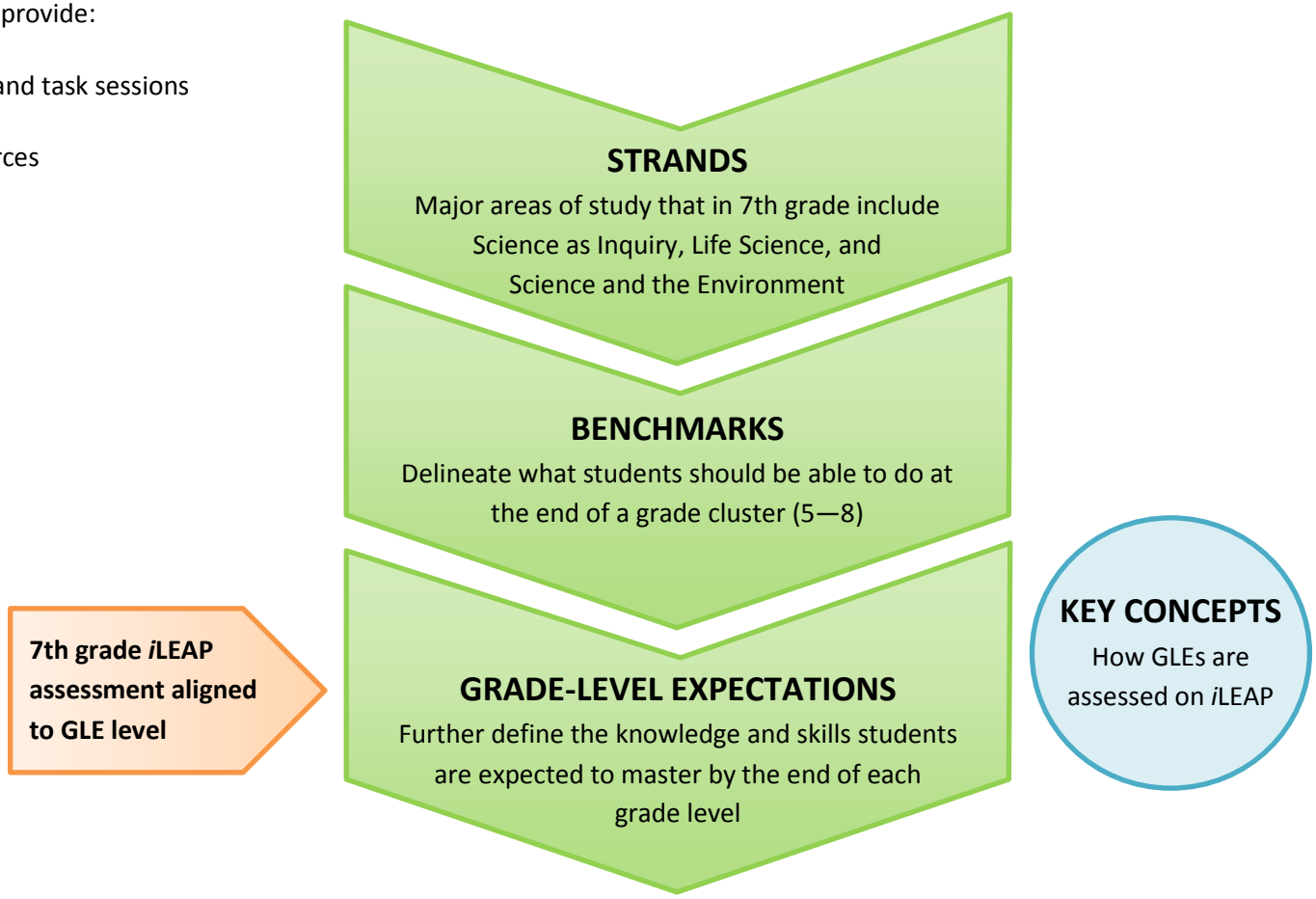
The grade 7 *i*LEAP test continues to assess Louisiana's science grade-level expectations (GLEs). The design of the test remains the same as in previous administrations.

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 items and other resources



Strands, Benchmarks, and GLEs

Louisiana's content standards —broad statements of expectations for student learning— encompass five strands: Science as Inquiry, Physical Science, Life Science, Earth and Space Science, and Science and the Environment. The grade 7 test assesses three of the five science strands: Science as Inquiry, Life Science, and Science and the Environment. At grade 7, the focus for students is life science concepts. The content explored at this grade level includes the chemistry of life, plant and animal cells, living organisms, ecology, balance within ecosystems, reproduction, heredity, health and diseases, and food webs and cycles.

