



**CRCT Content Descriptions
based on the Georgia Performance Standards**

**Science
Grades 3 - 8**



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Criterion-Referenced Competency Tests (CRCT)
Content Descriptions
Science

Georgia law requires the development and administration of the CRCT in the content areas of Reading, English/Language Arts, Mathematics, Science, and Social Studies. Each spring students in grades 1 through 8 take the Reading, English/Language Arts, and Mathematics CRCT, while students in grades 3 through 8 also take the Science and Social Studies CRCT. These tests are designed to measure student achievement of the Georgia Performance Standards (GPS).

Program Purpose

The CRCT is designed to measure student acquisition and understanding of the knowledge, concepts, and skills set forth in the GPS. The testing program serves as a measure of the quality of education in the state. Reports yielding information on academic achievement at the student, class, school, system, and state levels are produced annually.

Mandated Grades for Science

Grades 3 through 8 are mandated to participate in the Science CRCT each spring.

CRCT Content Descriptions

The CRCT Content Descriptions are provided to acquaint Georgia educators with the content coverage of the CRCT. Only the knowledge, concepts, and skills reflected in the GPS will be assessed on the CRCT. Committees of Georgia educators reviewed the curriculum and provided guidance for the assessment program.

It is important to note that some curricular standards are better suited for classroom or individual assessment rather than large-scale, paper-pencil assessment. While those curricular standards designed for classroom/individual assessment are not included in the Content Descriptions, the knowledge, concepts, and skills outlined are often required for the mastery of the standards that are assessed. Therefore, the CRCT Content Descriptions are in *no way* intended to substitute for the GPS; they are provided to help educators better understand how the curriculum will be assessed. Further, the CRCT Content Descriptions, *by no means*, suggest *when* concepts and skills should be introduced in the instructional sequence; rather, its purpose is to communicate when concepts and skills will be assessed on the CRCT. Georgia law requires educators to teach the standards set forth in the state-adopted curriculum (i.e., the GPS). The GPS is located at <http://www.georgiastandards.org>.

Science Content Domains

To provide reliable measures as well as structure to the assessment program, the curricular standards provided in the GPS were grouped into content domains. Each domain is comprised of standards with similar content characteristics. The domains for Science are:

Grade 3–5

Earth Science

Physical Science

Life Science

Grade 6: Earth Science

Astronomy

Hydrology and Meteorology

Geology

Grade 7: Life Science

Cells and Genetics

Interdependence of Life

Evolution

Grade 8: Physical Science

Structure of Matter

Force and Motion

Energy and its Transformations

The GPS in science requires that content be taught in conjunction with process skills identified as the Characteristics of Science. Characteristics of Science refers to the process skills used in the learning and practice of science, such as testing a hypothesis, record keeping, using correct safety procedures, using appropriate tools and instruments, applying math and technology, analyzing data, interpreting results, and communicating scientific information. It also refers to understanding how science knowledge grows and changes and the processes that drive those changes. The concepts and skills inherent in Characteristics of Science are integrated in items across the three content domains.

Using the Science CRCT Content Descriptions

The Science CRCT Content Descriptions provide information about the content and skills assessed by the CRCT. The documents are organized by grade and content domain. The curriculum standards assessed in each domain are provided as are the related concepts, skills, and abilities assessed. It is important to note the differences between the GPS and the former curriculum. The GPS is a conceptual curriculum, requiring instruction be integrated; the concepts, knowledge, skills, and abilities described in this document should not be viewed as discrete or taught in isolation. Deep understanding by students, resulting in higher achievement, is best achieved when the full curriculum is taught in an integrated, conceptual fashion.

Science

Grade: 4

Domain: Earth Science

Domain Description

Earth Science refers to comparing and contrasting stars, constellations, and planets, identifying the technology used to observe them, and explaining how the motions of Earth, the Moon, and the Sun cause the day/night cycle, the phases of the Moon, and the seasons. This domain also refers to describing how the states of water are related to the water cycle and weather and using tools to measure and predict weather conditions.

Standards Associated with Domain

S4E1

S4E2

S4E3

S4E4

Associated Concepts, Skills, and Abilities

- Recognize the physical attributes of stars in the night sky such as number, size, color, and patterns
- Compare and contrast planets and stars in characteristics, such as:
 - appearance
 - position
 - number in the night sky
- Explain why the pattern of stars in a constellation stays the same, but a planet can be seen in different locations at different times
- Identify how technology is used to observe distant objects in the sky
- Explain the day/night cycle of Earth using a model
- Explain the sequence of the phases of the Moon
- Describe the revolution of Earth around the Sun and Earth's tilt to explain the seasonal changes
- Describe the relative size and order from the Sun of the planets in our Solar System
- Demonstrate how water changes states, such as:
 - solid to liquid
 - liquid to gas
 - gas to liquid
 - liquid to solid
- Identify the temperatures at which water becomes a solid and at which water becomes a gas
- Explain how clouds are formed
- Differentiate between evaporation, condensation, and precipitation in the water cycle
- Demonstrate understanding of different forms of precipitation and sky conditions, such as:
 - rain
 - snow
 - sleet
 - hail
 - clouds
 - fog

- Identify and explain how to gather weather data by using weather instruments, such as:
 - thermometer
 - rain gauge
 - barometer
 - wind vane
 - anemometer
- Analyze data gathered through the use of weather instruments to formulate weather forecasts
- Use a weather map to identify weather data, such as:
 - fronts
 - temperature
 - precipitation
- Interpret weather conditions using the information gathered in a weather map
- Predict weather patterns throughout the year using observations and records of weather conditions
- Distinguish between weather and climate

Science

Grade: 4

Domain: Physical Science

Domain Description

Physical Science refers to describing how tools affect light, and explaining how sound is produced and changed. This domain also refers to explaining how simple machines are used, and describing the relationship between force and motion.

