Exemplar Grade 3 Mathematics Test Questions

ACT Aspire

Introduction

This booklet explains ACT® Aspire® Grade 3 Mathematics 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 Mathematics 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.

ACT Aspire Mathematics tests provide a picture of the whole of a student's mathematical development, including a look at the concepts and skills new to the grade level as well as whether the student has continued to strengthen, integrate, and apply mathematics from earlier grades. These components are important in judging how a student is progressing and what next steps are appropriate.

Reporting Categories

The following ACT Aspire reporting categories help to provide this picture.

Grade Level Progress

The Grade Level Progress reporting category represents a student's achievement related to the mathematical topics new to the grade. To allow for an analysis of student strengths, the category also includes a reporting category for each of the grade-level domains that constitute Grade Level Progress for that grade.

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[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**.

Integrating Essential Skills

The Integrating Essential Skills reporting category looks at the mathematical growth of the student with topics learned in previous grades. This mathematics should not be static, but should be strengthened as the student progresses through the grades. Students should integrate and become more fluent in these topics, using them flexibly as needed to solve problems, give explanations, and accomplish tasks of greater complexity that reflect grade-level expectations for mathematical practice.

Together, the Grade Level Progress and Integrating Essential Skills categories make up the entirety of the ACT Aspire Mathematics test. Two other reporting categories, Modeling and Justification and Explanation, pull out information that crosses the other reporting categories.

Modeling

The Modeling reporting category highlights questions that assess understanding of mathematical models and their creation, interpretation, evaluation, and improvement. Modeling is closely tied to problem solving, and because models are frequently used to teach mathematics—especially in the early grades—modeling is also closely tied to learning mathematics. Modeling expectations increase from one grade to the next. To ensure that the Modeling reporting category provides a better indication of being on track, some modeling skills are a part of the reporting category in lower grades but not in upper grades.

Justification and Explanation

The Justification and Explanation (JE) category focuses on giving reasons for why things work as they do, where students create a mathematical argument to justify. The evidence is collected through constructed-response tasks designed around a progression of justification skills connecting Grades 3 and up.

Structure of the Mathematics Test

The structure of the ACT Aspire Mathematics test is the same from Grade 3 through early high school (Grades 9 and 10), assessing new topics for the grade and whether students continue to strengthen their mathematical core. (For the Early High School test, Grade 8 topics are included in the Grade Level Progress component to keep together formal algebra, functions, and geometry topics. This makes Grade Level Progress and its subcategories more coherent.) Within this structure of content comes a level of rigor represented in part by a distribution of depth of knowledge through Webb's level 3. The Integrating Essential Skills component includes only DOK level 2 and level 3 because that component is about assessing how well students have continued to strengthen their mathematical core. Across all parts of the test, students can apply Mathematical Practices to help them demonstrate their mathematical achievement.

Mathematical justification is a way of knowing. In theory, students will be able to learn new mathematics more reliably if they have a strong framework to build upon. Mathematical justification is glue for that framework. The Common Core State Standards for Mathematics (CCSSM) recognizes this in its Mathematical Practice 3 (MP3): "Create viable arguments and critique the reasoning of others." The ACT Aspire Mathematics test focuses attention on student justification.

Students respond to JE tasks with a grade-level-appropriate mathematical argument. These tasks utilize a constructed-response format, allowing students flexibility in the way they shape their arguments. Each response is evaluated on the basis of demonstrated evidence of particular skills associated with mathematical justification. These JE skills include stating relevant properties and definitions that support the justification, constructing an argument that includes reasons for claims, and demonstrating indirect proof or command of counterexample.

The JE skills identified in table 1 are arranged in a progression from Grade 3 through EHS. At each grade, the JE skills are divided into three levels. Trained scorers weigh evidence and then make an overall determination about the evidence for or against each skill level. Demonstrating JE skills at one level is evidence of having learned the skills in previous levels. In addition to looking at the JE skills, each response is rated according to how successful the student was in completing the task assigned; this is the Progress rating. A full-credit response shows evidence of the required level of JE skills needed to solve the problem and applies these skills to complete the task.

For each of the JE tasks, evidence for and against each of the JE levels is combined with the Progress rating and mapped to a 0–4 scale. These task scores contribute to the JE reporting category and to the total Mathematics score. Some of the tasks contribute to the Grade Level Progress reporting category, and the others contribute to the Integrating Essential Skills reporting category.

