



Exemplar Grade 3 Science Test Questions



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Introduction

This booklet explains ACT Aspire® Grade 3 Science test questions by presenting, with their answer keys, sample questions aligned to each reporting category on the test. A key includes the question's depth-of-knowledge (DOK) level,¹ an explanation of the task posed by each question, a thorough explanation of correct responses, ideas for improvement, and more. The exemplar test questions included here are representative of the range of content and types of questions found on the ACT Aspire Grade 3 Science test. Educators can use this resource in several ways:

- Become familiar with ACT Aspire question types.
- See what typical questions in each ACT Aspire reporting category look like.
- Help reinforce or adjust teaching and learning objectives.
- Learn how ACT Aspire improvement idea statements can help students identify key skills they have not yet mastered.

The ACT Aspire Science tests focus on the assessment of science practices using real-world scientific scenarios. At the earlier grades, topics generally focus on everyday student discovery rather than formal science. The scenarios in the upper grade assessments include student investigations, formal scientific research, formal scientific data from references, and students or scientists providing competing explanations for real scientific phenomena.

The content of the tests includes material from biology (life sciences at the earlier grades), chemistry and physics (physical science at the earlier grades), and Earth/space sciences (such as geology, astronomy, and meteorology). Advanced knowledge in these areas is not required, but background knowledge acquired in general, introductory science courses may be needed to answer some of the questions in the upper grade assessments. The tests do not, however, sample specific content knowledge with enough regularity to make inferences about a student's attainment of any broad area, or specific part, of the science content domain. The ACT Aspire tests stress science practices over recall of scientific content, complex mathematics skills, and reading ability. To that end, the ACT Aspire Science tests assess science practices in three domains: Interpretation of Data; Scientific Investigation; and Evaluation of Models, Inferences, and Experimental Results.

¹ Norman L. Webb, "Depth-of-Knowledge Levels for Four Content Areas," last modified March 28, 2002, <http://facstaff.wcer.wisc.edu/normw/All%20content%20areas%20%20DOK%20levels%2032802.doc>.

The ACT Aspire tests currently include selected-response (multiple-choice) questions, technology-enhanced items (online only), and constructed-response tasks. In the technology-enhanced items, students must carry out actions such as moving objects, typing in their answers, and manipulating bar and line graphs to provide their responses. The constructed-response tasks require students to produce, rather than select, a response. Constructed-response tasks assess complex reasoning or thinking skills by providing opportunities for students to explain, justify, critique, create, propose, produce, design, or otherwise demonstrate their knowledge and understanding in ways that are not typically assessed through selected-response items. Constructed-response tasks are scored according to scoring criteria unique to each item. The scoring criteria identify the specific information a student needs to include for a valid and complete response. Depending on the item, a holistic rubric may also be used to score the item. The holistic rubric is used to assess the overall proficiency of the response, allowing for differentiation among multiple skill levels. Some constructed-response tasks, called composite tasks, blend technology-enhanced or selected-response elements with open response.

Improvement Ideas

ACT Aspire includes simple improvement ideas at the reporting category (skill) level on student and parent reports. These improvement ideas are provided for the lowest performing skill for each subject tested. The skills are always ordered from highest performing to lowest performing based on the percentage of points correct. If the percentages for two or more skills are tied, the skill with the lower number of total points is displayed first.





Keep in mind that the order of skills listed on reports may not always be exemplary of where to focus learning. For example, the skills in which a student performed within the ACT Readiness Range may not always be listed first, and the skills in which a student did not perform within the ACT Readiness Range may not always be listed last. Also, keep in mind the total number of points possible in each skill when interpreting the percentage correct.

There are two levels of improvement idea statements (low and high) for ACT Aspire summative reporting. Low statements are given on the report if the student's lowest skill score is below the ACT Readiness Range for that particular skill. High statements are given on the report if the student's lowest skill score is at or above the ACT Readiness Range for that particular skill.

Answer Key





This section presents the grade, item type, DOK level, alignment to the ACT Aspire reporting categories, and correct response for each question. Each question is accompanied by an explanation of the question and the correct response as well as improvement idea statements for ACT Aspire Science.

There are many types of clouds. Clouds can be found at different *altitudes*. The altitude is the distance, in meters (m), measured from the ground to the bottom of the cloud. *Storm clouds* can produce rain, lightning, or both rain and lightning. All other clouds are *fair weather* clouds. This table shows 4 types of clouds and some of their properties.

Type of cloud	Description	Appearance	Lowest altitude (m)	Highest altitude (m)	Produces rain	Produces lightning
Cumulus	big and fluffy, flat at the bottom, white		500	1,500	no	no
Stratus	wide and flat layers, white or gray		500	1,000	yes	no
Cirrus	feathery and thin, white		7,000	12,000	no	no
Cumulonimbus	towering, flat at the bottom, white to dark gray		500	6,000	yes	yes

Question 1

and lightning. All other clouds are *fair weather* clouds. This table shows 4 types of clouds and some of their properties.

