

RELEASED TEST ITEMS

Sample Student Work
Illustrating LEAP Achievement Levels

Fall 2012

Science



John C. White
State Superintendent of Education

Grade
8

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Louisiana Educational Assessment Program (LEAP)
GRADE 8 SAMPLE ITEMS AND STUDENT WORK
2011–2012

Louisiana Believes embraces the principle that all children can achieve at high levels. *Louisiana Believes* also promotes the idea that Louisiana’s educators should be empowered to make decisions to support the success of their students. In keeping with these values, the Department has created documents with released test items to help prepare teachers and students for the LEAP tests. These documents reflect the State’s commitment to consistent and rigorous assessments and provide educators and families with clear information about expectations for student performance.

LEAP is an integral part of the Louisiana school and district accountability system passed by the state legislature and signed into law in 1997. The primary purposes of the accountability system are to raise achievement expectations for all Louisiana public school students and to improve public education in the state.

In March and April of 2012, grade 8 students took Phases I and II of the LEAP English Language Arts, Mathematics, Science, and Social Studies tests. The test scores are combined with other relevant data to create school and district accountability scores, which serve as a means of measuring educational quality and improvement in educational programs over time.

LEAP Reports

Louisiana’s grade 8 students are tested each year in the spring. In May and July, individual student, school, district, and state test results are released in phases. School and district accountability results are reported in the fall.

For LEAP, student scores are reported at five achievement levels: *Advanced*, *Mastery*, *Basic*, *Approaching Basic*, and *Unsatisfactory*. The percentage of students scoring at each level is reported for individual schools, districts, and the state. General definitions for achievement levels are on page 2. Achievement level descriptors for all content areas can be found on the Louisiana Department of Education website. Go to www.louisianaschools.net/topics/leap_achievement_descriptors.html.

LEAP

General Achievement Level Definitions

Achievement Level	Definition
Advanced	A student at this level has demonstrated superior performance beyond the level of mastery.
Mastery	A student at this level has demonstrated competency over challenging subject matter and is well prepared for the next level of schooling.
Basic	A student at this level has demonstrated only the fundamental knowledge and skills needed for the next level of schooling.
Approaching Basic	A student at this level has only partially demonstrated the fundamental knowledge and skills needed for the next level of schooling.
Unsatisfactory	A student at this level has not demonstrated the fundamental knowledge and skills needed for the next level of schooling.

Purpose of This Document

This document is part of a series of materials meant to promote understanding of the knowledge and skills students must have and the kinds of work they must produce to be successful on the LEAP. Other documents providing background and further information on the LEAP tests can be found on the Louisiana Department of Education website at www.louisianaschools.net/topics/leap.html.

NOTE: Teachers are encouraged to use the test items presented in this document as part of a practice test or study guide and doing so is not a violation of test security.

This document presents student work in a Science test, which was completed as part of a LEAP assessment. The document includes multiple-choice and short-answer items that exemplify what students scoring at specified achievement levels should know and be able to do. A discussion of each item highlights the knowledge and skills it is intended to measure.

As you review the items, it is important to remember that a student's achievement level is based on his or her total test score (cumulative score for all questions in the test) in a content area, not on one particular item or section, and that the sample items included represent only a small portion of the body of knowledge and skills measured by the LEAP tests.

Science

The grade 8 LEAP Science test is composed of forty multiple-choice items, four independent short-answer items, and one comprehensive science task. The science task consists of three inquiry-based short-answer items and one extended constructed-response item, all based on a given problem or scenario. A student earns 1 point for each correct answer to a multiple-choice item, from 0 to 2 points for the answer and work shown for each short-answer item, and from 0 to 4 points for the answer and work shown for the extended constructed-response item.

The short-answer items are scored using the following rubric:

Score	Description
2	<ul style="list-style-type: none"> The student's response provides a complete and correct answer.
1	<ul style="list-style-type: none"> The student's response is partially correct. The student's response demonstrates limited awareness or contains errors.
0	<ul style="list-style-type: none"> The student's response is incorrect, irrelevant, too brief to evaluate, or blank.

The extended constructed-response item is scored using the following rubric:

Score	Description
4	<ul style="list-style-type: none"> The student's response demonstrates in-depth understanding of the relevant content and/or procedures. The student completes all important components of the task accurately and communicates ideas effectively. Where appropriate, the student offers insightful interpretations and/or extensions. Where appropriate, the student uses more sophisticated reasoning and/or efficient procedures.
3	<ul style="list-style-type: none"> The student completes most important aspects of the task accurately and communicates clearly. The student's response demonstrates an understanding of major concepts and/or processes, although less important ideas or details may be overlooked or misunderstood. The student's logic and reasoning may contain minor flaws.
2	<ul style="list-style-type: none"> The student completes some parts of the task successfully. The student's response demonstrates gaps in conceptual understanding.
1	<ul style="list-style-type: none"> The student completes only a small portion of the task and/or shows minimal understanding of the concepts and/or processes.
0	<ul style="list-style-type: none"> The student's response is incorrect, irrelevant, too brief to evaluate, or blank.