Level 1 JE skills are those where students should have a fluent command, and Level 2 JE skills are those most closely aligned with grade-level focus. Level 3 JE skills are more advanced. As the research base increases for this progression, the list will grow and become more refined. Note that there are two JE statements for evidence of misconceptions. These are marked with asterisks in table 1.

As students progress from grade to grade, expectations increase according to which JE skill belongs to which level. Some level 3 JE skills will become level 2, and some level 2 will become level 1.

Table 1. Justification and Explanation Skills Progression

Justification statement	JE level at grade:				
	3–4	5	6–7	8	10
EXA Provide an example.	1	1	1	1	1
DEF State a definition, theorem, formula, or axiom.	1	1	1	1	1
PRT State a property or classification of an object.	1	1	1	1	1
REL State a relationship between two or more objects.	1	1	1	1	1
PRO1 State one or more steps in a procedure.	1	1	1	1	1
VIS1 Provide a visual representation.	1	1	1	1	1
CMP1 Provide a computation.	1	1	1	1	1
LFD1 Use a Specific Statement to draw a Conclusion or Provide Specific Support for a Statement.	1	1	1	1	1
CMP2 Use a computation to Support a Statement or Conclusion.	2	1	1	1	1
PAT1 Generate a sequence from a rule OR explain a pattern using words, algebraic expressions, or numeric operations.	2	1	1	1	1
LFD2 Use two or more Specific Statements to draw a Conclusion.	2	1	1	1	1
ERR1 Indicate an error occurred.	2	1	1	1	1
PRO2 Explain why a step in a procedure is necessary.	2	2	2	1	1
CON1 Make a conditional statement (e.g. If-Then, When-Then, etc.).	2	2	2	1	1
VIS2 Draw and label a visual representation that illustrates a mathematical concept, property, or relationship.	2	2	2	1	1
PAT2 Use a pattern or sequence to support a Statement or Conclusion.	2	2	2	1	1
CNE1 Provide a counterexample of a conditional statement.	2	2	2	2	2
LFD3 Use a General Statement to draw a Conclusion or Provide General Support for a Statement.	2	2	2	2	2
LFD4 Use a Claim to draw a Conclusion and provide Specific Support for the Claim.	2	2	2	2	2
LFD5 Use a Claim to draw a Conclusion and provide General Support for the Claim.	3	3	2	2	2
LFD6 Use a Specific Statement and a General Statement to draw a Conclusion.	3	3	2	2	2
VIS3 Draw and label a visual representation that illustrates a mathematical concept, property, or relationship and use the labeling in one's prose to clarify an argument.	3	3	3	2	2
N-EXA Use proof by example.	3	3	3	2	2
CON2 Conclude from a conditional statement.	3	3	3	2	2
ERR2 Indicate an error and use a mathematical concept (definition, theorem, or axiom) to explain why an error occurred.	3	3	3	3	2
CNE2 Provide a counterexample and verify that the conditional conclusion does not hold for the example.	3	3	3	3	2

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Table 1 *(continued)*

Justification statement	JE level at grade:				
	3–4	5	6–7	8	10
CNV Understand that a statement can be true and its converse or inverse can be false.	3	3	3	3	2
N-CNV States that the converse or inverse of a conditional statement is true because the original statement is true.	3	3	3	3	2
CLA1 State that an object belongs (or does not belong) to a class, state at least one of the common characteristics of the class, and state that the object has (or does not have) those characteristics.	3	3	3	3	2
LFD7 Use two or more Specific Statements to draw a Conclusion and provide Specific Support for at least one of the Statements.	3	3	3	3	2
LFD8 Use two General Statements to draw a Conclusion.	3	3	3	3	2
PAT3 Introduce a pattern or sequence and use it to support a Statement or Conclusion.	3	3	3	3	3
CNE3 Provide a counterexample and verify that the conditional hypotheses do hold for the example, while the conditional conclusion does not.	3	3	3	3	3
CON3 Conclude from a conditional statement and verify that the statement's hypotheses hold.	3	3	3	3	3
CAS Use cases in a proof.	3	3	3	3	3
IND Use indirect proof (e.g. proof by contradiction).	3	3	3	3	3
LFD9 Use two or more Claims to draw a Conclusion and provide Support for at least one Claim—at least one Claim or Support must be General.	3	3	3	3	3
CLA2 State what is required to be a member of a class, verify that an object meets all of those requirements, and then state that the object belongs to that class.	3	3	3	3	3