To delineate what students should know and be able to do, each strand is divided into benchmarks for grade clusters (K-4 or 5-8). Benchmarks are organized into two to four thematic categories within each strand. These categories (e.g., Abilities Necessary to Do Scientific Inquiry, or Reproduction and Heredity) 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)

Test Structure

Test Sessions	Number of Items	Number of Points	Suggested Testing Time*
Multiple Choice	48	48	60 minutes
Task	4 multiple choice 1 extended response	8 (multiple choice = 1 pt each extended response = 4 pts)	30 minutes

*The science test is **untimed.**

Specifications for the Multiple-Choice Session

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

Strand/Category	**% of Points**
Science as Inquiry	42
A. The Abilities to Do Scientific Inquiry	
B. Understanding Scientific Inquiry	
Life Science	42
A. Structure and Function in Living Systems	
B. Reproduction and Heredity	
C. Populations and Ecosystems	
D. Adaptations of Organisms	
Science and the Environment	16
Total	100

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

Most of the GLEs are eligible for assessment on the multiple-choice session of the *i*LEAP science test. Some, however, do not lend themselves to direct assessment in multiple-choice format. The following GLEs are not assessed:

- Science as Inquiry: 7,8,9,14,15,19,20,24,37
- Life Science: 21, 40

Description of 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 any of the three science strands: Science as Inquiry, Life Science, and Science and the Environment. The following GLEs are not assessed in the task session:

- Science as Inquiry: 8,24

The task consists of four 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 grade 7 may be found in the Sample Items document.

At grade 7, the literacy skills required by the task may include some or all of the following:

- citing specific textual evidence
- determining the central ideas or conclusions of a text
- following precisely a multistep procedure when carrying out experiments, taking measurements, or performing technical tasks
- determining the meaning of symbols, key terms, and other domain-specific words and phrases
- analyzing the author's purpose in providing an explanation, describing a procedure, or discussing an experiment in a text
- integrating quantitative or technical information expressed in words in a text with a version of that information expressed visually (e.g., in a flowchart, diagram, model, graph, table)
- distinguishing among facts, reasoned judgment based on research findings, and speculation in a text
- comparing and contrasting the information gained from experiments, simulations, video, or multimedia sources with that gained from reading a text on the same topic

Description of Stimulus Material

The multiple-choice and task sessions of the grade 7 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.

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GRADE 7 SCIENCE STANDARDS, BENCHMARKS, AND GLES	
Science as Inquiry: **Students will *do* science by engaging in partial and full inquiries that are within their developmental capabilities.**	
A. The Abilities Necessary to Do Scientific Inquiry	
BENCHMARKS	**GRADE-LEVEL EXPECTATIONS**
SI-M-A1: identifying questions that can be used to design a scientific investigation	1. Generate testable questions about objects, organisms, and events that can be answered through scientific investigation 2. Identify problems, factors, and questions that must be considered in a scientific investigation 3. Use a variety of sources to answer questions
SI-M-A2: designing and conducting a scientific investigation	4. Design, predict outcomes, and conduct experiments to answer guiding questions 5. Identify independent variables, dependent variables, and variables that should be controlled in designing an experiment
SI-M-A3: using mathematics and appropriate tools and techniques to gather, analyze, and interpret data	6. Select and use appropriate equipment, technology, tools, and metric system units of measurement to make observations 7. Record observations using methods that complement investigations (e.g., journals, tables, charts) 8. Use consistency and precision in data collection, analysis, and reporting 9. Use computers and/or calculators to analyze and interpret quantitative data
SI-M-A4: developing descriptions, explanations, and graphs using data	10. Identify the difference between description and explanation 11. Construct, use, and interpret appropriate graphical representations to collect, record, and report data (e.g., tables, charts, circle graphs, bar and line graphs, diagrams, scatter plots, symbols) 12. Use data and information gathered to develop an explanation of experimental results 13. Identify patterns in data to explain natural events
SI-M-A5: developing models and predictions using the relationships between data and explanations	14. Develop models to illustrate or explain conclusions reached through investigation 15. Identify and explain the limitations of models used to represent the natural

