



North Carolina *Essential Standards* for Science
End-of-Grade Grades 5 and 8 Science Assessments
End-of-Course Biology Assessment
North Carolina Assessment Specifications

Purpose of the Assessments

- The End-of-Grade (EOG) Assessments of Science Grades 5 and 8 and the End-of-Course (EOC) Biology assessments will measure students' proficiency on the [*Essential Standards for Science*](#), adopted by the North Carolina State Board of Education in [February 2010](#).
- NC State Board of Education Policy [Requirements Regarding End-of-Course Assessments](#) (TEST-003) directs schools to use the results from all operational EOC assessments as at least twenty percent (20%) of the student's final course grade.
- Assessment results will be used for school and district accountability under the READY Accountability Model and for federal reporting purposes.

Curriculum Cycle

- 2010: North Carolina State Board of Education adoption of the *Essential Standards* for Science
- 2010-2011: Item development for the Next Generation of Assessments, Edition 4
- 2011-2012: Administration of stand-alone field tests of Edition 4 assessments
- 2012-2013: Operational administration of Edition 4 aligned to the *Essential Standards* for Science

Developing Assessments

- North Carolina educators were recruited and trained to write new items. The diversity among the item writers and their knowledge of the current standards was 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.
- For an in-depth explanation of the test development process see State Board Policy [Multiple-Choice Test Development \(TEST-013\)](#) or reference the [Test Development Process: Item, Selection and Form Development](#).

Standards

- The unifying concepts within each set of essential standards provide a context for teaching both science content and scientific-process skill goals.
- Each essential standard has associated clarifying objectives. The *Essential Standards* and its clarifying objectives were written using the framework *A Taxonomy for Learning, Teaching, and Assessing—A Revision of Bloom’s Taxonomy of Educational Objectives (RBT)*.
- The *Essential Standards* for Science for Grades 5 and 8 were written to include content from each of the three branches of science: Life Science (L), Earth Science (E), and Physical Science (P). The unifying concepts for grades 5 and 8 include:
 - Forces and Motion;
 - Matter: Properties and Change;
 - Energy: Conservation and Transfer;
 - Earth Systems, Structures and Processes;
 - Earth History;
 - Structures and Functions of Living Organisms;
 - Ecosystems;
 - Evolution and Genetics; and
 - Molecular Biology.
- The *Essential Standards* for Biology were written to provide a deeper understanding of the life science content learned throughout grades K–8. The unifying concepts for Biology include:
 - Structure and Function of Living Organisms,
 - Ecosystems,
 - Evolution and Genetics, and
 - Molecular Biology.

Prioritization of Standards

- Members of the North Carolina Department of Public Instruction (NCDPI)/Test Development Section invited North Carolina educators 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 different item formats. Subsequently, curriculum and test development staff from the NCDPI met to review the results from the teacher panels and to develop weight distributions across the domains for each grade level. *Tables 1–3* describe the range of total items that will appear on the assessments.

*Table 1: Weight Distributions for **Grade 5 Science***

Unifying Concept	Grade 5 Science
Forces and Motion	13–15%
Matter: Properties and Change	12–14%
Energy: Conservation and Transfer	11–13%
Earth Systems, Structures and Processes	15–17%
Structures and Functions of Living Organisms	14–16%
Ecosystems	14–16%
Evolution and Genetics	13–15%
Total	100%

*Table 2: Weight Distributions for **Grade 8 Science***

Unifying Concept	Grade 8 Science
Matter: Properties and Change	14–16%
Energy Conservation and Transfer	10–12%
Earth Systems, Structures and Processes	13–15%
Earth History	11–13%
Structure and Function of Living Organisms	19–23%
Ecosystems	9–11%
Evolution and Genetics	11–13%
Molecular Biology	8–10%
Total	100%

*Table 3: Weight Distributions for **Biology***

Unifying Concept	Biology
Structure and Function of Living Organisms	18–22%
Ecosystems	18–22%
Evolution and Genetics	43–53%
Molecular Biology	15–19%
Total	100%

- Appendices A–C show the number of operational items by standard. Note that future coverage of standards could vary within the constraints of the content category weights in *Tables 1–3*.

Cognitive Rigor and Item Complexity

Assessment items will be designed, developed, and classified to ensure that the cognitive rigor of the operational test forms align to the cognitive complexity and demands of the North Carolina *Essential Standards* for Science. These items will require students to not only recall information, but also apply concepts and skills and make decisions.

