

RELEASED TEST ITEMS

Sample Student Work
Illustrating LEAP Achievement Levels

Fall 2008

Science



Grade

8

Louisiana Department of
EDUCATION

Paul G. Pastorek
State Superintendent of Education

Louisiana State Board of Elementary and Secondary Education

Ms. Linda Johnson

President

8th BESE District

Mr. Walter Lee

Vice President

4th BESE District

Ms. Louella Givens

Secretary/Treasurer

2nd BESE District

Mr. James D. Garvey, Jr.

1st BESE District

Ms. Glenny Lee Buquet

3rd BESE District

Mr. Keith Guice

5th BESE District

Mr. Charles E. Roemer

6th BESE District

Mr. Dale Bayard

7th BESE District

Mr. John L. Bennett

Member-at-Large

Ms. Penny Dastugue

Member-at-Large

Ms. Tammie A. McDaniel

Member-at-Large

Dr. Amy Westbrook

Executive Director

For further information, contact

Claudia Davis

Division of Assessments and Accountability

225-342-3393, claudia.davis@la.gov

The Louisiana Department of Education (LDE) does not discriminate on the basis of sex in any of the education programs or activities that it operates, including employment and admission related to such programs and activities. The LDE is required by Title IX of the Education Amendments of 1972 (Title IX) and its implementing regulations not to engage in such discrimination. LDE's Title IX Coord. is Patrick Weaver, Deputy Undersecretary, LDE, Exec. Office of the Supt.; PO Box 94064, Baton Rouge, LA 70804-9064; 877-453-2721 or customerservice@la.gov. All inquiries pertaining to LDE's policy prohibiting discrimination based on sex or to the requirements of Title IX and its implementing regulations can be directed to Patrick Weaver or to the USDE, Asst. Sec. for Civil Rights.

This public document was published at a cost of \$180. One hundred and fifty (150) copies of this document were printed in this first printing at a cost of \$180. The total cost for the printing of this document, including reprints, was \$180. This document was published for the Louisiana Department of Education, Office of Student and School Performance, Division of Assessments and Accountability, PO Box 94064, Baton Rouge, LA 70804-9064, by Data Recognition Corporation, 13490 Bass Lake Road, Maple Grove, MN 55311. This material was printed in accordance with the standards for printing by State Agencies established pursuant to R.S. 43:31.

Louisiana Educational Assessment Program (LEAP)
GRADE 8 SAMPLE ITEMS AND STUDENT WORK
2007–2008

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 expectations for achievement for all Louisiana public school students and to improve public education in the state.

In March 2008, grade 8 students took 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.

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 Web site at www.louisianaschools.net.

LEAP Reports

Louisiana's grade 8 students are tested each year in the spring. Individual student, school, district, and state test results are released in phases in May and July. 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 given on page 2. Achievement level descriptors for all content areas can be found on the Louisiana Department of Education Web site at www.louisianaschools.net. Click on Testing at the top of the page and then on Achievement Level Descriptors in the drop-down menu under LEAP.

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 presents student work in a Science test, which was completed for 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 sample items represent 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 content-based 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 2008 raw score range for each achievement level is shown below.

Spring 2008 Science Test, Grade 8

Achievement Level	Raw Score Range
Advanced	53 – 58 points
Mastery	44 – 52 points
Basic	34 – 43 points
Approaching Basic	25 – 33 points
Unsatisfactory	0 – 24 points

The following section of this document presents four multiple-choice items, each taken from four of the five science strands: **Physical Science, Science as Inquiry, Science and the Environment,** and **Earth and Space Science.** 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.* In addition, two short-answer items with their scoring rubrics and sample student responses at score points 0 to 2 are included. For these items, each student response is annotated to explain how the score was derived and to identify the strengths and weaknesses of the response. Information shown for each item includes

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

Grade 8—Science Multiple-Choice Items

Strand:	Physical Science
Benchmark PS-M-C2:	Understanding the different kinds of energy transformations and the fact that energy can be neither destroyed nor created
Achievement Level:	<i>Advanced</i>

As a heavy metal ball rolls down a hill, it goes faster and faster. Which statement is true?

- * A. The ball's potential energy is changing to kinetic energy.
- B. The ball is gaining potential energy from the hill.
- C. The ball is rapidly losing kinetic energy as it rolls down the hill.
- D. The ball will continue gaining kinetic energy until it stops.

* *correct answer*

This item would most likely be answered correctly by students who score at the *Advanced* level. The item requires students to have knowledge of forms of energy and of energy conversion from one form to another. Students who select option B most likely have confused potential with kinetic energy, believing energy of motion is potential rather than kinetic. Students who select option C also misunderstand the two types of energy. Students who select option D understand part of this concept (energy conversion)—that gravitational potential energy is associated with height, so as the ball loses elevation the form of energy changes. However, these students do not understand that kinetic energy is related to the speed of the object and that as the ball slows, kinetic energy converts to potential energy. Students who select option A understand that potential energy is converted to kinetic energy as the ball rolls down the hill (gains speed). They also understand that as the ball increases in speed, it gains kinetic energy as potential energy is converted to kinetic.

