

# **Virginia**

Standards of Learning Assessments

**Test Blueprint**

## **Grade 3 Science**

**2010 Science  
Standards of Learning**

**This revised test blueprint will be effective with the administration of the 2012-2013 Science Standards of Learning (SOL) tests.**

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# Grade 3 Science Standards of Learning

## Test Blueprint

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## General Test Information

### Test Blueprint

Much like the blueprint for a building, a test blueprint serves as a guide for test construction. The blueprint indicates the content areas that will be addressed by the test and the number of items that will be included by content area and for the test as a whole. There is a blueprint for each test (e.g., grade 3 reading, grade 5 mathematics, grade 8 science, Virginia and United States History).

### Reporting Categories

Each test covers a number of Standards of Learning (SOL). In the test blueprint, the SOL are grouped into categories that address related content and skills. These categories are labeled as reporting categories (RC). For example, a reporting category for the Grade 3 Science Standards of Learning test is *Force, Motion, Energy, and Matter*. Each of the SOL in this reporting category addresses a skill involved in investigating or understanding the concepts of force, motion, energy, or matter. When the results of the SOL tests are reported, the scores will be presented for each reporting category and as a total test score.

### Assignment of Standards of Learning to Reporting Category

Different parts of a Standard of Learning may be assigned to different reporting categories. For example, Grade 2 Science SOL 2.7a, which covers the effects of weather and seasonal changes, is assigned to the reporting category *Life Processes and Living Systems* in the Grade 3 Science SOL test. However, 2.7b, which involves the weathering and erosion of land surfaces, is assigned to the reporting category *Earth/Space Systems and Cycles*.

### Standards of Learning Excluded from Testing

In some content areas, there are SOL that do not lend themselves to assessment within the current format of the SOL tests. The SOL not tested are listed as “Excluded from Testing” at the end of the blueprint for each test. In Grade 3 Science there are no SOL that are excluded within the current format of the SOL tests.

### Coverage of Standards of Learning

Due to the large number of SOL in each grade level content area, *every* Standard of Learning will not be assessed on every version (form) of an SOL test. By necessity, to keep the length of a test reasonable, each version will sample from the SOL within a reporting category. All SOL in the blueprint will be tested within a three year period, and *all of these* SOL are eligible for inclusion on each version of an SOL test.

### Use of the Curriculum Framework

The Grade 3 Science Standards of Learning, amplified by the Curriculum Framework, define the essential understandings, knowledge, and skills that are measured by the Standards of Learning tests. The Curriculum Framework enhances understanding of the SOL, defines essential content knowledge, and describes essential skills and processes students need to master.

## Grade 3 Science Test Blueprint Summary Table

Reporting Category	Grade 2 Standards of Learning	Grade 3 Standards of Learning	Number of Items
Assessed with other SOL	2.1m	3.1m	
Scientific Investigation, Reasoning, and Logic	2.1a-l	3.1a-l	10
Force, Motion, Energy, and Matter	2.2a-b 2.3a-c	3.2a-d 3.3a-c	8
Life Processes and Living Systems	2.4a-b 2.5a-d 2.7a 2.8a-d	3.4a-b 3.5a-c 3.6a-d 3.10a	11
Earth/Space Systems and Cycles	2.6a-c 2.7b	3.7a-d 3.8a-c 3.9a-e 3.10b-d 3.11a-c	11
Excluded from Testing	None		
Subsumed Content *	Content in Kindergarten and Grade 1 SOL		
<b>Number of Operational Items</b>			<b>40</b>
<b>Number of Field Test Items**</b>			<b>10</b>
<b>Total Number of Items on Test</b>			<b>50</b>

\* The Virginia science SOL are spiral in nature and are vertically aligned from kindergarten through Physics. Because science content and processes taught in kindergarten and first grade lay the foundation needed for ongoing science education in grades 2, 3, and beyond, the science content for kindergarten and grade 1 is subsumed in the grade 3 science SOL test.

\*\*Field test items are being tried out with students for potential use on subsequent tests and will not be used to compute students' scores on the test.

## **Grade 3 Science Expanded Test Blueprint**

### **Assessed with Other Science Standards of Learning**

The following skill-based standards will be assessed through the reporting categories by applying them to other Standards of Learning content:

#### Grade 2 Standards of Learning

- 2.1 The student will demonstrate an understanding of scientific reasoning, logic, and the nature of science by planning and conducting investigations in which
- m) current applications are used to reinforce science concepts.

#### Grade 3 Standards of Learning

- 3.1 The student will demonstrate an understanding of scientific reasoning, logic, and the nature of science by planning and conducting investigations in which
- m) current applications are used to reinforce science concepts.

### **Reporting Category: Scientific Investigation, Reasoning, and Logic**

**Number of Items: 10**

#### **Standards of Learning:**

#### Grade 2 Standards of Learning

- 2.1 The student will demonstrate an understanding of scientific reasoning, logic, and the nature of science by planning and conducting investigations in which
- a) observations and predictions are made and questions are formed;
  - b) observations are differentiated from personal interpretation;
  - c) observations are repeated to ensure accuracy;
  - d) two or more characteristics or properties are used to classify items;
  - e) length, volume, mass, and temperature are measured in metric units and standard English units using the proper tools;
  - f) time is measured using the proper tools;
  - g) conditions that influence a change are identified and inferences are made;
  - h) data are collected and recorded, and bar graphs are constructed using numbered axes;
  - i) data are analyzed, and unexpected or unusual quantitative data are recognized;
  - j) conclusions are drawn;
  - k) observations and data are communicated; and
  - l) simple physical models are designed and constructed to clarify explanations and show relationships.