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.
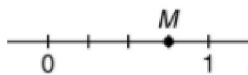
Answer Key

This section presents the grade, question type, DOK level, alignment to the ACT Aspire reporting categories, and correct response for each of several test questions. Each question is also accompanied by an explanation of the question and by the correct response as well as improvement idea statements for ACT Aspire Mathematics.
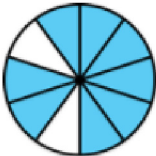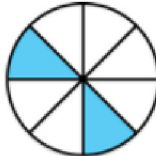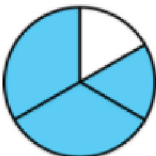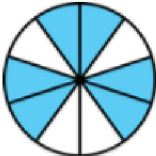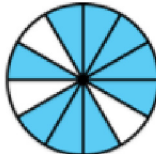
Some test questions are appropriate at several grades: as a part of Grade Level Progress when the topic is new to the grade and then in later grades as a part of Integrating Essential Skills (as long as the question is at least DOK level 2 for that grade).

Question 1

Juliana divided the part of a number line from 0 to 1 into sections of equal length. She plotted point M on the number line, as shown below.

One of the following circles is shaded to represent a fraction that is equivalent to the number represented by point M. Which one?

M

0   1

A.

B.

C.

D.

E.

Question type	CCSSM topic	Correct response
Selected Response	3.NF.A, MP4, Recognize equivalent fractions and fractions in lowest terms (N 13–15)	E

Appropriate grade level(s)	Integrating Essential Skills and Grade Level Progress reporting categories	Modeling	DOK level
3	Grade Level Progress > Number and Operations—Fractions	Yes	3
4–5	Integrating Essential Skills	Yes	3
6–EHS	Integrating Essential Skills	Yes	2

In this selected-response (multiple-choice) question, students must analyze the number line given and determine what fraction is being represented (CCSSM.3.NF.A.3). Because this question requires students to analyze the situation and connect different representations, it is a DOK level 3 question for the Grades 3, 4, and 5 tests. For all other ACT Aspire tests, it is a DOK level 2 question. Because students are interpreting models, this question is a part of the Modeling reporting category (MP4).

Correct Response

After determining that the fraction at point M is $\frac{3}{4}$, students must then determine which of the circles provided has $\frac{3}{4}$ of its area shaded. The circle in answer option E has 9 out of 12 equally sized sections shaded, and $\frac{9}{12}$ is equivalent to $\frac{3}{4}$.

Improvement Idea Statements

Reporting category	Grade	Low statement (scored below ACT Readiness Range)	High statement (scored at or above ACT Readiness Range)
Grade Level Progress	3	Complete your homework when assigned. Ask questions in class.	Explain one of your assignments to a parent, grandparent, brother, or sister.
Number and Operations—Fractions	3	Work on understanding and comparing unit fractions and understanding equivalent fractions. Why is 1/4 more than 1/6 ?	Make a drawing that has pictures that represent 5 different fractions. Show on the drawing how you know which picture represents the greatest fraction and which represents the least fraction.
Modeling	3	Work on creating picture representations of numerical statements and use the pictures to solve problems.	Create a 3-dimensional math problem by using everyday objects to represent numbers.

Question 2

After Cammy gets out of bed in the morning, she completes several activities to get ready for school. The list below shows the numbers of minutes she needs to complete each of these activities.

- 30 minutes: brush teeth, shower, and get dressed
- 10 minutes: eat breakfast
- 30 minutes: car ride to school

Cammy must be at school by 8:00 a.m. What is the **latest** time Cammy can get out of bed, complete all her activities, and still get to school on time? Explain why your answer is correct.

1000

Question type	CCSSM topic	Correct response
Justification and Explanation (Constructed Response)	3.MD.A, MP1, MP3	See explanation.

Appropriate grade level(s)	Integrating Essential Skills and Grade Level Progress reporting categories	JE level	Modeling	DOK level
3	Grade Level Progress	3	Yes	3
4–6	Integrating Essential Skills	3	No	3

This Justification and Explanation task asks students not just to find a solution, but to explain the procedure that leads to that solution. Successful students will explain how they solved the problem and give reasons why their solution is correct. Procedure, computation, and logical flow justification are a few of the justification skills this task elicits. The content here is addition and subtraction of time intervals (CCSSM.3.MD.A). This problem enables students to relate the mathematics they learn in the classroom to their everyday experience. A successful student will make sense of the problem and persevere in solving it (MP1). Students are doing modeling by simulating the events and connecting them to the time each takes. This level of modeling is a part of the Modeling reporting category for Grade 3 but not for higher grades.

