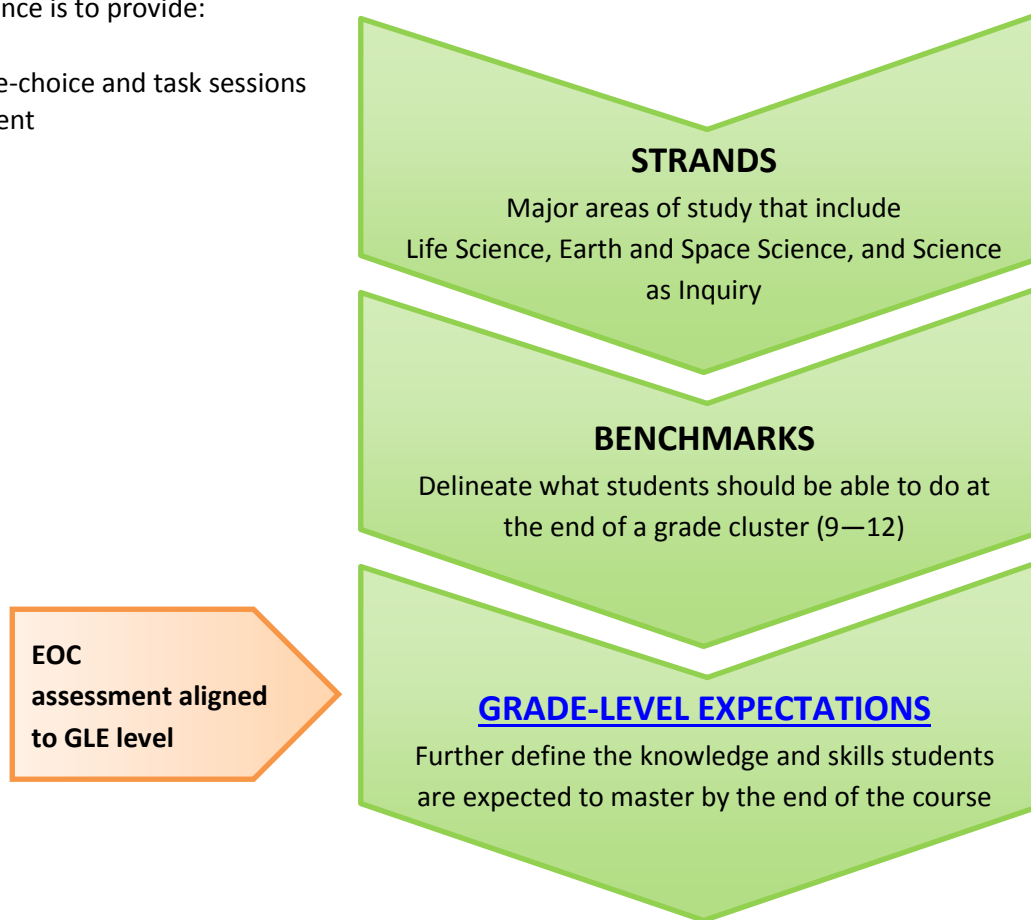


The End-of-Course test (EOC) Biology test continues to assess Biology grade-level expectations (GLEs) that have been taught since 2004. The design of the test remains the same as in previous administrations. Committees of Louisiana educators created the [K-12 Louisiana Student Standards for Science](#) which were approved and adopted in 2017. The spring 2018 EOC Biology test will include additional field-test items aligned to the new standards to be used to create a new five-level test, operational beginning Fall 2018, as part of the LEAP 2025 assessment system. The type of items being field tested will include discrete items, item sets, and tasks. This assessment guide will be updated in Winter 2017-2018 to include more information about the embedded field test items.

The purpose of this assessment guidance is to provide:

- the structure of the test
- specifications for the multiple-choice and task sessions
- the [GLEs](#) eligible for assessment
- links to sample test items



Strands, Benchmarks, and Grade-Level Expectations (GLEs)

The Louisiana science content standards—broad statements of expectations for student learning— assessed on the EOC Biology test encompass five strands: Science as Inquiry, Physical Science, Life Science, Earth and Space Science, and Science and the Environment. The Biology test assesses three strands of the five strands: Life Science, Earth and Space Science, and Science as Inquiry primarily through life science concepts. More emphasis is placed on the categories in Life Science: the cell, the molecular basis of heredity, biological evolution, interdependence of organisms, matter, energy, and organization of living systems, systems and the behavior of organisms, and personal and community health.

To delineate what students should know and be able to do, each standard is divided into benchmarks for grade clusters (5-8 or 9-12). Benchmarks are organized into three or four thematic categories within each strand. These categories provide content definition by highlighting the underlying themes within the domain of each strand.

