



2017–2018 North Carolina Final Exams of Science

Grades 6 and 7 North Carolina Assessment Specifications

Purpose of the Assessments

- The North Carolina Final Exams (NCFEs) of Science Grades 6 and 7 measure students' academic progress in the [NC Essential Standards](#), adopted by the North Carolina State Board of Education in [February 2010](#).
- NCFEs are considered standardized artifacts reflective of student growth for teachers and school growth for participants in the teacher evaluation process.
- [North Carolina State Board of Education](#) policy Test- 016 directs schools to use the results from all course-specific NCFEs as a minimum of 20% of the student's final grade for the course.
- NCFEs are not used for school and district accountability under the READY Accountability Model or for Federal reporting purposes.

Developing Assessments

North Carolina educators are recruited and trained to write new items for the NCFEs. The diversity among the item writers and their knowledge of the current standards are addressed during recruitment. Trained North Carolina educators also review items and suggest improvements, if necessary. The use of North Carolina educators to develop and review items strengthens the instructional validity of the items. Teachers interested in training to become an item writer or reviewer for the North Carolina Testing Program can visit <https://center.ncsu.edu/ncpd/course/view.php?id=128>.

For an in-depth explanation of the test development process see [State Board policy TEST-013](#) or reference the [Test Development Process: Item, Selection and Form Development \(updated May 2016\)](#).

Curriculum and Assessment Cycle

- 2010: North Carolina State Board of Education adoption of the [NC Essential Standards](#).
- 2012–13: Operational administration of the Measures of Student Learning: Common Exams.
- 2013–14: Redesign and subsequent first operational administration of the NCFEs.
- 2014–15: Second operational administration of the NCFEs.
- 2015–16: Third operational administration of the NCFEs.
- 2016–17: Fourth operational administration of the NCFEs.
- 2017–18: Fifth operational administration of the NCFEs.

Prioritization of Standards

- Members of the Test Development Section of the North Carolina Department of Public Instruction (NCDPI) invited teachers to collaborate and develop recommendations for a prioritization of the standards indicating the relative importance of each standard, the anticipated instructional time, and the appropriateness of the standard for multiple-choice item formats.
- Tables 1 and 2 describe the range of total items that will appear on the NCFEs of Science Grades 6 and 7.

Table 1. *Test Specification Weights for the Science Grade 6 NCFE*

<u>NC Essential Standards</u>	<u>Range of Total Items</u>
Physical Science	
6.P.1	13% to 17%
6.P.2	16 % to 22%
6.P.3	7% to 11%
Earth Science	
6.E.1	9% to 14%
6.E.2	16 % to 20%
Life Science	
6.L.1	2% to 8%
6.L.2	10% to 16%
Total	100%

Table 2. *Test Specification Weights for the Science Grade 7 NCFE*

<u>NC Essential Standards</u>	<u>Range of Total Items</u>
Physical Science	
7.P.1	13% to 17%
7.P.2	18% to 24%
Earth Science	
7.E.1	20% to 28%
Life Science	
7.L.1	16% to 22%
7.L.2	8% to 14%
Total	100%

Cognitive Rigor

- NCFEs elementary and middle grade science items were aligned to the [North Carolina Essential Standards](#) using the Revised Bloom’s Taxonomy (RBT).

Types of Items and Supplemental Materials

- All grade 6 and grade 7 science NCFEs contain four-response-option, multiple-choice items.
- A complete list of the supplemental test materials (i.e., *NC Final Exams Materials List*) may be reviewed at the [NCDPI/Accountability Services](#) website.
- Released items are available on the [NCDPI/Accountability Services](#) website. Released items may be used by school systems to help acquaint students with items. The released items may not reflect the breadth of the standards assessed and/or the range of item difficulty found on the NCFE. These materials must not be used for personal or financial gain. The released items are also available to schools through NCTest, the NCDPI’s online assessment platform.
- Schools must ensure every student participating in an online assessment for the North Carolina Testing Program completed the Online Assessment Tutorial for the associated assessment at least one time per year at the school before test day. The tutorial provides students the opportunity to practice the mechanics of navigating through the testing platform, to become familiar with the tools, and to respond to the sample items.

