

# ACTAAP

Arkansas Comprehensive Testing, Assessment, and Accountability Program

**RELEASED ITEM**

**BOOKLET**

**GRADE 5**

**AUGMENTED BENCHMARK EXAMINATION**

**April 2015**

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**Arkansas Department of Education**



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The criterion-referenced tests implemented as part of the Arkansas Comprehensive Testing, Assessment, and Accountability Program (ACTAAP) are being developed in response to Arkansas Legislative Act 35, which requires the State Board of Education to develop a comprehensive testing program that includes assessment of the challenging academic content standards defined by the Arkansas Curriculum Frameworks.

As part of this program, all grade 5 students in Arkansas public schools participated in the *Grade 5 Augmented Benchmark Examination* in April 2015.

This Released Item Booklet for the *Grade 5 Augmented Benchmark Examination* contains test questions or items that were asked of students during the April 2015 operational administration. The test items included in Part II of this booklet are some of the items that contributed to the student performance results for that administration.

Students were given between two and three hours each day to complete assigned test sessions during the two days of testing in April 2015. All of the multiple-choice items within this booklet have the correct response marked with an asterisk (\*). The open-response questions are listed with scoring guides (rubrics) immediately following. These rubrics provide information on the scoring model used.

The development of the *Grade 5 Augmented Benchmark Examination* was based on the Arkansas Curriculum Frameworks. These frameworks have common distinct levels: Strands to be taught in concert, Content Standards within each Strand, and Student Learning Expectations within each Content Standard. An abridged version of the *Arkansas Science Curriculum Framework* can be found in Part III of this booklet. It is important to note that this abridged version lists only the predominant Strand, Content Standard, and Student Learning Expectation associated with each item. However, since many key concepts within the Arkansas Curriculum Frameworks are interrelated, in many cases there are other item correlations or associations across Strands, Content Standards, and Student Learning Expectations.

Part III of the Released Item Booklet also contains a tabular listing of the Strand, Content Standard, and Student Learning Expectation that each question was designed to assess. The multiple-choice and open-response items found on the *Grade 5 Augmented Benchmark Examination* were developed in close association with the Arkansas education community. Arkansas teachers participated as members of the Content Advisory Committee providing routine feedback and recommendations for all items. The number of items associated with specific Strands, Content Standards, and Student Learning Expectations was based on approximate proportions suggested by the Content Advisory Committee, and their recommendations were accommodated to the greatest extent possible given the overall test design. Part III of the Released Item Booklet provides Arkansas educators with specific information on how the *Grade 5 Augmented Benchmark Examination* items align or correlate with the Arkansas Curriculum Frameworks to provide models for classroom instruction.

## PART I Scoring Student Responses to Open-Response Items

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While multiple-choice items are scored by machine to determine if the student chose the correct answer from four options, responses to open-response items must be scored by trained “readers” using a pre-established set of scoring criteria.

The Arkansas Benchmark Rangefinding Committee assisted in the development of the scoring criteria. The committee comprises active Arkansas educators with expertise in science.

### Reader Training

All readers who qualify for scoring Arkansas Benchmark Science will have a four year college degree.

Before readers are allowed to begin assigning scores to any student responses, they go through intensive training. The first step in that training is for the readers to read the science open-response item as it appeared in the test booklet and to respond—just as the student test takers are required to do. This step gives the readers some insight into how the students might have responded. The next step is the readers’ introduction to the scoring rubric. All of the specific requirements of the rubric are explained by the Scoring Director who has been specifically trained to lead the scoring group. Then, responses (anchor papers) that illustrate the score points of the rubric are presented to the readers and discussed. The goal of this discussion is for the readers to understand why a particular response (or type of response) receives a particular score. After discussion of the rubric and anchor papers, readers practice scoring sets of responses that have been pre-scored and selected for use as training papers. Detailed discussion of the responses and the scores they receive follows.