Types of Items and Supplemental Materials

- The EOG science and EOC Biology assessments will consist of four-response-option multiple-choice items and technology-enhanced items (online administration only). All items will be worth one point each.
- Students taking the EOG grade 8 science assessment will receive a periodic table of the elements to reference. A sample can be downloaded from NCDPI/[Released Forms](#) page. All students will be provided blank paper.
- Released items are available on the NCDPI/[Released Forms](#) page. 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 EOG assessments. 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.

Testing Structure and Test Administration Time

- Included in the total item counts are embedded field test items that will not be included in the score but will be used for purposes of developing items for future test forms.

Grade Level or Course	Number of Operational Items	Number of Field Test Items	Total Number of Items
Grade 5 Science	60	15	75
Grade 8 Science	60	15	75
Biology	60	15	75

- The NCDPI estimates it will take 180 minutes for nearly all students to complete the EOG science grades 5 and 8 assessments. The NCDPI estimates it will take 150 minutes for nearly all students to complete the EOC Biology assessment. The NCDPI requires all students be allowed ample opportunity to complete the assessment. The maximum amount of time allowed is 240 minutes except for students with documented special needs requiring accommodations, such as *Scheduled Extended Time*. Refer to the [North Carolina Test Coordinators' Policies and Procedures Handbook](#).

Test Cycle and Delivery Mode

- The EOG assessments must be administered during the last ten days of the school year. All student in membership at grades 5 and 8 (according to PowerSchool) are expected to participate with or without accommodations in the standard administration of the EOG assessments. Refer to the [North Carolina Test Coordinators' Policies and Procedures Handbook](#) for exceptions.
- The EOC assessments must be administered during the last five (5) days (4x4/semester courses/summer school) or the last ten (10) days (traditional yearlong schedule) of the instructional period. According to State Board of Education policy [Requirements Regarding End-of-Course Assessments](#) (TEST-003), students who are enrolled for credit in courses in which EOC assessments are required shall take the appropriate assessment at the completion of the course. Refer to the [North Carolina Test Coordinators' Policies and Procedures Handbook](#) for exceptions and additional information.
- The EOG grades 5 and 8 science and EOC Biology assessments will be designed for an online administration. Online assessments are delivered through NCTest, The NCDPI's online assessment platform. Paper editions will be available.
- Schools must ensure every student participating in an online assessment for the North Carolina Testing Program completes the Online Assessment Tutorial for the associated assessment at least once 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. Refer to the [North Carolina Test Coordinators' Policies and Procedures Handbook](#) for additional information.
- The EOG and EOC assessments are only provided in English. Native language translation versions are not available. [Chapter 115C-81 Basic Education Program](#) of the North Carolina General Statutes requires all teachers and principals to conduct classes except foreign language classes in English.

Alternate Assessment

- The *NCEXTENDI* alternate assessment is a performance-based alternate assessment designed to assess students with significant cognitive disabilities who are being taught using the Extended Content Standards. The *NCEXTENDI* alternate assessment items are grade-level, performance-based, multiple-choice items that measure the standards specified in the [North Carolina Extended Content Standards](#).
- Eligibility criteria and additional information is available in the *2016 Testing Students with Disabilities: North Carolina Testing Program* document available on the [Accountability Services/Testing Students with Disabilities](#) web page.
- The *NCEXTENDI* alternate assessments will consist of fifteen performance-based, multiple-choice items. All items will be worth one point each.

Appendix A
Grade 5 Science
Number of Operational Items by Clarifying Objective

The following table shows the approximate number of operational items for each clarifying objective. Note that future coverage of objectives could vary within the constraints of the content category weights in *Tables 1-3*. Some objectives not designated with tested items (i.e., “–”) may be a prerequisite standard, may be tested within the context of another standard or may be included as an embedded field test item.

<u>Grade 5 Science Objective</u>	Number of Operational Items by Objective
Forces and Motion 5.P.1.1	3-4
5.P.1.2	3-4
5.P.1.3	0-1
5.P.1.4	0-1
Matter: Properties and Change 5.P.2.1	4-7
5.P.2.2	0-1
5.P.2.3	2-3
Energy: Conservation and Transfer 5.P.3.1	1-4
5.P.3.2	2-5
Earth Systems, Structures and Processes 5.E.1.1	2
5.E.1.2	3-5
5.E.1.3	4-6
Structures and Functions of Living Organisms 5.L.1.1	4-5
5.L.1.2	5-6
Ecosystems 5.L.2.1	1-2
5.L.2.2	3-4
5.L.2.3	5-6
Evolution and Genetics 5.L.3.1	2-4
5.L.3.2	4-5