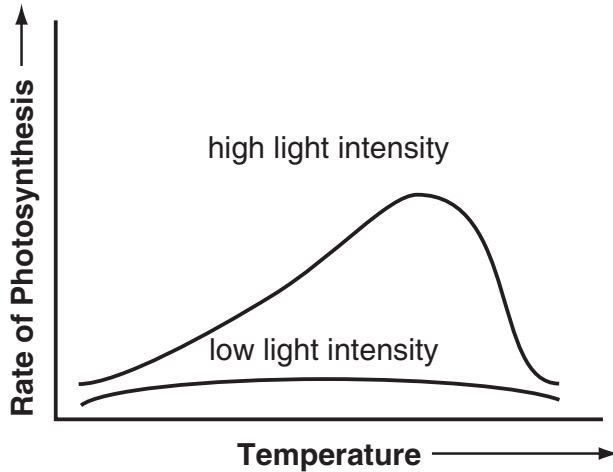
Strand: Science as Inquiry

Benchmark SI-M-B1: Recognizing that different kinds of questions guide different kinds of scientific investigations

Achievement Level: *Mastery*

Use the graph below to answer question XX.

Photosynthesis Investigation Results



The graph shows the results of a photosynthesis investigation on algae. Which question was the scientist **most likely** studying?

- A. Why is the rate of photosynthesis different in high light intensity from low light intensity?
- B. Why does increasing the light intensity increase the rate of photosynthesis in algae?
- * C. How is the rate of photosynthesis in algae at two light intensities affected by different temperatures?
- D. How does increasing the rate of photosynthesis in algae change its temperature?

* correct answer

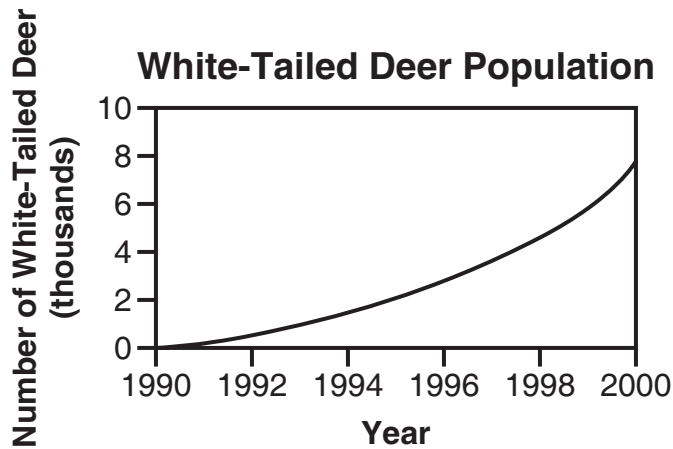
This item would most likely be answered correctly by students who score at the *Mastery* level and above. The item requires students to analyze a graph and correctly describe an investigation. Students who select option A incorrectly interpret the information, most likely believing the intensity of light is the manipulated variable because there are two relationship curves shown on the graph. Students who select option B also misunderstand which variable is manipulated. Students who select option D confuse the independent/ manipulated and dependent/responding variables; they select the photosynthesis rate as the manipulated variable. Students who select option C correctly interpret the results of the investigation by accurately identifying the variables shown on the graph.

Strand: Science and the Environment

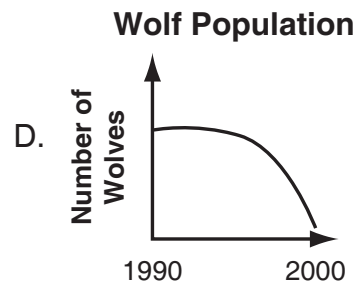
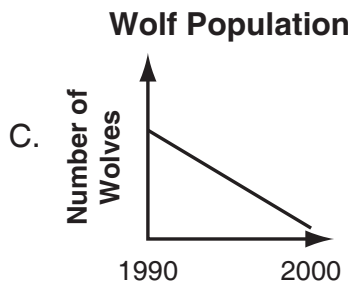
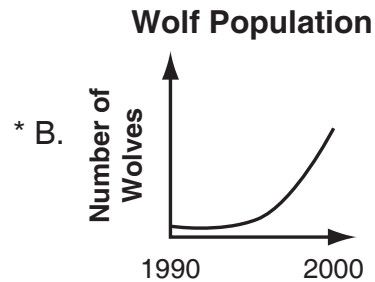
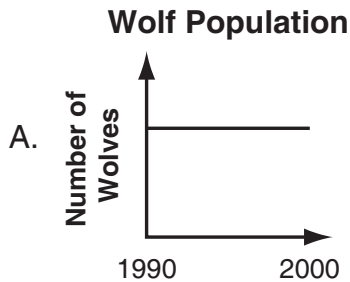
Benchmark SE-M-A2: Demonstrating an understanding of how carrying capacity and limiting factors affect plant and animal populations

Achievement Level: *Basic*

Use the graph below to answer question XX.