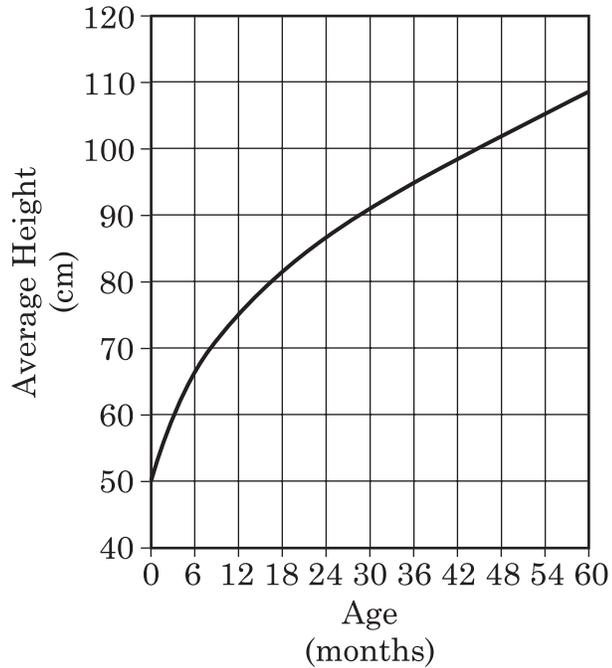
After three or four of these practice sets, readers are given “qualifying rounds.” These are additional sets of pre-scored papers, and, in order to qualify, each reader scoring responses must score in exact agreement on at least 80% of the responses. Readers who do not score within the required rate of agreement are not allowed to score the *Grade 5 Augmented Benchmark Examination* responses.

Once scoring of the actual student responses begins, readers are monitored constantly throughout the project to ensure that they are scoring according to the criteria. Daily and cumulative statistics are posted and analyzed, and the Scoring Director or Team Leaders reread selected responses scored by the readers. These procedures promote reliable and consistent scoring. Any reader who does not maintain an acceptable level of agreement is dismissed from the project.

### Scoring Procedures

All student responses to the *Grade 5 Augmented Benchmark Examination* open-response test items are scored independently by two readers. Those two scores are compared, and responses that receive scores that are non-adjacent (a “1” and a “3,” for example) are scored a third time by a Team Leader or the Scoring Director for resolution.

- 1 The graph below shows the average height of children from birth to five years old.



At approximately which age is a child **most likely** 80 cm tall?

- A 12 months
- \* B 18 months
- C 48 months
- D 80 months

- 2 A student observes two flowering plants in a meadow.



Which characteristic of the plants is **most** alike?

- A height of plant
- \*B shape of leaves
- C shape of flower
- D number of petals

- 3** In 1872, the United States created a national park called Yellowstone. The park includes more than two million acres in the three states of Idaho, Montana, and Wyoming.

Which statement **best** explains why national parks have a positive effect on ecosystems?

- A** National parks limit people from seeing wildlife.
- \***B** National parks limit mining, logging, and hunting.
- C** National parks protect land for farmers and ranchers.
- D** National parks protect land for people to build houses.

- 4** A student observes cells in an object by using a microscope. The student thinks that the object was part of a living thing.

Which statement explains why cell theory can be used to support the student's thinking?

- A** Cell theory was developed using a microscope.
- B** Cell theory was developed to study living things.
- \***C** Cell theory states that all living things are made of cells.
- D** Cell theory states that scientists may classify things as living or nonliving.

- 5** Which statement describes all matter?

- A** All matter contains carbon.
- B** All matter contains oxygen.
- C** All matter is made up of cells.
- \***D** All matter is made up of atoms.

- 6** Which phrase **best** describes the mass of an object?

- A** the weight of the object
- B** the volume of the object
- \***C** the amount of matter in the object
- D** the amount of gravitational pull on the object

- 7** Which is the **best** example of an object with kinetic energy?

