

Kindergarten – Grade Three Science Progression Technical Assistance Document

The K-3 *Science Standards of Learning* set minimum expectations for what teachers must teach and students must learn. Teachers are encouraged to go beyond the standards and select instructional strategies and assessment methods that lead to a richer, more comprehensive study of concepts by second and third grades. The science standards are spiral in nature, with vertical alignment from kindergarten through secondary physics.

Beginning in 2012-2013, kindergarten and first-grade science standards will be measured in the context of the second- and third-grade standards. This has been largely the practice in previous state science assessments, with only a limited number of items on the k-3 assessment directly measuring content from kindergarten and first grade. The K-3 *Science Standards of Learning* test blueprint does not show standards from kindergarten and first grade. Rather, the content contained in these standards is considered foundational and thus required to develop a full understanding of the second- and third-grade standards. The absence of the kindergarten and first-grade standards from the blueprint, however, does not minimize the importance of the content in the learning sequence.

Kindergarten and first-grade classroom assessments can reveal very useful information about how students have met those initial standards. As the [2010 Science Standards of Learning](#) are implemented, along with the introduction of new assessments in 2012-2013 to measure these standards, it is important that science instruction continue to be a priority in the primary grades. In addition, a major revision to the [Standards of Accreditation](#), resulting from legislative changes made by the 2012 General Assembly, increased the third-grade science pass rate from 50 percent to 70 percent.

Therefore, to maintain and enhance science learning and achievement at this level, school divisions must ensure that:

- the rigor and integrity of the instructional sequence in the kindergarten through third-grade science curriculum is not weakened due to the change in an assessment practice;
- classroom time for science-specific and integrated instruction continues to be provided on a regular and sustained basis in kindergarten and first grades; and
- kindergarten and first-grade teachers continue to receive high-quality professional development to support their science instruction.

* Revised 2010 Science SOL Blueprint -

http://www.doe.virginia.gov/testing/sol/blueprints/science_blueprints/2010/2010_blueprint_science_3.pdf

** Standards of Accreditation - <http://www.doe.virginia.gov/boe/accreditation/index.shtml>

	G = Grade Level RC = Reporting Category			
	G-2 SOL	G-2 RC	G-3 SOL	G-3 RC

Kindergarten Standards of Learning

K.1 The student will demonstrate an understanding of scientific reasoning, logic, and the nature of science by planning and conducting investigations in which

a) basic characteristics or properties of objects are identified by direct observation;	2.1a	1	3.1a	1
	2.1b	1		
b) observations are made from multiple positions to achieve different perspectives;	2.1a	1	3.1a	1
c) a set of objects is sequenced according to size;	2.1d	1	3.1c	1
d) a set of objects is separated into two groups based on a single physical characteristic;	2.1d	1	3.1c	1
e) nonstandard units are used to measure the length, mass, and volume of common objects;	2.1e	1	3.1e	1
f) observations and predictions are made for an unseen member in a sequence of objects;	2.1a	1	3.1b	1
g) a question is developed and predictions are made from one or more observations;	2.1a	1	3.1a	1
			3.1b	1
h) observations are recorded;	2.1h	1	3.1h	1
i) picture graphs are constructed;	2.1h	1	3.1h	1
j) unusual or unexpected results in an activity are recognized; and	2.1i	1	3.1i	1
k) objects are described both pictorially and verbally.	2.1h	1	3.1k	1
	2.1k	1		

K.2 The student will investigate and understand that humans have senses that allow them to seek, find, take in, and react or respond to information in order to learn about their surroundings. Key concepts include

a) the five senses and corresponding sensing organs; and	2.1a	1	3.1a	1
	2.1b	1		
	2.1c	1		
b) sensory descriptors used to describe common objects and phenomena.	2.1a	1	3.1a	1
	2.1b	1		
	2.1c	1		

K.3 The student will investigate and understand that magnets have an effect on some materials, make some things move without touching them, and have useful applications. Key concepts include

a) magnetism and its effects; and	2.2a	2		
b) useful applications of magnetism.	2.2b	2		

K.4 The student will investigate and understand that the position, motion, and physical properties of an object can be described. Key concepts include				
a) colors of objects;	2.1a	1	3.1a	1
	2.1b	1		
	2.1c	1		
	2.3a	2		
b) shapes and forms of objects;	2.1a	1	3.1a	1
	2.1b	1		
	2.1c	1		
c) textures and feel of objects;	2.1a	1	3.1a	1
	2.1b	1		
	2.1c	1		
d) relative sizes and weights of objects; and	2.1d	1	3.1c	1
	2.1e	1	3.1e	1
	2.3b	2		
e) relative positions and speed of objects.			3.2a	2
			3.2b	2
			3.2c	2