Testing Structure and Test Administration Time

- The NCFEs of Science Grades 6 and 7 contain a total of 40 multiple-choice items.
- Included in the total item counts are embedded multiple-choice field test items that will not count toward or against a student’s score. These items are indistinguishable from operational items and should not interfere with the student’s test-taking experience. These items are examined for inclusion on future operational assessments.

NC Final Exam 2017–18	Number of Operational Items	Number of Field Test Items*	Total Number of Items
Grade 6 Science	35 multiple-choice	5 multiple-choice	40
Grade 7 Science	35 multiple-choice	5 multiple-choice	40

*Field test items will not count toward or against the student’s score.

- Students will be given 120 minutes to answer all items.
- Appendices A and B show the number of operational test items for each clarifying objective for the 2017–18 exams. Note that future coverage of objectives could vary within the constraints of the content category weights in Tables 1 and 2.

Test Cycle and Delivery Mode

- The NCFEs are administered to students enrolled in fall and spring courses. A list of course codes that align with the 2017–18 NCFEs (i.e., *Course Codes that Align with the NC Final Exams*) is available on the [NCDPI/Accountability Services](#) website.
- The NCFEs are administered through NCTest, the NCDPI’s online assessment platform. Paper editions are also available.
- The NCFEs are only provided in English. Native language translation versions are not available.

Appendix A
North Carolina Final Exam of Science Grade 6
2017–18 Number of Operational Items by Clarifying
Objectives

The following table shows the number of operational (scored) test items for each clarifying objective. Note that future coverage of objectives could vary within the constraints of the test specification weights in Tables 1–2. Some objectives not designated with tested items (i.e., “–”) may be a prerequisite objective, may be tested within the context of another objective, or may be included as an embedded field test item.

<u>Grade 6 Science</u> <u>Clarifying Objectives</u>	Number of Operational Items by Objective
Forces and Motion	
6.P.1.1—Compare the properties of waves to the wavelike property of energy in earthquakes, light and sound.	2
6.P.1.2—Explain the relationship among visible light, the electromagnetic spectrum, and sight.	2
6.P.1.3—Explain the relationship among the rate of vibration, the medium through which vibrations travel, sound and hearing.	2
Matter: Properties and Change	
6.P.2.1—Recognize that all matter is made up of atoms and atoms of the same element are all alike, but are different from the atoms of other elements.	2
6.P.2.2—Explain the effect of heat on the motion of atoms through a description of what happens to particles during a change in phase.	2
6.P.2.3—Compare the physical properties of pure substances that are independent of the amount of matter present including density, melting point, boiling point, and solubility to properties that are dependent on the amount of matter present to include volume, mass and weight.	3
Energy: Conservation and Transfer	
6.P.3.1—Illustrate the transfer of heat energy from warmer objects to cooler ones using examples of conduction, radiation and convection and the effects that may result.	1
6.P.3.2—Explain the effects of electromagnetic waves on various materials to include absorption, scattering, and change in temperature.	1
6.P.3.3—Explain the suitability of materials for use in technological design based on a response to heat (to include conduction, expansion, and contraction) and electrical energy (conductors and insulators).	1
Earth in the Universe	
6.E.1.1—Explain how the relative motion and relative position of the sun, Earth and moon affect the seasons, tides, phases of the moon, and eclipses.	2

6.E.1.2—Explain why Earth sustains life while other planets do not based on their properties (including types of surface, atmosphere and gravitational force) and location to the Sun.	1
6.E.1.3—Summarize space exploration and the understandings gained from them.	1
Earth Systems, Structures and Processes	
6.E.2.1—Summarize the structure of the earth, including the layers, the mantle and core based on the relative position, composition and density.	3
6.E.2.2—Explain how crustal plates and ocean basins are formed, move and interact using earthquakes, heat flow and volcanoes to reflect forces within the earth.	2
6.E.2.3—Explain how the formation of soil is related to the parent rock type and the environment in which it develops.	2
6.E.2.4—Conclude that the good health of humans requires: monitoring the lithosphere, maintaining soil quality and stewardship.	–
Structures and Functions of Living Organisms	
6.L.1.1—Summarize the basic structures and functions of flowering plants required for survival, reproduction and defense.	2
6.L.1.2—Explain the significance of the processes of photosynthesis, respiration, and transpiration to the survival of green plants and other organisms.	1
Ecosystems	
6.L.2.1—Summarize how energy derived from the sun is used by plants to produce sugars (photosynthesis) and is transferred within food chains and food webs (terrestrial and aquatic) from producers to consumers to decomposers.	2
6.L.2.2—Explain how plants respond to external stimuli (including dormancy and forms of tropism) to enhance survival in an environment.	1
6.L.2.3—Summarize how the abiotic factors (such as temperature, water, sunlight, and soil quality) of biomes (freshwater, marine, forest, grasslands, desert, Tundra) affect the ability of organisms to grow, survive and/or create their own food through photosynthesis.	2