It is important to recognize that score points for constructed-response items and LEAP achievement levels do not share a one-to-one correspondence. For example, it should not be assumed that a student who scores at the *Advanced* level in the assessment has earned a score of 4 on the extended constructed-response item.

It is possible for a grade 8 student to earn a total of 58 points on the LEAP Science test. The number of raw score points a student would have to achieve to reach each achievement level may change slightly from year to year given the difficulty of that particular form of the test. The spring 2012 raw score range for each achievement level is shown below.

Spring 2012 Science Test, Grade 8

Achievement Level	Raw Score Range
Advanced	51–58 points
Mastery	43–50 points
Basic	33–42 points
Approaching Basic	23–32 points
Unsatisfactory	0–22 points

The following section of this document presents four multiple-choice items, each taken from four of the five science strands: **Science as Inquiry, Physical Science, Earth and Space Science, Life Science, and Science and the Environment**. The items were selected because they illustrate results from four of the five achievement levels used to report LEAP results—*Advanced, Mastery, Basic, and Approaching Basic*. Examples of *Unsatisfactory* work are not included; by definition, work classified as *Unsatisfactory* exhibits a narrower range of knowledge and skills than work classified as *Approaching Basic*. Information shown for each item includes

- the strand and benchmark each item measures,
- the achievement level or score point,
- the correct answer, and
- commentary on the skills/knowledge measured by the item.

Grade 8—Science Multiple-Choice Items

- Strand:** Science and the Environment
- Benchmark SE-M-A2:** demonstrating an understanding of how carrying capacity and limiting factors affect plant and animal populations
- Achievement Level:** *Advanced*

Which statement **best** describes how birth and death rates compare in a population at carrying capacity?

- A. The birth rate is greater than the death rate.
- B. The birth rate is less than the death rate.
- * C. The birth rate is equal to the death rate.
- D. The birth rate and the death rate are zero.

* *correct answer*

This **Science and the Environment** item would most likely be answered correctly by students who score at the **Advanced** level. The item requires students to understand that plant and animal populations are affected by carrying capacity and limiting factors.

Students who choose option A may recognize that once carrying capacity for a population is reached, individuals will continue to be born but do not recognize that when a birth rate grows out of balance with the death rate, the size of the population will continue to grow beyond the capacity of the habitat to support it.

Students who choose option B may recognize that once carrying capacity for a population is reached, individuals will continue to die but do not recognize that in a population where the death rate grows out of balance with the birth rate, the size of the population will decline to the point of extinction.

Students who choose option D may recognize that once carrying capacity is reached, the birth rate equals the death rate but may not recognize that population extinction exists when the birth and death rates are zero.

Students who choose option C correctly recognize that a population's carrying capacity is the maximum number of individuals of a species that can be supported by a particular area's resources; adding individuals beyond this point (increasing birth rate) will deplete the area's resources and increase the death

rate. At carrying capacity, the population's birth rate and death rate are balanced, and the population remains at a level that can be supported by the habitat.

- Strand:** Physical Science
- Benchmark PS-M-A4:** understanding that atoms and molecules are perpetually in motion
- Achievement Level:** ***Mastery***

When observing a very small piece of dust in a liquid under a microscope, the dust appears to jiggle slightly. This movement results from the dust interacting with the molecules in the liquid. What property of the molecules in the liquid causes this effect?

- A. The molecules briefly form chemical bonds with nearby objects.
- * B. The molecules are always in random motion.
- C. The molecules transfer an electric charge to the dust particles.
- D. The molecules frequently change shape.

* *correct answer*

This **Physical Science** item would most likely be answered correctly by students who score at the ***Mastery*** level and above. The item requires students to understand that atoms and molecules are in perpetual motion.

Students who choose option A do not recognize that the action of the dust particles is not an indicator of chemical bonding since motion is a physical change.

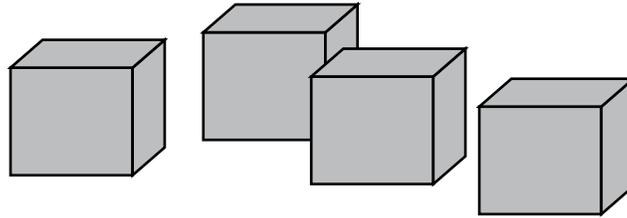
Students who choose option C may think that the motion of the dust particle comes from the process that creates static electricity.

Students who choose option D have a limited understanding of the physical properties of matter.

Students who choose option B correctly recognize that the movement of the dust particles is caused by their interaction with the motion of the molecules in the liquid.

Strand: Science as Inquiry
Benchmark SI-M-A4: developing descriptions, explanations, and graphs using data
Achievement Level: *Basic*

Use the diagram below to answer question XX.



Lana had four equal-size blocks. She used a balance to find that the mass of one block is 12.2 grams. Lana predicted the mass of all four blocks to be 48.8 grams. She found the mass of all four blocks is 50.3 grams. Which conclusion is **best** supported by these observations?

- A. Lana made a poor prediction.
- * B. At least one block has a different mass.
- C. At least one block has a different volume.
- D. Lana needs to use a more precise balance.