Type of cloud	Description	Appearance	Lowest altitude (m)	Highest altitude (m)	Produces rain	Produces lightning
Cumulus	big and fluffy, flat at the bottom, white		500	1,500	no	no
Stratus	wide and flat layers, white or gray		500	1,000	yes	no
Cirrus	feathery and thin, white		7,000	12,000	no	no
Cumulonimbus	towering, flat at the bottom, white to dark gray		500	6,000	yes	yes

Look at the table. Which type of cloud can be found at the highest altitude?

A. Cumulus
 B. Stratus
 C. Cirrus
 D. Cumulonimbus

Sequence	Grade	Question type	DOK level	Reporting category	Correct response
1	3	Selected Response	2	Interpretation of Data	C

This question requires the examinee to compare values for the highest altitude listed in the table.

Correct Response




According to the table, a cirrus cloud can be found at a greater altitude (12,000 m) than any of the other types of clouds, making answer option C the correct response.

Improvement Idea Statements


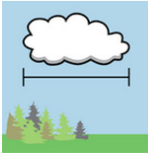


Reporting category	Grade	Low statement (scored below ACT Readiness Range)	High statement (scored at or above ACT Readiness Range)
Interpretation of Data	3	Generate and interpret a greater number and variety of data presentations (tables, line plots, pictographs, bar graphs). Begin working with more advanced data presentations (dense tables, line graphs).	Generate and interpret more advanced data presentations (dense tables, line graphs). Think about who will use a data presentation to decide how to present data in the most accurate and useful way.

Question 2

There are many types of clouds. Clouds can be found at different *altitudes*. The altitude is the distance, in meters (m), measured from the ground to the bottom of the cloud. *Storm clouds* can produce rain, lightning, or both rain and lightning. All other clouds are *fair weather* clouds. This table shows 4 types of clouds and some of their properties.

Type of cloud	Description	Appearance	Lowest altitude (m)	Highest altitude (m)	Produces rain	Produces lightning
Cumulus	big and fluffy, flat at the bottom, white		500	1,500	no	no
Stratus	wide and flat layers, white or gray		500	1,000	yes	no
Cirrus	feathery and thin, white		7,000	12,000	no	no

Look at the passage. Which of these diagrams best shows how the altitude of a cloud is measured?

- A. 
- B. 
- C. 
- D. 

Sequence	Grade	Question type	DOK level	Reporting category	Correct response
2	3	Selected Response	2	Scientific Investigation	D

This question requires the examinee to understand the methods used in a simple experiment.

Correct Response





According to the passage, the altitude of a cloud is measured from the ground to the bottom of the cloud. Answer option D is the correct response.

Improvement Idea Statements

Reporting category	Grade	Low statement (scored below ACT Readiness Range)	High statement (scored at or above ACT Readiness Range)
Scientific Investigation	3	Generate questions that can be investigated and then design and perform simple investigations that will validly test the questions. Start to examine more complex scientific investigations.	Generate questions that can be investigated and then design and perform scientific investigations to validly test the questions. Evaluate the methods and procedures used in other's investigations.

Question 3

bottom of the cloud. *Storm clouds* can produce rain, lightning, or both rain and lightning. All other clouds are *fair weather* clouds. This table shows 4 types of clouds and some of their properties.

Type of cloud	Description	Appearance	Lowest altitude (m)	Highest altitude (m)	Produces rain	Produces lightning
Cumulus	big and fluffy, flat at the bottom, white		500	1,500	no	no
Stratus	wide and flat layers, white or gray		500	1,000	yes	no
Cirrus	feathery and thin, white		7,000	12,000	no	no
Cumulonimbus	towering, flat at the bottom, white to dark gray		500	6,000	yes	yes

Students saw bright flashes of lightning in the sky. Based on the table, which type of cloud most likely produced the lightning? Explain your answer using information from the table.

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Sequence	Grade	Question type	DOK level	Reporting category	Correct response
3	3	Constructed Response	2	Evaluation of Models, Inferences, and Experimental Results	See scoring guide.

This question requires the examinee to make a conclusion based on information about cloud types provided in the table and to defend that conclusion using data from the table.

Scoring Guide

2 points; analytic

Rubric

Score	Description
2	The examinee identifies the type of cloud that produced lightning AND explains his or her answer using information from the table.
1	The examinee identifies the type of cloud that produced the lightning but either does not explain the answer OR explains the answer without using information from the table.
0	The response demonstrates little to no understanding of the concept.

Sample Student Responses

Score	Response
2	Cumulonimbus, because it is the only cloud listed in the table that produces lightning.
1	Cumulonimbus, because it is a storm cloud.
0	Stratus; it produces rain, and there is lightning when it rains.

Improvement Idea Statements

Reporting category	Grade	Low statement (scored below ACT Readiness Range)	High statement (scored at or above ACT Readiness Range)
Evaluation of Models, Inferences, and Experimental Results	3	Examine the results of simple investigations. Draw conclusions (claims and predictions) from those results. Consider ways to improve those investigations.	Examine the results of scientific investigations. Draw conclusions (claims and predictions) from those results and modify your investigations based on your conclusions.