For Grade 3 students, this task would be a part of the Grade Level Progress reporting category. This task would also be appropriate for the Grades 4, 5, or 6 tests. However, it would be a part of the Integrating Essential Skills reporting category for those tests. At these grade levels, this task requires JE level 3 reasoning and is part of the JE reporting category; the task also is a DOK level 3 task.

Response 1

The reasoning in the following sample response is within reach of a Grade 3 student and would receive full credit.

30 + 10 + 30 = 70 min

70 − 60 = 10

70 min = 1 hr 10 min

8 a.m. − 1 hr 10 min = 6:50 a.m.

Cammy must wake up at 6:50 a.m. so she is not late for school. I know my answer is correct because Cammy has to be at school at 8 and you need to figure how much time it takes to get ready and get to school. I added the times for dressing, eating, and driving to school to get 70 minutes. Then, I subtracted the time needed from the school's start time to find when Cammy needs to get up.

Describing the computational procedure and its results can make an argument more clear, so ACT Aspire captures when students use those types of justification techniques. The main JE statements captured in this response are "Use a computation to Support a Statement or Conclusion," "Explain why a step in a procedure is necessary," and "Use two or more Specific Statements to draw a Conclusion and provide Specific Support for at least one of the Statements." The response also provides direct evidence of "Provide a computation," "State a relationship between two or more objects," and "State one or more steps in a procedure." A response of this type demonstrates direct evidence for all three levels of justification at Grade 3.

This response successfully completes the assigned task by finding the time that Cammy has to wake up and by thoroughly supporting that answer. The response demonstrates understanding of the given information and the goal. The student's calculations are evidence that the student understands a procedure required to complete the task successfully, and the explanation is presented clearly and is well organized. This response would be given a Progress score of 3.

With Level 3 justification and a Progress score of 3, this response would be given 4 points.

Response 2

8 a.m. – 30 min = 7:30 a.m.

7:30 a.m. – 30 min = 7 a.m.

7 a.m. – 10 min = 6:50 a.m.

Cammy should get up at 6:50 a.m.

The main JE statements captured in this response are "Provide a computation" and "Use a computation to Support a Statement or Conclusion." While the computations are important to the student's approach, the argument could be strengthened by explaining why the computations are being done. A response of this type demonstrates evidence of the first two levels of justification at Grade 3.

This response arrives at the correct conclusion. The calculations are evidence that the student understands the procedure, that subtraction is required to complete the task successfully, and that the student approached the task correctly. However, the response fails to explain why the answer is correct or why the subtractions were done to arrive at the answer. The student demonstrates a successful approach to the problem, but some evidence is implicit. Because of the strong approach to the task, this response would be given a Progress score of 2.

Since this is a JE Level 3 task at Grade 3, Level 2 justification and a Progress score of 2 would give this response 2 out of the 4 points possible.

Response 3

The latest time Cammy can get up is 6:50 a.m.

Since this response is only the answer to the task's question, there is no evidence of justification present.

This response arrives at the correct conclusion and demonstrates a developing understanding of the goal. However, the response fails to provide the steps or calculations used to arrive at the conclusion; while the answer is correct, the response does not address the "Explain why your answer is correct" portion of the task. Since there is some evidence of understanding, this response would be given a Progress score of 1.

With no evidence of justification and a Progress score of 1, this response would be given 1 out of the 4 points possible for this task.

Response 4

8 a.m. + 30 min + 30 min + 10 min = 9:10 a.m.

The main JE statement captured in this response is "Provide a computation." Adding reasons for doing the computations and a more formal explanation of the student's reasoning would increase the justification evidence present and also add to the clarity of the response. A response of this type demonstrates the first level of justification.

This response doesn't include a clear answer to the task's question. The response demonstrates a lack of understanding of how to achieve the goal by using an incorrect approach. Further, no logical reason for the calculation is provided. Since the response has little evidence of understanding the task, a Progress score of 0 would be given.

With Level 1 justification and a Progress score of 0, this response would be given 1 out of the 4 points possible for this task.