To further define the knowledge and skills students are expected to know at the end of each grade, not just at the end of a grade span, Louisiana educators developed grade-level expectations (GLEs).

GLEs Eligible for Assessment

While all Biology GLEs are eligible for assessment, some strands and components receive more emphasis. The components of Life Science are assessed through multiple-choice items and the task. The Earth and Space Science strand and the Science as Inquiry strand are assessed through multiple-choice items only. Some, however, do not lend themselves to direct assessment in multiple-choice format. The following GLEs are not assessed:

- Science as Inquiry: 2,6,12

The EOC Biology test for Spring 2018 will include these items as well as embedded field test items that are aligned to the new Louisiana Student Standards for Science. More information will be forthcoming in a Winter of 2017-2018 update.

Fall 2017 EOC Biology Test Structure

The table below includes test structure information for the Fall 2017 EOC Biology test. The test structure and field-test embedding plan is still being determined for the Spring 2018 EOC Biology test and more information will be released in Winter 2017-2018.

Test Sessions	Number of Items	Number of Points	Suggested Testing Time**
Session 1: Multiple Choice	25*	23	40 minutes
Session 2: Task	4 multiple choice 2 extended response*	6 (2 multiple choice = 1 pt each, 1 extended response = 4 pts)	50 minutes
Session 3: Multiple Choice	25*	23	40 minutes

*Contains embedded field test items which are used to develop new test forms.

The EOC test is **untimed.

Test Specifications

Number and Percentage of Points by Strand for the Multiple-Choice Session*

Strand or Component	Approximate Percentage by Component	Approximate Percentage by Strand
Life Science		71
1. The Cell	11	
2. The Molecular Basis of Heredity	11	
3. Biological Evolution	11	
4. Interdependence of Organisms	8	
5. Matter, Energy, and Organization of Living Systems	8	
6. Systems and the Behavior of Organisms	11	
7. Personal and Community Health	10	
Earth and Space Science		12
Science as Inquiry		17
Total		100

*The table refers to the multiple-choice session only.

Specifications for the Task

The task promotes science literacy through the use of discipline-specific practices to collect, apply, and communicate content knowledge. The task reflects the rigor of Louisiana’s content standards and applies English language arts standards for reading informational text (includes science and technical texts) and writing to a science context.

The items in the task are aligned to science GLEs. The task may assess the following science strand: Life Science.

The task consists of two multiple-choice items and one extended-response item. The items are based on one or two stimulus materials. The extended-response portion of the task requires students to provide a written response that will be scored using a 0-4 point rubric. The task asks students to incorporate science content knowledge with evidence from stimulus materials. A sample task for Biology may be found in the [Sample Items](#) document.

For the Biology test, the literacy skills required by the task may include some or all of the following:

- citing specific textual evidence to support analysis of science and technical texts, attending to the precise details of explanations or descriptions
- determining the central ideas or conclusions of a text; trace the text’s explanation or depiction of a complex process, phenomenon, or concept; provide an accurate summary of the text
- following precisely a complex multi-step procedure when carrying out experiments, taking measurements, or performing technical tasks, attending to special cases of exceptions defined in the text
- determining the meaning of symbols, key terms, and other domain specific words and phrases as they are used in a specific scientific or technical context relevant to grade 10 texts and topics
- analyzing the structure of the relationships among concepts in a text, including relationships among key terms (e.g., force, friction, reaction force, energy)
- analyzing the author’s purpose in providing an explanation, describing a procedure, or discussing an experiment in a text, defining the question the author seeks to address
- translating quantitative or technical information expressed in words in a text into visual form (e.g., table or chart) and translating information expressed visually or mathematically (e.g., in an equation) into words
- assessing the extent to which the reasoning and evidence in a text support the author’s claim or a recommendation for solving a scientific or technical problem
- comparing and contrasting findings presented in a text to those from other sources (including their own experiments), noting when the findings support or contradict previous explanations or accounts

Description of Stimulus Material

The multiple-choice and task sessions of the Biology EOC test may incorporate the following types of stimulus material:

- an excerpt from a text-based source
- data tables or graphs presenting data to be read or interpreted
- charts, illustrations, or graphic organizers
- descriptions and details of science investigations
- maps showing geographical features

Examples of the types of stimulus materials may be found in the [Sample Items](#) document.

Test Administration









The EOC Biology test is administered during three testing windows, shown in the table below. The school or district test coordinator will communicate the testing schedule. For more information about scheduling and administration policies, refer to the [Computer-based Test Guidance](#) document, found in the LDOE [assessment library](#). Students taking the EOC Biology test in 2017-2018 will receive results in 4-6 days. The table shows the testing window and student-level results by administration.