### Grade 3 Standards of Learning

- 3.1 The student will demonstrate an understanding of scientific reasoning, logic, and the nature of science by planning and conducting investigations in which
- observations are made and are repeated to ensure accuracy;
  - predictions are formulated using a variety of sources of information;
  - objects with similar characteristics or properties are classified into at least two sets and two subsets;
  - natural events are sequenced chronologically;
  - length, volume, mass, and temperature are estimated and measured in metric and standard English units using proper tools and techniques;
  - time is measured to the nearest minute using proper tools and techniques;
  - questions are developed to formulate hypotheses;
  - data are gathered, charted, graphed, and analyzed;
  - unexpected or unusual quantitative data are recognized;
  - inferences are made and conclusions are drawn;
  - data are communicated; and
  - models are designed and built.

#### **Reporting Category: Force, Motion, Energy, and Matter**

**Number of Items: 8**

#### **Standards of Learning:**

### Grade 2 Standards of Learning

- 2.2 The student will investigate and understand that natural and artificial magnets have certain characteristics and attract specific types of metals. Key concepts include
- magnetism, iron, magnetic/nonmagnetic, poles, attract/repel; and
  - important applications of magnetism.
- 2.3 The student will investigate and understand basic properties of solids, liquids, and gases. Key concepts include
- identification of distinguishing characteristics of solids, liquids, and gases;
  - measurement of the mass and volume of solids and liquids; and
  - changes in phases of matter with the addition or removal of energy.

### Grade 3 Standards of Learning

- 3.2 The student will investigate and understand simple machines and their uses. Key concepts include
- purpose and function of simple machines;
  - types of simple machines;
  - compound machines; and

- d) examples of simple and compound machines found in the school, home, and work environments.
- 3.3 The student will investigate and understand that objects are made of materials that can be described by their physical properties. Key concepts include
- objects are made of one or more materials;
  - physical properties remain the same as the material is changed in visible size; and
  - visible physical changes are identified.

### **Reporting Category: Life Processes and Living Systems**

**Number of Items: 11**

#### **Standards of Learning:**

#### Grade 2 Standards of Learning

- 2.4 The student will investigate and understand that plants and animals undergo a series of orderly changes as they mature and grow. Key concepts include
- animal life cycles; and
  - plant life cycles.
- 2.5 The student will investigate and understand that living things are part of a system. Key concepts include
- living organisms are interdependent with their living and nonliving surroundings;
  - an animal's habitat includes adequate food, water, shelter or cover, and space;
  - habitats change over time due to many influences; and
  - fossils provide information about living systems that were on Earth years ago.
- 2.7 The student will investigate and understand that weather and seasonal changes affect plants, animals, and their surroundings. Key concepts include
- effects of weather and seasonal changes on the growth and behavior of living things.
- 2.8 The student will investigate and understand that plants produce oxygen and food, are a source of useful products, and provide benefits in nature. Key concepts include
- important plant products are identified and classified;
  - the availability of plant products affects the development of a geographic area;
  - plants provide oxygen, homes, and food for many animals; and
  - plants can help reduce erosion.

#### Grade 3 Standards of Learning

- 3.4 The student will investigate and understand that adaptations allow animals to satisfy life needs and respond to the environment. Key concepts include
- behavioral adaptations; and
  - physical adaptations.

- 3.5 The student will investigate and understand relationships among organisms in aquatic and terrestrial food chains. Key concepts include
- producer, consumer, decomposer;
  - herbivore, carnivore, omnivore; and
  - predator and prey.
- 3.6 The student will investigate and understand that ecosystems support a diversity of plants and animals that share limited resources. Key concepts include
- aquatic ecosystems;
  - terrestrial ecosystems;
  - populations and communities; and
  - the human role in conserving limited resources.
- 3.10 The student will investigate and understand that natural events and human influences can affect the survival of species. Key concepts include
- the interdependency of plants and animals.

**Reporting Category: Earth/Space Systems and Cycles****Number of Items: 11****Standards of Learning:**Grade 2 Standards of Learning

- 2.6 The student will investigate and understand basic types, changes, and patterns of weather. Key concepts include
- identification of common storms and other weather phenomena;
  - the uses and importance of measuring, recording, and interpreting weather data; and
  - the uses and importance of tracking weather data over time.
- 2.7 The student will investigate and understand that weather and seasonal changes affect plants, animals, and their surroundings. Key concepts include
- weathering and erosion of land surfaces.

Grade 3 Standards of Learning

- 3.7 The student will investigate and understand the major components of soil, its origin, and its importance to plants and animals including humans. Key concepts include
- soil provides the support and nutrients necessary for plant growth;
  - topsoil is a natural product of subsoil and bedrock;
  - rock, clay, silt, sand, and humus are components of soils; and
  - soil is a natural resource and should be conserved.

- 3.8 The student will investigate and understand basic patterns and cycles occurring in nature. Key concepts include
- patterns of natural events such as day and night, seasonal changes, simple phases of the moon, and tides;
  - animal life cycles; and
  - plant life cycles.
- 3.9 The student will investigate and understand the water cycle and its relationship to life on Earth. Key concepts include
- there are many sources of water on Earth;
  - the energy from the sun drives the water cycle;
  - the water cycle involves several processes;
  - water is essential for living things; and
  - water on Earth is limited and needs to be conserved.
- 3.10 The student will investigate and understand that natural events and human influences can affect the survival of species. Key concepts include
- the effects of human activity on the quality of air, water, and habitat;
  - the effects of fire, flood, disease, and erosion on organisms; and
  - conservation and resource renewal.
- 3.11 The student will investigate and understand different sources of energy. Key concepts include
- energy from the sun;
  - sources of renewable energy; and
  - sources of nonrenewable energy.