	world 16. Use evidence to make inferences and predict trends
SI-M-A6: comparing alternative explanations and predictions	17. Recognize that there may be more than one way to interpret a given set of data, which can result in alternative scientific explanations and predictions 18. Identify faulty reasoning and statements that misinterpret or are not supported by the evidence
SI-M-A7: communicating scientific procedures, information, and explanations	19. Communicate ideas in a variety of ways (e.g., symbols, illustrations, graphs, charts, spreadsheets, concept maps, oral and written reports, equations) 20. Write clear, step-by-step instructions that others can follow to carry out procedures or conduct investigations 21. Distinguish between *observations* and *inferences* 22. Use evidence and observations to explain and communicate the results of investigations
SI-M-A8: utilizing safety procedures during scientific investigations	23. Use relevant safety procedures and equipment to conduct scientific investigations 24. Provide appropriate care and utilize safe practices and ethical treatment when animals are involved in scientific field and laboratory research
B. Understanding Scientific Inquiry	
BENCHMARKS	**GRADE-LEVEL EXPECTATIONS**
SI-M-B1: recognizing that different kinds of questions guide different kinds of scientific investigations	25. Compare and critique scientific investigations 26. Use and describe alternate methods for investigating different types of testable questions 27. Recognize that science uses processes that involve a logical and empirical, but flexible, approach to problem solving
SI-M-B2: communicating that current scientific knowledge guides scientific investigations	28. Recognize that investigations generally begin with a review of the work of others
SI-M-B3: understanding that mathematics, technology, and scientific techniques used in an experiment can limit or enhance the accuracy of scientific knowledge	29. Explain how technology can expand the senses and contribute to the increase and/or modification of scientific knowledge 30. Describe why all questions cannot be answered with present technologies 31. Recognize that there is an acceptable range of variation in collected data 32. Explain the use of statistical methods to confirm the significance of data

	(e.g., mean, median, mode, range)
SI-M-B4: using data and logical arguments to propose, modify, or elaborate on principles and models	33. Evaluate models, identify problems in design, and make recommendations for improvement
SI-M-B5: understanding that scientific knowledge is enhanced through peer review, alternative explanations, and constructive criticism	34. Recognize the importance of communication among scientists about investigations in progress and the work of others 35. Explain how skepticism about accepted scientific explanations (i.e., hypotheses and theories) leads to new understanding 36. Explain why an experiment must be verified through multiple investigations and yield consistent results before the findings are accepted 37. Critique and analyze their own inquiries and the inquiries of others
SI-M-B6: communicating that scientific investigations can result in new ideas, new methods or procedures, and new technologies	38. Explain that, through the use of scientific processes and knowledge, people can solve problems, make decisions, and form new ideas
Physical Science: Students will develop an understanding of the characteristics and interrelationships of matter and energy in the physical world.	
A. Properties And Changes Of Properties In Matter	
BENCHMARKS	**GRADE-LEVEL EXPECTATIONS**
PS-M-A9: identifying elements and compounds found in common foods, clothing, household materials, and automobiles	1. Identify the elements most often found in living organisms (e.g., C, N, H, O, P, S, Ca, Fe)
B. Motions and Forces	
There are no Grade-Level Expectations for benchmarks in grade 7 for this category.	
C. Transformations of Energy	
There are no Grade-Level Expectations for benchmarks in grade 7 for this category.	
Life Science: Students will become aware of the characteristics and life cycles of organisms and understand their relationships to each other and to their environment.	
A. Structure and Function in Living Systems	
Benchmarks	**Grade-Level Expectations**
LS-M-A1: describing the observable components and functions of a cell, such as the cell membrane, nucleus, and movement of molecules into and out of cells	2. Compare the basic structures and functions of different types of cells 3. Illustrate and demonstrate osmosis and diffusion in cells