Administration and Results for EOC Biology

Administration	Testing Window	Release of Results
Fall	November 29, 2017 – December 13, 2017	4 to 6 days
Spring	April 23, 2018 – May 18, 2018	4 to 6 days
Summer	June 18, 2018 – June 22, 2018	4 to 6 days

Students will use the online testing system to enter answers. Students will enter their answers into the online testing system by clicking on the circle next to the correct answer for multiple-choice questions. When composing their written responses to the extended-response portion of the task, students will type their response box into the box using the typing tools provided.

The online testing platform includes the following tools, which allow a student to select answer choices, “mark” items, eliminate answer options, take notes, enlarge the item, guide the reading of a source or an item line by line, and use an equation builder for entering special characters. A help tool is also featured to assist students as they use the online system.

- Pointer tool 
 - Highlighter tool 
 - Cross-Off tool 
- Sticky Note tool 
 - Magnifying tool 
 - Line Guide 
- Extended-Response Checklist 
 - Help Tool 

All students should work through the Online Tools Training available in INSIGHT or [here](#) using the Chrome browser) to practice using the online tools so they are well prepared to navigate the online testing system. The OTT will be updated in Winter 2017-2018 so students may practice answering the new item types.

BIOLOGY LIFE SCIENCE	
BENCHMARKS – THE CELL	GRADE-LEVEL EXPECTATIONS
<p>LS-H-A1: observing cells, identifying organelles, relating structure to function, and differentiating among cell types</p> <p>LS-H-A2: demonstrating a knowledge of cellular transport</p> <p>LS-H-A3: investigating cell differentiation and describing stages of embryological development in representative organisms</p>	<ol style="list-style-type: none"> 1. Compare prokaryotic and eukaryotic cells 2. Identify and describe structural and functional differences among organelles 3. Investigate and describe the role of enzymes in the function of the cell 4. Compare active and passive cellular transport 5. Analyze the movement of water across a cell membrane in hypotonic, isotonic, and hypertonic solutions 6. Analyze a diagram of a developing zygote to determine when cell differentiation occurs
BENCHMARKS – THE MOLECULAR BASIS OF HEREDITY	GRADE-LEVEL EXPECTATIONS
<p>LS-H-B1: explaining the relationship among chromosomes, DNA, genes, RNA, and proteins</p> <p>LS-H-B2: comparing and contrasting mitosis and meiosis</p>	<ol style="list-style-type: none"> 7. Identify the basic structure and function of nucleic acids (e.g., DNA, RNA) 8. Describe the relationship among DNA, genes, chromosomes and proteins

<p>LS-H-B3: describing the transmission of traits from parent to offspring and the influence of environmental factors on gene expression</p> <p>LS-H-B4: exploring advances in biotechnology and identifying possible positive and negative effects</p>	<p>9. Compare mitosis and meiosis</p> <p>10. Analyze pedigrees to identify patterns of inheritance for common genetic disorders</p> <p>11. Calculate the probability of genotypes and phenotypes of offspring given the parental genotype</p> <p>12. Describe the processes used in modern biotechnology related to genetic engineering</p> <p>13. Identify possible positive and negative effects of advances in biotechnology</p>
<p>BENCHMARKS – BIOLOGICAL EVOLUTION</p>	<p>GRADE-LEVEL EXPECTATIONS</p>
<p>LS-H-C1: exploring experimental evidence that supports the theory of the origin of life</p> <p>LS-H-C2: recognizing the evidence for evolution</p> <p>LS-H-C3: discussing the patterns, mechanisms, and rate of evolution</p> <p>LS-H-C4: classifying organisms</p> <p>LS-H-C5: distinguishing among the kingdoms</p> <p>LS-H-C6: comparing and contrasting life cycles of organisms</p> <p>LS-H-C7: comparing viruses to cells</p>	<p>14. Analyze evidence on biological evolution, utilizing descriptions of existing investigations, computer models, and fossil records</p> <p>15. Compare the embryological development of animals in different phyla</p> <p>16. Explain how DNA evidence and fossil records support Darwin’s theory of evolution</p> <p>17. Explain how factors affect gene frequency in a population over time</p> <p>18. Classify organisms from different kingdoms at several taxonomic levels, using a dichotomous key</p> <p>19. Compare characteristics of the major kingdoms</p> <p>20. Analyze differences in life cycles of selected organisms in each of the kingdoms</p> <p>21. Compare the structures, functions, and cycles of viruses to those of cells</p> <p>22. Describe the role of viruses in causing diseases and conditions (e.g., AIDS, common colds, smallpox, influenza, warts)</p>
<p>BENCHMARKS – INTERDEPENDENCE OF ORGANISMS</p>	<p>GRADE-LEVEL EXPECTATIONS</p>
<p>LS-H-D1: illustrating the biogeochemical cycles and explaining their importance</p> <p>LS-H-D2: describing trophic levels and energy flows</p> <p>LS-H-D3: investigating population dynamics</p> <p>LS-H-D4: exploring how humans have impacted ecosystems and the need for societies to plan for the future</p>	<p>23. Illustrate the flow of carbon, nitrogen, and water through an ecosystem</p> <p>24. Analyze food webs by predicting the impact of the loss or gain of an organism</p>