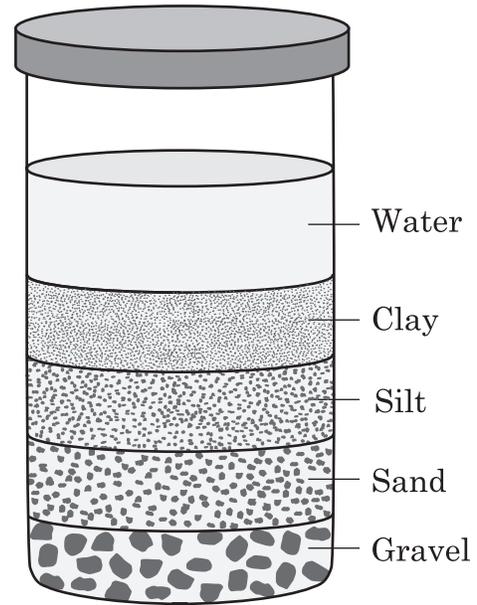
- A** a plate sitting on a table
- B** a bird perching in a tree
- \***C** a marble rolling down a ramp
- D** a dam holding back some water

- 8** Antarctica is a continent at Earth's south pole. Fossils of tropical fern plants were discovered in Antarctica even though these plants do not grow there today.

Which conclusion does the fossil evidence **best** support?

- \***A** Millions of years ago, Antarctica was in a warmer location on Earth.
- B** Recently, a natural disaster killed all of the fern plants in Antarctica.
- C** Recently, birds stopped carrying the seeds of fern plants to Antarctica.
- D** Millions of years ago, Earth's south pole was much colder than it is today.

- 9** A student collected muddy water in a jar from a fast-flowing stream. After two days, the student saw four layers of sediment in the jar, as shown below.



Which kind of sediment is heaviest?

- A** clay
- B** silt
- C** sand
- \***D** gravel

**Science Item A—2015 Grade 5**

**A** A student sets up an aquarium to study the carbon dioxide-oxygen cycle. Water is added to the aquarium. The student chooses items from the list below to place into the aquarium.

- |       |       |
|-------|-------|
| Algae | Fish  |
| Plant | Rock  |
| Sand  | Snail |

1. Name two items from the list that the student should place into the aquarium that are necessary for studying the carbon dioxide-oxygen cycle.
2. Explain why the items named in Part 1 are necessary for studying the carbon dioxide-oxygen cycle.

The student places the aquarium in a dark room.

3. Explain how placing the aquarium in a dark room affects the carbon dioxide-oxygen cycle.

**BE SURE TO LABEL YOUR RESPONSES 1, 2, AND 3.**

**Science Item A Scoring Rubric—2015 Grade 5**

<b>Score</b>	<b>Description</b>
4	Response shows a complete understanding of conducting investigations demonstrating the role of the carbon dioxide-oxygen cycle in ecosystems. The response to all parts of the task is correct and complete.
3	Response shows a nearly complete understanding of conducting investigations demonstrating the role of the carbon dioxide-oxygen cycle in ecosystems. The response may contain minor errors.
2	Response shows a limited understanding of conducting investigations demonstrating the role of the carbon dioxide-oxygen cycle in ecosystems. The response may contain a major error.
1	Response shows a minimal understanding of conducting investigations demonstrating the role of the carbon dioxide-oxygen cycle in ecosystems. The response may be incomplete or contain a major error.
0	Response shows insufficient understanding of conducting investigations demonstrating the role of the carbon dioxide-oxygen cycle in ecosystems. The response contains major errors or is irrelevant.

**Solution and Scoring**

<b>Parts</b>	<b>Points</b>
1	<b>1 point possible:</b> ½ point for each item named
2	<b>2 points possible:</b> 1 point for each explanation
3	<b>1 point possible:</b> 1 point for explanation

**The Arkansas Science Curriculum Framework\***

<b>Strands</b>	<b>Content Standards</b>	<b>Student Learning Expectations</b>
1— Nature of Science (N)	1. Characteristics and Processes of Science Students shall demonstrate and apply knowledge of the characteristics and processes of science using appropriate safety procedures, equipment, and technology	1. Make observations 2. Identify and define components of experimental design used to produce empirical evidence: <ul style="list-style-type: none"> <li>• hypothesis</li> <li>• replication</li> <li>• sample size</li> <li>• appropriate use of control</li> <li>• use of standardized variables</li> </ul> 4. Interpret scientific data using <ul style="list-style-type: none"> <li>• data tables/charts</li> <li>• bar graphs</li> <li>• circle graphs</li> <li>• line graphs</li> <li>• stem and leaf plots</li> <li>• Venn diagrams</li> </ul> 5. Communicate results and conclusions from scientific inquiry

\* The Content Standards and Student Learning Expectations listed are those that specifically relate to the released and non-released test items in this booklet.