Appendix B
North Carolina Final Exam of Science Grade 7
2017–18 Number of Operational Items by Clarifying
Objectives

The following table shows the number of operational (scored) test items for each clarifying objective. Note that future coverage of objectives could vary within the constraints of the test specification weights in Tables 1–2. Some objectives not designated with tested items (i.e., “–”) may be a prerequisite objective, may be tested within the context of another objective, or may be included as an embedded field test item.

<u>Grade 7 Science</u> <u>Clarifying Objectives</u>	Number of Operational Items by Objective
Forces and Motion	
7.P.1.1—Explain how the motion of an object can be described by its position, direction of motion, and speed with respect to some other object.	2
7.P.1.2—Explain the effects of balanced and unbalanced forces acting on an object (including friction, gravity and magnets).	2
7.P.1.3—Illustrate the motion of an object using a graph to show a change in position over a period of time.	1
7.P.1.4—Interpret distance versus time graphs for constant speed and variable motion.	1
Energy: Conservation and Transfer	
7.P.2.1—Explain how kinetic and potential energy contribute to the mechanical energy of an object.	3
7.P.2.2—Explain how energy can be transformed from one form to another (specifically potential energy and kinetic energy) using a model or diagram of a moving object (roller coaster, pendulum, or cars on ramps as examples).	2
7.P.2.3—Recognize that energy can be transferred from one system to another when two objects push or pull on each other over a distance (work) and electrical circuits require a complete loop through which an electrical current can pass.	2
7.P.2.4—Explain how simple machines such as inclined planes, pulleys, levers and wheel and axles are used to create mechanical advantage and increase efficiency.	1
Earth Systems, Structures and Processes	
7.E.1.1—Compare the composition, properties and structure of Earth’s atmosphere to include: mixtures of gases and differences in temperature and pressure within layers.	3
7.E.1.2—Explain how the cycling of water in and out of the atmosphere and atmospheric conditions relate to the weather patterns on Earth.	3

7.E.1.3—Explain the relationship between the movement of air masses, high and low-pressure systems, and frontal boundaries to storms (including thunderstorms, hurricanes, and tornadoes) and other weather conditions that may result.	—
7.E.1.4—Predict weather conditions and patterns based on information obtained from: • Weather data collected from direct observations and measurement (wind speed and direction, air temperature, humidity and air pressure) • Weather maps, satellites and radar • Cloud shapes and types and associated elevation	1
7.E.1.5—Explain the influence of convection, global winds and the jet stream on weather and climatic conditions.	1
7.E.1.6—Conclude that the good health of humans requires: monitoring the atmosphere, maintaining air quality and stewardship.	1
Structures and Functions of Living Organisms	
7.L.1.1—Compare the structures and life functions of single-celled organisms that carry out all of the basic functions of life including: • Euglena • Amoeba • Paramecium • Volvox	2
7.L.1.2—Compare the structures and functions of plant and animal cells, including major organelles (cell membrane, cell wall, nucleus, chloroplasts, mitochondria, and vacuoles).	1
7.L.1.3—Summarize the hierarchical organization of multi-cellular organisms from cells to tissues to organs to systems to organisms.	1
7.L.1.4—Summarize the general functions of the major systems of the human body (digestion, respiration, reproduction, circulation, and excretion) and ways that these systems interact with each other to sustain life.	3
Evolution and Genetics	
7.L.2.1—Explain why offspring that result from sexual reproduction (fertilization and meiosis) have greater variation than offspring that result from asexual reproduction (budding and mitosis).	1
7.L.2.2—Infer patterns of heredity using information from Punnett squares and pedigree analysis.	3
7.L.2.3—Explain the impact of the environment and lifestyle choices on biological inheritance (to include common genetic diseases) and survival.	1