K.5 The student will investigate and understand that water flows and has properties that can be observed and tested. Key concepts include				
a) water occurs in different phases;	2.3a	2	3.9a	4
	2.3b	2	3.9b	4
	2.3c	2	3.9c	4
			3.9d	4
			3.9e	4
b) water flows downhill; and	2.3a	2	3.9a	4
	2.3b	2	3.9b	4
	2.3c	2	3.9c	4
c) some materials float in water, while others sink.	2.3a	2	3.9a	4
	2.3b	2	3.9b	4
	2.3c	2	3.9c	4

K.6 The student will investigate and understand the differences between living organisms and nonliving objects. Key concepts include				
a) all things can be classified as living or nonliving; and	2.4a	3	3.6a	3
	2.4b	3	3.6b	3
	2.5a	3	3.6c	3
	2.5b	3		
	2.5c	3		
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.	2.4a	3	3.4a	3
	2.4b	3	3.4b	3
	2.5a	3	3.8b	4
	2.5b	3	3.8c	4
	2.5c	3		

K.7 The student will investigate and understand basic needs and life processes of plants and animals. Key concepts include				
a) animals need adequate food, water, shelter, air, and space to survive;	2.4a	3	3.6a	3
	2.5a	3	3.6b	3
	2.5b	3	3.6c	3
	2.5c	3	3.6d	3
b) plants need nutrients, water, air, light, and a place to grow to survive;	2.4b	3	3.6a	3
	2.5a	3	3.6b	3
	2.5b	3	3.6c	3
	2.5c	3	3.6d	3
c) plants and animals change as they grow, have varied life cycles, and eventually die; and	2.4a	3	3.4a	3
	2.4b	3	3.4b	3
	2.5a	3	3.8b	4
	2.5c	3	3.8c	4
d) offspring of plants and animals are similar but not identical to their parents or to one another.	2.4a	3	3.4b	3
	2.4b	3	3.8b	4
			3.8c	4

K.8 The student will investigate and understand that shadows occur when light is blocked by an object. Key concepts include				
a) shadows occur in nature when sunlight is blocked by an object; and	2.1g	1	3.8a	4
	2.11	1	3.11a	4
b) shadows can be produced by blocking artificial light sources.	2.1g	1		
	2.11	1		

K.9 The student will investigate and understand that there are simple repeating patterns in his/her daily life. Key concepts include				
a) weather observations;	2.6a	3	3.9a	4
	2.6b	3		
	2.6c	3		
b) the shapes and forms of many common natural objects including seeds, cones, and leaves; and	2.4a	3	3.1a	1
	2.4b	3	3.1c	1
	2.5d	3	3.4b	3
c) animal and plant growth.	2.4a	3	3.8a	4
	2.4b	3	3.8b	4
	2.5a	3	3.8c	4
	2.5b	3		
	2.7a	3		

K.10 The student will investigate and understand that change occurs over time and rates may be fast or slow. Key concepts include				
a) natural and human-made things may change over time; and	2.3c	3	3.1d	1
	2.5c	3	3.7b	4
	2.5d	3	3.10b	4
	2.7a	4	3.10c	4
	2.7b	4	3.10d	4
b) changes can be observed and measured.	2.1k	1	3.1d	1
	2.3c	3	3.10b	4
	2.5c	3	3.10c	4
	2.5d	3	3.10d	4
	2.7a	4		
	2.7b	4		

K.11 The student will investigate and understand that materials can be reused, recycled, and conserved. Key concepts include				
a) materials and objects can be used over and over again;			3.7d	4
			3.9a	4
			3.9b	4
			3.9c	4
			3.9d	4
			3.9e	4
			3.11a	4
			3.11b	4
b) everyday materials can be recycled; and	2.8b	3	3.11c	4
			3.9a	4
			3.9b	4
			3.9e	4
			3.11a	4
c) water and energy conservation at home and in school helps ensure resources are available for future use.	2.8b	3	3.11b	4
			3.11c	4
			3.6d	3
			3.9a	4
			3.9d	4
			3.9e	4
		3.11a	4	
		3.11b	4	
		3.11c	4	