Appendix B
Grade 8 Science
Number of Operational Items by Clarifying Objective

The following table shows the approximate number of operational items for each clarifying objective. Note that future coverage of objectives could vary within the constraints of the content category weights in *Tables 1-3*. 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 8 Science Objective</u>	Number of Operational Items by Objective
Matter: Properties and Change 8.P.1.1	2
8.P.1.2	2-3
8.P.1.3	2
8.P.1.4	3
Energy: Conservation and Transfer 8.P.2.1	2-3
8.P.2.2	3-4
Earth Systems, Structures and Processes 8.E.1.1	2-4
8.E.1.2	2
8.E.1.3	1-3
8.E.1.4	0-1
Earth History 8.E.2.1	2-3
8.E.2.2	4-5
Structures and Functions of Living Organisms 8.L.1.1	3-4
8.L.1.2	1-2
8.L.2.1	4-6
Ecosystems 8.L.3.1	1
8.L.3.2	2-3
8.L.3.3	3-4
Evolution and Genetics 8.L.4.1	4
8.L.4.2	3-4
Molecular Biology 8.L.5.1	2-3
8.L.5.2	1-3

Appendix C
Biology

Number of Operational Items by Clarifying Objective

The following table shows the approximate number of operational items for each clarifying objective. Note that future coverage of objectives could vary within the constraints of the content category weights in *Tables 1-3*. Some objectives not designated with tested items (i.e., “–”) may be a prerequisite standard, may be tested within the context of another standard or may be included as an embedded field test item.

<u>Biology Objective</u>	Number of Operational Items by Objective
Structure and Functions of Living Organisms	
1.1.1	2
1.1.2	1-2
1.1.3	3
1.2.1	2
1.2.2	3
1.2.3	1
Ecosystems	
2.1.1	1
2.1.2	1-2
2.1.3	1-3
2.1.4	1-2
2.2.1	2-3
2.2.2	3-4
Evolution and Genetics	
3.1.1	2-3
3.1.2	2-3
3.1.3	1
3.2.1	1-2
3.2.2	1
3.2.3	3-4
3.3.1	3
3.3.2	2
3.3.3	–
3.4.1	2
3.4.2	2-3
3.4.3	1-2
3.5.1	2
3.5.2	2

<u>Biology Objective</u>	Number of Operational Items by Objective
Molecular Biology 4.1.1	2
4.1.2	2
4.1.3	1
4.2.1	2
4.2.2	2

EOG and EOC Science Assessments Specifications—Document History

Date	Comment	Revision Location	Revision Description
June 2012	Original document	N/A	N/A
April 2013	Additional information added	Curriculum Cycle	<i>2012–2013: Operational administration of Edition 4 aligned to the Essential Standards</i>
March 2015	Information removed	Multiple pages	Information related to the NCEXTEND2 alternate assessment was removed from the document. The NCEXTEND2 assessments were eliminated effective with the 2014–15 school year due to USED regulations governing ESEA and ESEA Flexibility requirements.
	Additional information added	Appendices A-C	Tables reporting the number of items by standard were added.
March 2016	Correction	Purposed of the Assessments	<i>The Essential Standards for Science were adopted in February 2010.</i>
	Additional information added	Delivery Mode	<i>End-of-grade and end-of-course assessments are only provided in English. Native language translation versions are not available.</i>
February 2017	Additional information added	Developing Assessments (p. 1)	This section was added to the document.
		Types of Items and Supplemental Materials (p. 4)	Information about supplemental materials and the released forms was added to the document.
		Testing Structure and Test Administration Time (p. 4)	This section was added to the document.
		Test Cycle and Delivery Mode (p. 5)	Information about the test cycle was added. Information about the Online Assessment Tutorial was added.
		Alternate Assessment (p. 5)	This section was added to the document.

EOG and EOC Science Assessments Specifications—Document History (continued)

February 2017 (continued)	Revision	Appendix A Grade 5 Science (p. 6)	The information in the <i>Number of Operational Items by Standard</i> column was revised to reflect the addition of a new assessment form. Note: The coverage of standards remains within the original constraints of the weight distribution as reported in <i>Tables 1-3</i> .
		Appendix B Grade 8 Science (p. 7)	The information in the <i>Number of Operational Items by Standard</i> column was revised to reflect the addition of a new assessment form. Note: The coverage of standards remains within the original constraints of the weight distribution as reported in <i>Tables 1-3</i> .
		Appendix C Biology (p. 8)	The information in the <i>Number of Operational Items by Standard</i> column was revised to reflect the addition of a new assessment form. Note: The coverage of standards remains within the original constraints of the weight distribution as reported in <i>Tables 1-3</i> .
		Multiple pages	Hyperlinks were updated and formatting was adjusted as needed.