	<p>25. Evaluate the efficiency of the flow of energy and matter through a food chain/pyramid</p> <p>26. Analyze the dynamics of a population with and without limiting factors</p> <p>27. Analyze positive and negative effects of human actions on ecosystems</p>
BENCHMARKS – MATTER, ENERGY, AND ORGANIZATION OF LIVING SYSTEMS	GRADE-LEVEL EXPECTATIONS
<p>LS-H-E1: comparing and contrasting photosynthesis and cellular respiration; emphasizing their relationships</p> <p>LS-H-E2: recognizing the importance of the ATP cycle in energy usage within the cell</p> <p>LS-H-E3: differentiating among levels of biological organization</p>	<p>28. Explain why ecosystems require a continuous input of energy from the Sun</p> <p>29. Use balanced equations to analyze the relationship between photosynthesis and cellular respiration</p> <p>30. Explain the role of adenosine triphosphate (ATP) in a cell</p> <p>31. Compare the levels of organization in the biosphere</p>
BENCHMARKS – SYSTEMS AND THE BEHAVIOR OF ORGANISMS	GRADE-LEVEL EXPECTATIONS
<p>LS-H-F1: identifying the structure and functions of organ systems</p> <p>LS-H-F2: identifying mechanisms involved in homeostasis</p> <p>LS-H-F3: recognizing that behavior is the response of an organism to internal changes and/or external stimuli</p> <p>LS-H-F4: recognizing that behavior patterns have adaptive value</p>	<p>32. Analyze the interrelationship of organs in major system</p> <p>33. Compare structure to function of organs in a variety of organisms</p> <p>34. Explain how body systems maintain homeostasis</p> <p>35. Explain how selected organisms respond to a variety of stimuli</p> <p>36. Explain how behavior affects the survival of species</p>
BENCHMARKS – PERSONAL AND COMMUNITY HEALTH	GRADE-LEVEL EXPECTATIONS
<p>LS-H-G1: relating fitness and health to longevity</p> <p>LS-H-G2: contrasting how organisms cause disease</p> <p>LS-H-G3: explaining the role of the immune system in fighting disease</p> <p>LS-H-G4: exploring current research on the major diseases with regard to cause, symptoms, treatment, prevention, and cure</p> <p>LS-H-G5: researching technology used in prevention, diagnosis, and treatment of disease/disorders</p>	<p>37. Explain how fitness and health maintenance can result in a longer human life span</p> <p>38. Discuss mechanisms of disease transmission and processes of infection</p> <p>39. Compare the functions of the basic components of the human immune system</p> <p>40. Determine the relationship between vaccination and immunity</p> <p>41. Describe causes, symptoms, treatments, and preventions of major communicable and noncommunicable diseases</p> <p>42. Summarize the uses of selected technological developments related to the prevention, diagnosis, and treatment of diseases or disorders</p>
EARTH AND SPACE SCIENCE	