**PART III Item Correlation with Curriculum Framework—Grade 5**

**The Arkansas Science Curriculum Framework\* (continued)**

Strands	Content Standards	Student Learning Expectations
2— Life Science (L)	<p>2. Living Systems: Characteristics, Structure, and Function Students shall demonstrate and apply knowledge of living systems using appropriate safety procedures, equipment, and technology</p>	<p>1. Compare the cell theory to the characteristics of a scientific theory</p> <p>4. Model and identify the parts of animal cells and plant cells:</p> <ul style="list-style-type: none"> <li>• cell wall</li> <li>• cell membrane</li> <li>• nucleus</li> <li>• cytoplasm</li> <li>• chloroplast</li> </ul> <p>5. Compare and contrast plant and animal cells</p> <p>8. Explain and illustrate photosynthesis</p>
	<p>4. Populations and Ecosystems Students shall demonstrate and apply knowledge of populations and ecosystems using appropriate safety procedures, equipment, and technology</p>	<p>1. Distinguish among and model</p> <ul style="list-style-type: none"> <li>• organisms</li> <li>• populations</li> <li>• communities</li> <li>• ecosystems</li> <li>• biosphere</li> </ul> <p>4. Evaluate food webs under conditions of stress:</p> <ul style="list-style-type: none"> <li>• overgrazing</li> <li>• overpopulation</li> <li>• natural disaster</li> <li>• introduction of nonnative species</li> <li>• human impact/urban development</li> </ul> <p>5. Examine the role of limiting factors on the carrying capacity of an ecosystem:</p> <ul style="list-style-type: none"> <li>• food</li> <li>• space</li> <li>• water</li> <li>• shelter</li> </ul> <p>8. Describe and diagram the carbon dioxide-oxygen cycle in ecosystems</p> <p>9. Conduct investigations demonstrating the role of the carbon dioxide oxygen cycle in ecosystems</p> <p>15. Conduct field studies identifying and categorizing organisms in a given area of an ecosystem</p> <p>16. Evaluate positive and negative human effects on ecosystems</p> <p>17. Describe and illustrate various symbiotic relationships:</p> <ul style="list-style-type: none"> <li>• parasitism</li> <li>• mutualism</li> <li>• commensalism</li> </ul>

\* The Content Standards and Student Learning Expectations listed are those that specifically relate to the released and non-released test items in this booklet.

**The Arkansas Science Curriculum Framework\* (continued)**

Strands	Content Standards	Student Learning Expectations
3— Physical Science (P)	5. Matter: Properties and Changes Students shall demonstrate and apply knowledge of matter, including properties and changes, using appropriate safety procedures, equipment, and technology	<ol style="list-style-type: none"> <li>1. Identify the relationship of atoms to all matter</li> <li>2. Conduct scientific investigations on physical properties of objects</li> <li>7. Demonstrate the effect of changes in the physical properties of matter</li> <li>8. Model the motion and position of molecules in solids, liquids, and gases in terms of kinetic energy</li> </ol>
	6. Motion and Forces Students shall demonstrate and apply knowledge of motion and forces using appropriate safety procedures, equipment, and technology	<ol style="list-style-type: none"> <li>2. Conduct investigations using                             <ul style="list-style-type: none"> <li>• levers (e.g., toothbrush)</li> <li>• pulleys</li> <li>• inclined planes-ramps, wedges, and screws</li> <li>• wheels and axles</li> </ul> </li> <li>5. Classify real world examples as potential energy or kinetic energy as applied to motion</li> </ol>
	7. Energy and Transfer of Energy Students shall demonstrate and apply knowledge of energy and transfer of energy using appropriate safety procedures, equipment, and technology	<ol style="list-style-type: none"> <li>1. Summarize how light can interact with matter through absorption, refraction, and reflection</li> <li>2. Investigate how light travels and interacts with an object or material</li> <li>3. Conduct investigations demonstrating how an object can be seen</li> <li>4. Design and conduct investigations of transparent, translucent, and opaque as applied to light</li> <li>5. Investigate physical interactions of light and matter and the effect on color perception:                             <ul style="list-style-type: none"> <li>• refraction</li> <li>• absorption</li> <li>• transmission</li> <li>• scattering</li> </ul> </li> </ol>