The graph above shows how a white-tailed deer population recovered over a ten-year period after a population crash. Wolves in the same area feed primarily on deer. Which graph shows the **most likely** change in wolf population for the same ten-year period?



* correct answer

This item would most likely be answered correctly by students who score at the *Basic* level and above. The item requires students to know the relationship that exists between producers and consumers of an ecosystem. Students who choose option A, C, or D think that the deer population would increase only if the predator population remained constant or decreased. These students do not consider that the population crash may have resulted from a disease or other factor and not from predators. Students who choose option B understand that the wolf population should increase as the availability of a food source increases.

Strand: Earth and Space Science

Benchmark ESS-M-C5: Modeling the position of the Earth in relationship to other objects in the solar system

Achievement Level: *Approaching Basic*

In an accurate diagram of the solar system, which object would be shown **closest** to Earth?

- * A. the Moon
- B. the asteroid belt
- C. Mars
- D. Saturn

* *correct answer*

This item would most likely be answered correctly by students who score at the *Approaching Basic* level and above. The item requires students to know the position of objects within our solar system relative to Earth. Students who select option B may be confusing asteroids with meteoroids, many of which reach Earth's atmosphere. Students who select option C or D may be misreading the stem and are selecting the planet they believe is farthest from Earth or are confused about the relative position of planets in the solar system. Students who select option A know that the Moon is the closest of these objects to Earth.

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.

Sample 1

Strand: Physical Science

Benchmark PS-M-C5: Investigating and describing the movement of heat and the effects of heat in objects and systems

Describe how molecules transfer heat through the length of a copper bar from a hot end to a cold end.

Scoring Rubric

Score	Description
2	The student correctly describes the mechanism for the heat transfer. There are no errors.
1	The student describes the mechanism but includes error(s) or misconception(s).
0	The student's response is incorrect, irrelevant, too brief to evaluate, or blank.

Information for Scorers:

Heat in solids such as copper becomes kinetic energy of atoms that vibrate in position. High-energy vibration of atoms in one area of the metal causes the vibration of neighboring atoms to increase and so on through the metal. Students should not be considered wrong if they use the term *molecules* instead of *atoms*.

The word *conduction* by itself gets 1 point for basic knowledge.

Score Point 2

Describe how molecules transfer heat through the length of a copper bar from a hot end to a cold end.

The heat is transferred from one atom to another until the whole bar is heated. This is how all things are heated.

The student earns 2 points by correctly stating that heat is transferred from one atom to another in a copper bar until the whole bar is heated.

Score Point 1

Describe how molecules transfer heat through the length of a copper bar from a hot end to a cold end.

The heat is generated through the metal part of copper and this process is called conduction.

The student earns 1 point by stating that heat is generated through the metal by conduction.

Score Point 0

Describe how molecules transfer heat through the length of a copper bar from a hot end to a cold end.

Molecules transfer heat through the length of a copper bar from a hot end to a cold end by the copper.

The student copied the information from the test item and so receives no credit.

Sample 2**Strand:** Life Science**Benchmark LS-M-A5:** Investigating human body systems and their functions (including circulatory, digestive, skeletal, respiratory)

For people to live, there must be a way to get food and oxygen to their cells and a way to remove carbon dioxide and other wastes from the cells. Identify the system that performs these functions and describe how it works.

Scoring Rubric

Score	Description
2	The student correctly identifies the circulatory system AND describes how it works. Response contains no errors.
1	The student identifies the circulatory system and may partially describe how it works OR the student describes how the circulatory system works without naming the system. Response may contain errors or omissions.
0	The student's response is incorrect, irrelevant, too brief to evaluate, or blank.

Score Point 2

For people to live, there must be a way to get food and oxygen to their cells and a way to remove carbon dioxide and other wastes from the cells. Identify the system that performs these functions and describe how it works.

The circulatory system performs this task. It takes oxygen from the lungs and is pumped by the heart to parts of the body. It removes waste and takes it to organs that will clean the blood.

The student earns 2 points for identifying the circulatory system correctly and describing how the heart pumps oxygen to different parts of the body and removes waste and takes it to organs to clean.

Score Point 1

For people to live, there must be a way to get food and oxygen to their cells and a way to remove carbon dioxide and other wastes from the cells. Identify the system that performs these functions and describe how it works.

Blood provides oxygen to cells and carries waste out of cells and disposes of it.

The student earns 1 point for describing that the system provides oxygen to the cells and carries away waste from the cells. The student failed to identify the system.

Score Point 0

For people to live, there must be a way to get food and oxygen to their cells and a way to remove carbon dioxide and other wastes from the cells. Identify the system that performs these functions and describe how it works.

You can get food anywhere but I'm not sure about oxygen

The student does not identify the system or describe how the system works and so receives no credit.



Fall 2008

Louisiana Department of Education
Office of Student and School Performance
Division of Assessments and Accountability