Standards Associated with Domain

S4P1

S4P2

S4P3

Associated Concepts, Skills, and Abilities

- Determine the nature of light to classify materials, such as:
 - transparent
 - opaque
 - translucent
- Explain the reflection of light using a mirror and a light source
- Distinguish between a convex lens, a concave lens, and a prism by:
 - identifying physical properties
 - explaining where each is used
- Investigate how sound is produced
- Recognize the conditions that cause pitch to vary
- Identify and explain the use of simple machines, such as:
 - levers
 - pulleys
 - wedges
 - inclined planes
 - screws
 - wheels and axles
- Observe how force affects the speed and motion of different-size objects
- Explain what happens to the speed or direction of an object when a greater force than the initial one is applied
- Determine the effect of gravitational force on the motion of an object

Science

Grade: 4

Domain: Life Science

Domain Description

Life Science refers to differentiating between the roles of organisms, describing the flow of energy in an ecosystem, and predicting how changes to part of the system affect the other parts. This domain also refers to identifying features that affect the survival of organisms or factors that may cause the extinction of organisms.

Standards Associated with Domain

S4L1

S4L2

Associated Concepts, Skills, and Abilities

- Distinguish between the roles of organisms in a community, such as:
 - producers
 - consumers
 - decomposers
- Describe the flow of energy through a food web or chain beginning with sunlight and including producers, consumers, and decomposers
- Predict how changes in the environment would affect a community (ecosystem) of organisms
- Predict effects on a population if some of the plants or animals in the community are either scarce or overabundant
- Identify the external features of organisms that allow them to survive or reproduce better than organisms that do not have these features, some examples may include:
 - camouflage
 - use of hibernation
 - protection
- Identify factors that may have led to the extinction of some organisms

Science

Grade: 4

Characteristics of Science

Characteristics of Science items are integrated across the three content domains.

Characteristics of Science refers to understanding the process skills used in the learning and practice of science. These skills include testing a hypothesis, record keeping, using correct safety procedures, using appropriate tools and instruments, applying math and technology, analyzing data, interpreting results, and communicating scientific information. Characteristics of Science also refers to understanding how science knowledge grows and changes and the processes that drive those changes.

Standards Associated with Characteristics of Science

S4CS1	S4CS2	S4CS3	S4CS4
S4CS5	S4CS6	S4CS7	S4CS8

Associated Concepts, Skills, and Abilities

- Demonstrate understanding that records of investigations and observations should not be altered
- Distinguish observations from ideas and speculation about those observations
- Offer reasons for findings and consider reasons suggested by others
- Add, subtract, multiply, and divide whole numbers through different means, such as:
 - mentally
 - on paper
 - with a calculator
- Compute scientific calculations using commonly encountered fractions, such as:
 - halves
 - thirds
 - fourths
 - fifths
 - tenths
 - hundredths
- Evaluate measurements and computations of quantities and decide if they are reasonable answers to scientific problems by comparing them to typical values in dimensions, such as:
 - length
 - area
 - volume
 - weight
 - time
- Determine appropriate common materials for making simple mechanical constructions and repairing things
- Explain how to measure and mix dry and liquid materials in prescribed amounts while exercising reasonable safety precautions
- Explain when to use computers, cameras, and recording devices for capturing information

- Implement accepted safety procedures while manipulating science materials and equipment

- Observe and describe how parts influence one another in things with many parts
- Represent features of objects, events, and processes in the real world by constructing representations, such as:
 - geometric figures
 - number sequences
 - graphs
 - diagrams
 - sketches
 - number lines
 - maps
 - stories
- Describe patterns of change—such as steady, repetitive, or irregular change—using appropriate forms, such as:
 - records
 - tables
 - graphs of measurements
- Construct instructions that others can follow in carrying out a scientific procedure
- Evaluate sketches used to aid in explaining scientific procedures or ideas
- Use numerical data to describe and compare objects and events, and to explore scientific or technological matters
- Evaluate sources of scientific information, such as:
 - reference books
 - back issues of newspapers and magazines
 - CD-ROMs
 - computer databases
- Recognize when comparisons might not be fair because some conditions are different
- Explain that similar scientific investigations seldom produce exactly the same results due to circumstances, such as:
 - unexpected differences in what is being investigated
 - unrecognized differences in the methods or circumstances of the investigation
 - observational uncertainties
- Demonstrate understanding that although some scientific knowledge is very old, it is still applicable today
- Determine that scientific investigations may take many different forms, such as:
 - surveying what things are like
 - observing what is happening
 - collecting specimens for analysis
 - doing experiments
- Justify the reasons why clear and active communication is an essential part of doing science, such as:
 - enabling scientists to inform others about their work
 - allowing scientists to expose their ideas to criticism by other scientists
 - helping scientists stay informed about scientific discoveries around the world

- Describe ways scientists use technology to increase their acuity in such activities as:
 - observing
 - measuring
 - comparing
- Demonstrate understanding that science involves many different kinds of work and engages men and women of all ages and backgrounds