BENCHMARKS – ENERGY IN EARTH’S SYSTEM	GRADE-LEVEL EXPECTATIONS
<p>ESS-H-A1: investigating the methods of energy transfer and identifying the sun as the major source of energy for most of the earth’s systems</p>	<ol style="list-style-type: none"> 1. Describe what happens to the solar energy received by earth everyday 2. Trace the flow of heat energy through the processes in the water cycle 3. Describe the effect of natural insulation on energy transfer in a closed system
BENCHMARKS – GEOCHEMICAL CYCLES	GRADE-LEVEL EXPECTATIONS
<p>ESS-H-B1: illustrating how stable chemical atoms or elements are recycled through the solid earth, oceans, atmosphere, and organisms</p> <p>ESS-H-B2: demonstrating earth’s internal and external energy sources as forces in moving chemical atoms or elements</p>	<ol style="list-style-type: none"> 13. Explain how stable elements and atoms are recycled during natural geologic process 15. Identify the sun-driven processes that move substances at or near earth’s surface
BENCHMARKS – THE ORIGIN AND EVOLUTION OF THE EARTH SYSTEM	GRADE-LEVEL EXPECTATIONS
<p>ESS-H-C2: estimating the age of the earth by using dating techniques</p> <p>ESS-H-C5: explaining that natural processes and changes in the earth system may take place in a matter of seconds or develop over billions of years</p>	<ol style="list-style-type: none"> 17. Determine the relative ages of rock layers in a geologic profile or cross section 18. Use data from radioactive dating techniques to estimate the age of earth materials 22. Analyze data related to a variety of natural processes to determine the time frame of the changes involved (e.g., formation of sedimentary rock layers, deposition of ash layers, fossilization of plant or animal species)
SCIENCE AS INQUIRY	
BENCHMARKS – THE ABILITIES NECESSARY TO DO SCIENTIFIC INQUIRY	GRADE-LEVEL EXPECTATIONS
<p>SI-H-A1: identifying questions and concepts that guide scientific investigations</p> <p>SI-H-A2: designing and conducting scientific investigations</p> <p>SI-H-A3: using technology and mathematics to improve investigations and communications</p> <p>SI-H-A4: formulating and revising scientific explanations and models using logic and evidence</p> <p>SI-H-A5: recognizing and analyzing alternative explanations and models</p> <p>SI-H-A6: communicating and defending a scientific argument</p> <p>SI-H-A7: utilizing science safety procedures during scientific investigations</p>	<ol style="list-style-type: none"> 1. Write a testable question or hypothesis when given a topic 3. Plan and record step-by-step procedures for a valid investigation, select equipment and materials, and identify variables and controls. 4. Conduct an investigation that includes multiple trials and record, organize, and display data properly 5. Utilize mathematics, organizational tools, and graphing skills to solve problems

	<ol style="list-style-type: none"> 7. Choose appropriate models to explain scientific knowledge or experimental results (e.g., objects, mathematical relationships, plans, schemes, examples, role-playing, computer simulations) 8. Give an example of how new scientific data can cause an existing scientific explanation to be supported, revised, or rejected 9. Write and defend a conclusion based on logical analysis of experimental data 10. Given a description of an experiment, identify appropriate safety measures
<p>BENCHMARKS – UNDERSTANDING SCIENTIFIC INQUIRY</p> <p>SI-H-B1: communicating that scientists usually base their investigations on existing models, explanations, and theories</p> <p>SI-H-B2: communicating that scientists conduct investigations for a variety of reasons, such as exploration of new areas, discovery of new aspects of the natural world, confirmation of prior investigations, evaluation of current theories, and comparison of models and theories</p> <p>SI-H-B3: communicating that scientists rely on technology to enhance the gathering and manipulation of data</p> <p>SI-H-B4: analyzing a proposed explanation of scientific evidence according to the following criteria: follow a logical structure, follow rules of evidence, allow for questions and modifications, and is based on historical and current scientific knowledge</p> <p>SI-H-B5: communicating that the results of scientific inquiry, new knowledge, and methods emerge from different types of investigations and public communication among scientists</p>	<p>GRADE-LEVEL EXPECTATIONS</p> <ol style="list-style-type: none"> 11. Evaluate selected theories based on supporting scientific evidence 13. Identify scientific evidence that has caused modifications in previously accepted theories 14. Cite examples of scientific advances and emerging technologies and how they affect society (e.g., MRI, DNA in forensics) 15. Analyze the conclusion from an investigation by using data to determine its validity 16. Use the following rules of evidence to examine experimental results: <ol style="list-style-type: none"> a. Can an expert’s technique or theory be tested, has it been tested, or is it simply a subjective, conclusive approach that cannot be reasonably assessed for reliability? b. Has the technique or theory been subjected to peer review and publication? c. What is the known or potential rate of error of the technique or theory when applied? d. Were standards and controls applied and maintained? e. Has the technique or theory been generally accepted in the scientific community?

Explanation of Codes:

GLEs are numbered consecutively in each grade level and grouped by strand and thematic category. Benchmarks are coded by strand, grade cluster, and benchmark number. The first term in the code refers to the strand. The second term refers to the grade cluster, and the third term refers to the category and benchmark number.

Examples of Science Codes:

CODE	TRANSLATION
SI-E-A5	SI Strand, Elementary, Category A, Benchmark 5
PS-M-B4	PS Strand, Middle School, Category B, Benchmark 4
SE-H-A6	SE Strand, High School, Category A, Benchmark 6