\* The Content Standards and Student Learning Expectations listed are those that specifically relate to the released and non-released test items in this booklet.

**PART III Item Correlation with Curriculum Framework—Grade 5**

**The Arkansas Science Curriculum Framework\* (continued)**

Strands	Content Standards	Student Learning Expectations
4— Earth and Space Science (E)	<p>8. Earth Systems Students shall demonstrate and apply knowledge of Earth's structure and properties using appropriate safety procedures, equipment, and technology</p>	<p>3. Identify characteristics of minerals</p> <p>4. Conduct investigations on mineral properties:</p> <ul style="list-style-type: none"> <li>• luster</li> <li>• hardness</li> <li>• streak</li> <li>• acid test for calcite</li> <li>• fluorescence</li> </ul> <p>5. Identify the following minerals:</p> <ul style="list-style-type: none"> <li>• halite (salt)</li> <li>• feldspar</li> <li>• sulfur</li> <li>• quartz</li> <li>• diamonds</li> <li>• gypsum</li> <li>• calcite talc</li> <li>• hematite (iron)</li> <li>• precious metals (gold, silver)</li> </ul> <p>9. Classify the three basic types of rocks</p> <p>11. Investigate the formation of soil</p> <p>12. Conduct investigations on sedimentation</p> <p>13. Describe and illustrate the rock cycle</p>
	<p>9. Earth's History Students shall demonstrate and apply knowledge of Earth's history using appropriate safety procedures, equipment, and technology</p>	<p>1. Explain and give examples of how physical evidence from fossils supports the theory that Earth has changed over time</p>
	<p>10. Objects in the Universe Students shall demonstrate and apply knowledge of objects in the universe using appropriate safety procedures, equipment, and technology</p>	<p>2. Demonstrate the order of planets and other space objects in our solar system</p> <p>3. Compare the properties of planets in our solar system:</p> <ul style="list-style-type: none"> <li>• size</li> <li>• shape</li> <li>• density</li> <li>• atmosphere</li> <li>• distance from the sun</li> <li>• orbital path</li> <li>• moons</li> <li>• surface</li> <li>• composition</li> </ul> <p>4. Distinguish between mass and weight</p>

\* The Content Standards and Student Learning Expectations listed are those that specifically relate to the released and non-released test items in this booklet.

**Released Items for 5th Grade Science**

<b>Item</b>	<b>Strand</b>	<b>Content Standard</b>	<b>Student Learning Expectation</b>
1	N	1	4
2	L	4	15
3	L	4	16
4	L	2	1
5	P	5	1
6	E	10	4
7	P	6	5
8	E	9	1
9	E	8	12
A	L	4	9

**Non-Released Items for 5th Grade Science**

<b>Strand</b>	<b>Content Standard</b>	<b>Student Learning Expectation</b>
P	7	3
E	8	13
P	7	5
E	10	2
L	2	5
L	2	8
P	7	5
E	8	11
L	2	4
P	7	2
L	4	1
E	10	3
L	4	16
E	8	3
E	8	9
N	1	1
E	8	13
L	4	17
P	5	8
E	8	4
L	4	5
P	7	4
E	8	5
L	4	8
P	6	2
N	1	5
P	5	7
L	4	4
E	10	3
P	5	2
P	7	1
N	1	2
N	1	4
P	6	2
N	1	5



# ACTAAP

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