		G = Grade Level RC = Reporting Category			
		G-2 SOL	G-2 RC	G-3 SOL	G-3 RC
Grade 1 Standards of Learning					
1.1 The student will demonstrate an understanding of scientific reasoning, logic, and the nature of science by planning and conducting investigations in which					
a) the senses are used to observe differences in physical properties;	2.1a	1	3.1a	1	
	2.1b	1	3.1c	1	
	2.1c	1			
b) observations are made from multiple positions to achieve a variety of perspectives and are repeated to ensure accuracy;	2.1a	1	3.1a	1	
	2.1b	1	3.1c	1	
	2.1c	1			
c) objects or events are classified and arranged according to characteristics or properties;	2.1d	1	3.1c	1	
	2.8a	3			
d) simple tools are used to enhance observations;	2.1e	1	3.1e	1	
	2.1f	1	3.1f	1	
e) length, mass, volume, and temperature are measured using nonstandard units;	2.1e	1	3.1e	1	
f) inferences are made and conclusions are drawn about familiar objects and events;	2.1g	1	3.1j	1	
	2.1j	1			
g) a question is developed from one or more observations;	2.1a	1	3.1g	1	
h) predictions are made based on patterns of observations;	2.1a	1	3.1b	1	
i) observations and data are recorded, analyzed, and communicated orally and with simple graphs, pictures, written statements, and numbers; and	2.1h	1	3.1h	1	
	2.1i	1	3.1k	1	
j) simple investigations and experiments are conducted to answer questions.	2.1	1	3.1	1	

1.2 The student will investigate and understand that moving objects exhibit different kinds of motion. Key concepts include				
a) objects may have straight, circular, and back-and-forth motions;			3.2a	1
b) objects may vibrate and produce sound; and			3.2b	2
c) pushes or pulls can change the movement of an object.	2.2a	2	3.2a	2
	2.2b	2	3.2b	2
			3.2c	2
			3.2d	2

1.3 The student will investigate and understand how different common materials interact with water. Key concepts include				
a) some liquids will separate when mixed with water, but others will not;	2.3a	2	3.9c	4
	2.3b	2	3.9d	4
	2.3c	2		
b) some solids will dissolve in water, but others will not; and	2.3a	2	3.9c	4
	2.3b	2	3.9d	4
	2.3c	2		
c) some substances will dissolve more readily in hot water than in cold water.	2.3a	2	3.9c	4
	2.3b	2	3.9d	4
	2.3c	2		

1.4 The student will investigate and understand that plants have basic life needs and functional parts and can be classified according to certain characteristics. Key concepts include				
a) plants need nutrients, air, water, light, and a place to grow;	2.4b	3	3.7a	4
	2.5a	3	3.8c	4
	2.8a	3	3.9d	4
	2.8b	3		
	2.8c	3		
	2.8d	3		
b) basic parts of plants; and	2.4b	3	3.8c	4
	2.8a	3		
c) plants can be classified based on a variety of characteristics.	2.1d	1	3.1c	1
	2.4b	3	3.8c	4
	2.5a	3		
	2.5c	3		
	2.8a	3		

1.5 The student will investigate and understand that animals, including humans, have basic needs and certain distinguishing characteristics. Key concepts include				
a) basic needs include adequate air, food, water, shelter, and space (habitat);	2.4a	3	3.5a	3
	2.5a	3	3.5b	3
	2.5b	3	3.5c	3
	2.5c	3		
	2.8c	3		
b) animals, including humans, have many different physical characteristics; and	2.4a	3	3.4a	3
	2.5a	3	3.4b	3
c) animals can be classified according to a variety of characteristics.	2.1d	1	3.1c	1
	2.4a	3	3.4a	3
	2.5a	3	3.4b	3
	2.5c	3		

1.6 The student will investigate and understand the basic relationships between the sun and Earth. Key concepts include				
a) the sun is the source of energy and light that warms the land, air, and water; and			3.8a	4
			3.9b	4
			3.11a	4
b) the sun's relative position in the morning is east and in the late afternoon is west.			3.8a	4
			3.9b	4
			3.11a	4

1.7 The student will investigate and understand weather and seasonal changes. Key concepts include				
a) changes in temperature, light, and precipitation affect plants and animals, including humans;			2.7a	4
			2.7b	4
b) there are relationships between daily and seasonal changes; and			2.5a	3
			2.5c	3
			2.7a	3
c) changes in temperature, light, and precipitation can be observed and recorded over time.			2.1a	1
			2.1b	1
			2.1c	1
			2.1e	1
			2.1h	1
			2.6a	4
			2.6b	4
			2.6c	4
			2.7a	4
			2.7b	4

1.8 The student will investigate and understand that natural resources are limited. Key concepts include				
a) identification of natural resources;			3.7b	4
			3.7d	4
			3.9a	4
			3.11b	4
b) factors that affect air and water quality; and			3.10b	4
c) recycling, reusing, and reducing consumption of natural resources.	2.8b	3	3.7d	4
			3.9e	4
			3.10d	4
			3.11b	4
			3.11c	4