* *correct answer*

This **Science as Inquiry** item would most likely be answered correctly by students who score at the **Basic** level and above. The item requires students to make explanations using data.

Students who choose option A may assume that Lana made a poor prediction because it was incorrect. Lana assumed that since the blocks are of equal size, they are likely to be of equal mass. Based on this incorrect assumption, her prediction is sound. After collecting additional data that disproved her initial prediction, a new hypothesis is needed.

Students who choose option C may not have a clear understanding of the relationship between size and volume of the blocks. Blocks of equal size should be equivalent to blocks of equal volume.

Students who choose option D have insufficient data to assume that mass was measured imprecisely. While possible, it is not the **best** conclusion based on the data provided.

Students who choose option B recognize that the data presented indicate that even though the blocks are of equal size, they are not of equal mass; otherwise, Lana's prediction would be correct.

Strand: Life Science
Benchmark LS-M-D2: explaining how some members of a species survive under changed environmental conditions
Achievement Level: *Approaching Basic*

A lizard species mostly eats fruit from one particular type of tree. If a virus kills most of these trees, which individual lizards will **most likely** survive?

- A. lizards that can climb higher in the fruit trees
- B. lizards that have darker coloration
- * C. lizards that can find other types of food
- D. lizards that produce more offspring

** correct answer*

This **Life Science** item would most likely be answered correctly by students who score at the **Approaching Basic** level and above. The item requires students to understand that some species may survive environmental conditions change.

Students who choose option A may not recognize that a lizard climbing higher in a dead fruit tree **most likely** will not find food there to survive.

Students who choose option B may not recognize that having darker skin color, a survival mechanism that may protect a lizard from predators, **most likely** will not help it find other food to survive.

Students who choose option D may recognize that producing more offspring can be a survival mechanism for the species if the lizard has sufficient food to reproduce and its offspring have sufficient food to survive. In this case, it is **most likely** that food will be scarce since the virus is killing the lizard's primary food source.

Students who choose option C correctly recognize that even though the lizard mostly eats one type of food, that one type of food isn't necessarily the only type of food it will eat. Lizards **most likely** can find other types of food to survive.

Grade 8—Science Short-Answer Items

A science short-answer item for a LEAP test may require students to reflect on an idea, demonstrate understanding of the unifying concepts and processes of science, make meaning of a given set of data, or critique the design or interpretation of results from an experiment. Frequently, the short-answer items have more than one part. In addition to writing, students may be asked to work with graphics, tables, or other materials.

The items, scoring rubrics, and sample student work are shown on the following pages. The student responses at each score point (0 to 2) are annotated to explain how each score was derived and to identify the strengths and weaknesses of the responses.

Strand: Earth and Space Science

Benchmark ESS-M-A8: identifying the man-made and natural causes of coastal erosion and the steps taken to combat it

Louisiana is constantly losing important wetlands to both human uses and natural causes. Identify one cause of wetland loss and tell whether it is due to human use or natural causes.

Scoring Rubric

Score	Description
2	Student identifies a recognized cause and tells whether it is due to human use or natural cause. There are no errors.
1	Student makes error(s) in describing or attributing a cause but includes some correct information.
0	The student's response is incorrect, irrelevant, too brief to evaluate, or blank.

Scoring Notes

HUMAN CAUSES—building levees that prevent natural floods that replenish wetlands, building canals and channels that allow salt water intrusion and drain wetlands, recreation uses that disturb wetlands, destruction or overuse of barrier islands that protect wetlands, commercial and residential development.

NATURAL CAUSES—wave, wind, and tidal erosion of sand dunes and other barriers, coastal storms that cause sand and salt water intrusion, nutria (rodent) destruction of natural vegetation, natural sinking of land (subsidence) enhanced by lack of sediment, change in sea level.

Score Point 2

Louisiana is constantly losing important wetlands to both human uses and natural causes. Identify one cause of wetland loss and tell whether it is due to human use or natural causes.

one cause of wetland loss is when a hurricane comes with high surges. The water covers up the wetland, causing us to lose more. Natural cause.

The student describes a recognized cause of wetland loss, “when a hurricane comes with high surges.” The student correctly states that this is a natural cause of wetland loss. There are no errors. This response earns 2 points.

Score Point 1

Louisiana is constantly losing important wetlands to both human uses and natural causes. Identify one cause of wetland loss and tell whether it is due to human use or natural causes.

nutria rats because they eat up our grass in the wetlands.

The student describes a recognized cause of wetland loss, “nutria rats because they eat up our grass,” but neglects to tell whether this is due to human use or natural causes. This response earns 1 point.

Score Point 0

Louisiana is constantly losing important wetlands to both human uses and natural causes. Identify one cause of wetland loss and tell whether it is due to human use or natural causes.

One important wetland cost is the lost of plants and animals. It is both human uses and natural causes.

There is no correct or relevant information in this response. The student describes a “cost” of wetland loss (“lost of plants and animals”) but does not correctly describe a cause. Since no cause is described, the statement, “It is both human uses and natural causes,” is considered irrelevant. This response receives a score of 0.



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