LS-M-A2: comparing and contrasting the basic structures and functions of different plant and animal cells	4. Compare functions of plant and animal cell structures (i.e., organelles)
LS-M-A3: observing and analyzing the growth and development of selected organisms, including a seed plant, an insect with complete metamorphosis, and an amphibian	5. Compare complete and incomplete metamorphosis in insects (e.g., butterflies, mealworms, grasshoppers) 6. Compare the life cycles of a variety of organisms, including nonflowering and flowering plants, reptiles, birds, amphibians, and mammals
LS-M-A4: describing the basic processes of photosynthesis and respiration and their importance to life	7. Construct a word equation that illustrates the processes of photosynthesis and respiration 8. Distinguish between *aerobic* respiration and *anaerobic* respiration
LS-M-A5: investigating human body systems and their functions (including circulatory, digestive, skeletal, respiratory)	9. Relate structural features of organs to their functions in major systems 10. Describe the way major organ systems in the human body interact to sustain life
LS-M-A6: describing how the human body changes with age and listing factors that affect the length and quality of life	11. Describe the growth and development of humans from infancy to old age 12. Explain how external factors and genetics can influence the quality and length of human life (e.g., nutrition, smoking, drug use, exercise)
LS-M-A7: describing communicable and noncommunicable diseases	13. Identify and describe common communicable and noncommunicable diseases and the methods by which they are transmitted, treated, and prevented
B. Reproduction and Heredity	
BENCHMARKS	**GRADE-LEVEL EXPECTATIONS**
LS-M-B1: describing the importance of body cell division (mitosis) and sex cell production (meiosis)	14. Differentiate between sexual and asexual reproduction 15. Contrast the processes of mitosis and meiosis in relation to growth, repair, reproduction, and heredity
LS-M-B2: describing the role of chromosomes and genes in heredity	16. Explain why chromosomes in body cells exist in pairs 17. Explain the relationship of genes to chromosomes and genotypes to phenotypes 18. Recognize genetic errors caused by changes in chromosomes
LS-M-B3: describing how heredity allows parents to pass certain traits to offspring	19. Apply the basic laws of Mendelian genetics to solve simple monohybrid crosses, using a Punnett square 20. Explain the differences among the inheritance of dominant, recessive, and incomplete dominant traits 21. Use a Punnett square to demonstrate how sex linked traits are inherited 22. Give examples of the importance of selective breeding (e.g., domestic

	animals, livestock, horticulture)
C. Populations and Ecosystems	
BENCHMARKS	**GRADE-LEVEL EXPECTATIONS**
LS-M-C1: constructing and using classification systems based on the structure of organisms	23. Classify organisms based on structural characteristics, using a dichotomous key
LS-M-C2: modeling and interpreting food chains and food webs	24. Analyze food webs to determine energy transfer among organisms
LS-M-C3: investigating major ecosystems and recognizing physical properties and organisms within each	25. Locate and describe the major biomes of the world 26. Describe and compare the levels of organization of living things within an ecosystem
LS-M-C4: explaining the interaction and interdependence of nonliving and living components within ecosystems	27. Identify the various relationships among plants and animals (e.g., mutualistic, parasitic, producer/consumer) 28. Differentiate between ecosystem components of habitat and niche 29. Predict the impact changes in a species' population have on an ecosystem
D. Adaptations of Organisms	
BENCHMARKS	**GRADE-LEVEL EXPECTATIONS**
LS-M-D1: describing the importance of plant and animal adaptation, including local examples	30. Differentiate between structural and behavioral adaptations in a variety of organisms 31. Describe and evaluate the impact of introducing nonnative species into an ecosystem
LS-M-D2: explaining how some members of a species survive under changed environmental conditions	32. Describe changes that can occur in various ecosystems and relate the changes to the ability of an organism to survive 33. Illustrate how variations in individual organisms within a population determine the success of the population 34. Explain how environmental factors impact survival of a population
Earth and Space Science: Students will develop an understanding of the properties of earth materials, the structure of Earth's systems, the Earth's history, and the Earth's place in the universe.	
There are no Grade-Level Expectations for benchmarks in grade 7 for this strand.	
Science and the Environment: Students will develop an appreciation of the natural environment, learn the importance of environmental quality, and acquire a sense of stewardship. As consumers and citizens, they will be able to recognize how our personal, professional, and political actions affect the natural world.	

BENCHMARKS	GRADE-LEVEL EXPECTATIONS
SE-M-A1: demonstrating knowledge that an ecosystem includes living and nonliving factors and that humans are an integral part of ecosystems	35. Identify resources humans derive from ecosystems 36. Distinguish the essential roles played by biotic and abiotic components in various ecosystems
SE-M-A2: demonstrating an understanding of how carrying capacity and limiting factors affect plant and animal populations	37. Identify and describe the effects of limiting factors on a given population 38. Evaluate the carrying capacity of an ecosystem
SE-M-A4: understanding that human actions can create risks and consequences in the environment	39. Analyze the consequences of human activities on ecosystems
SE-M-A5: tracing the flow of energy through an ecosystem and demonstrating a knowledge of the roles of producers, consumers, and decomposers in the ecosystem	40. Construct or draw food webs for various ecosystems
SE-M-A7: demonstrating knowledge of the natural cycles, such as the carbon cycle, nitrogen cycle, water cycle, and oxygen cycle	41. Describe the nitrogen cycle and explain why it is important for the survival of organisms 42. Describe how photosynthesis and respiration relate to the carbon cycle
SE-M-A8: investigating and analyzing how technology affects the physical, chemical, and biological factors in an ecosystem	43. Identify and analyze the environmental impact of humans' use of technology (e.g., energy production, agriculture, transportation, human habitation)

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