH.14i	
<b>Removed 2003 Physics SOL Content</b>		
<p>PH.1 d) metric units are used in all measurements and calculations; g) data gathered from non-SI instruments are incorporated through appropriate conversions; and</p> <p>PH.7 The student will investigate and understand properties of fluids. Key concepts include a) density and pressure; b) variation of pressure with depth; c) Archimedes' principle of buoyancy; d) Pascal's principle; e) fluids in motion; and f) Bernoulli's principle.</p> <p>PH.11 The student will investigate and understand, in describing optical systems, how light behaves in the fundamental processes of reflection, refraction, and image formation. Key concepts include a) application of the laws of reflection and refraction; b) construction and interpretation of ray diagrams; c) development and use of mirror and lens equations; and d) predictions of type, size, and position of real and virtual images.</p> <p>PH.13 c) circuit components including resistors, batteries, generators, fuses, switches, and capacitors.</p>		

\*Italicized words represent additions to the 2010 Science Standards of Learning (SOL). In most cases the complete standard is not restated in this crosswalk. Comments are provided as a brief comparison between the 2010 and 2003 Science SOL.