



Exemplar Grade 5 Science Test Questions

ACT[®] **Aspire**[®]

discoveractaspire.org

Introduction

This booklet explains ACT Aspire® Grade 5 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 5 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.

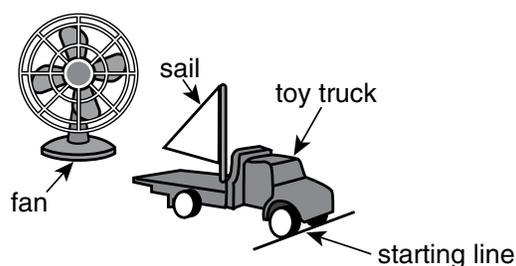
There are two levels of improvement idea statements (low and high) for ACT Aspire summative reporting. Low statements are given on the report if the student's lowest skill score is below the ACT Readiness Range for that particular skill. High statements are given on the report if the student's lowest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

Jonah attached a sail to a toy truck. He placed the truck at a starting line in front of a fan (see Figure 1).

Figure 1



Jonah switched on the fan. The moving air pushed against the sail, causing the truck to begin to move. The truck moved along the floor before slowing and coming to a stop. Jonah performed 2 investigations to study the motion of the truck.

Investigation 1

In Test 1, Jonah placed the truck at the starting line and switched on the fan. He then waited until the truck came to a stop. He switched off the fan and measured the distance, in centimeters (cm), between the starting line and the truck's front wheels. In Test 2, Jonah returned the truck to the starting line and placed one 10-gram (g) block in the back of the truck. He then repeated the steps from Test 1. In Tests 3–6, Jonah continued to repeat this method, adding one 10 g block each time, until the truck did not move from the starting line. His measurements are shown in Table 1.

Test	Number of blocks in the truck	Distance (cm)
1	0	110
2	1	85
3	2	70
4	3	45
5	4	15
6	5	0

Investigation 2

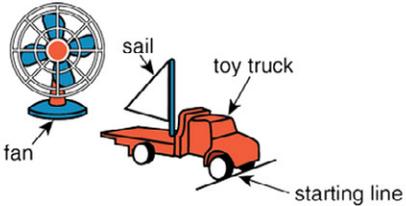
Jonah removed all the blocks from the truck and placed the truck at the starting line. He switched on the fan at the low setting and measured the distance in the same way as in Test 1. He repeated this test using the medium and high fan settings. His measurements are shown in Table 2.

Test	Fan setting	Distance (cm)
7	low	35
8	medium	70
9	high	110

Question 1

Jonah attached a sail to a toy truck. He placed the truck at a starting line in front of a fan (see Figure 1).

Figure 1



Jonah switched on the fan. The moving air pushed against the sail, causing the truck to begin to move. The truck moved along the floor before slowing and coming to a stop. Jonah performed 2 investigations to study the motion of the truck.

According to Table 1, what distance, if any, did the truck move when there were 4 blocks in the truck?

A. 0 cm

B. 15 cm

C. 45 cm

D. 110 cm

Sequence	Grade	Question type	DOK level	Reporting category	Correct response
1	5	Selected Response	1	Interpretation of Data	B

This item requires the examinee to select data from a table.

Correct Response

According to Table 1, the truck moved a distance of 15 cm when there were 4 blocks in the truck. Answer option B is the correct response.

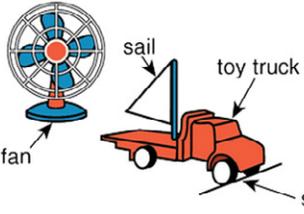
Improvement Idea Statements

Reporting category	Grade	Low statement (scored below ACT Readiness Range)	High statement (scored at or above ACT Readiness Range)
Interpretation of Data	5	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

Jonah attached a sail to a toy truck. He placed the truck at a starting line in front of a fan (see Figure 1).

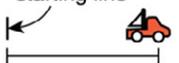
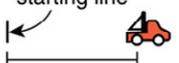
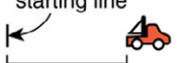
Figure 1



Jonah switched on the fan. The moving air pushed against the sail, causing the truck to begin to move. The truck moved along the floor before slowing and coming to a stop. Jonah performed 2 investigations to study the motion of the truck.

Which of these figures best shows how Jonah measured the distance the truck moved in each test?

- A. starting line

- B. starting line

- C. starting line

- D. starting line


Sequence	Grade	Question type	DOK level	Reporting category	Correct response
2	5	Selected Response	2	Scientific Investigation	B

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

Correct Response

According to the passage, the distance the truck moved was measured between the starting line and the truck's front wheels. Answer option B is the correct response.

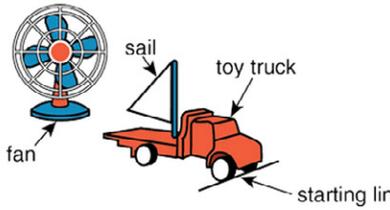
Improvement Idea Statements

Reporting category	Grade	Low statement (scored below ACT Readiness Range)	High statement (scored at or above ACT Readiness Range)
Scientific Investigation	5	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 others' investigations.

Question 3

Jonah attached a sail to a toy truck. He placed the truck at a starting line in front of a fan (see Figure 1).

Figure 1



Jonah switched on the fan. The moving air pushed against the sail, causing the truck to begin to move. The truck moved along the floor before slowing and coming to a stop. Jonah performed 2 investigations to study the motion of the truck.

Based on the results of Investigation 2, was the fan setting used in Investigation 1 more likely medium or high?

- A. Medium; the truck moved the same distance in Tests 1 and 9.
- B. Medium; the truck moved the same distance in Tests 2 and 8.
- C. High; the truck moved the same distance in Tests 1 and 9.
- D. High; the truck moved the same distance in Tests 2 and 8.

Sequence	Grade	Question type	DOK level	Reporting category	Correct response
3	5	Selected Response	2	Evaluation of Models, Inferences, and Experimental Results	C

This item requires the examinee to draw a conclusion from data collected in a table.

Correct Response

When the blocks were removed from the truck in Investigation 2, it moved a distance of 110 cm using the high fan setting (the same distance the truck moved in Investigation 1 with 0 blocks in the truck). The correct response is answer option C.

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	5	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.