Improvement Idea Statements

Reporting category	Grade	Low statement (scored below ACT Readiness Range)	High statement (scored at or above ACT Readiness Range)
Grade Level Progress	3	Complete your homework when assigned. Ask questions in class.	Explain one of your assignments to a parent, grandparent, brother, or sister.
Justification and Explanation	3	Give reasons for your steps when solving a mathematical problem. Why do you do those things? Explain how to solve a problem from your homework to a classmate.	On one or two of your homework problems each day, put in steps to better show what you were thinking, and add justifications for each step.
Modeling	3	Work on creating picture representations of numerical statements and use the pictures to solve problems.	Create a 3-dimensional math problem by using everyday objects to represent numbers.

Question 3

Mario and Jenna each drew a circle. Mario divided his circle in half. Jenna divided her circle into twice as many equal sections as Mario's circle.

Select the word below that names the fraction Jenna divided her circle into, and select **all** of the figures below that could represent Jenna's circle.
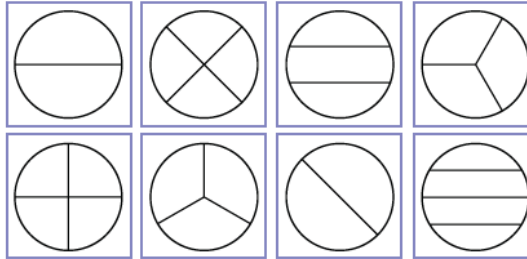
thirds	halves	three

four	two	fourths

Question type	CCSSM topic	Correct response
Technology Enhanced	2.G.A, MP4	

thirds	halves	three

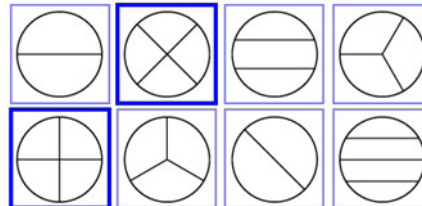| four	two	**fourths**

Appropriate grade level(s)	Integrating Essential Skills and Grade Level Progress reporting categories	Modeling	DOK level
3–6	Integrating Essential Skills	Yes	2

This technology-enhanced question involves partitioning circles and using correct terms to describe that partitioning (CCSSM.2.G.A.3). This problem is part of the Integrating Essential Skills reporting category for the Grades 3, 4, 5, and 6 tests, and it assesses DOK level 2 skills on each of those tests. Students must judge the appropriateness of each shape as a model for the situation. This problem is a part of the Modeling reporting category.

Correct Response

Students must translate the description given in the problem and connect that to mathematical words and figures. Students who do this correctly will find that Jenna divided her circle into fourths.

Improvement Idea Statements

Reporting category	Grade	Low statement (scored below ACT Readiness Range)	High statement (scored at or above ACT Readiness Range)
Integrating Essential Skills	3	Continue to strengthen your skills by using the mathematics you learned in previous grades.	Before you solve a math problem, predict how the solution will go and what method(s) will work.
Modeling	3	Work on creating picture representations of numerical statements and use the pictures to solve problems.	Create a 3-dimensional math problem by using everyday objects to represent numbers.

Question 4

The number of students who attended summer camp during each of 2 weeks is listed below.

- Week 1: 289
- Week 2: 347

Andrea estimated the total number of students by correctly rounding each number to the nearest 100 and then adding the rounded numbers. What is Andrea's estimated total?

○ A. 500

○ B. 550

○ C. 600

○ D. 640

○ E. 700

Question type	CCSSM topic	Correct response
Selected Response	3.NBT.A, Exhibit knowledge of elementary number concepts such as rounding, the ordering of decimals, pattern identification, primes, and greatest common factor (N 20–23)	C

Appropriate grade level(s)	Integrating Essential Skills and Grade Level Progress reporting categories	Modeling	DOK level
3	Grade Level Progress > Number and Operations in Base Ten	No	2

This selected-response (multiple-choice) question assesses a student's ability to round and sum two three-digit whole numbers (CCSSM.3.NBT.A.1). At Grade 3, students are still developing their skills with estimation and finding sums of multidigit numbers, which is a DOK level 2 skill. This question falls under the Number and Operations in Base Ten reporting category within the Grade Level Progress reporting category for a Grade 3 test. Given that Grade 4 students are expected to be fluent in such skills, this question would not appear on a higher-grade test.

Correct Response

The number 289 rounds to 300 because the digit to the immediate right of the hundreds place (8) is greater than 5. The number 347 rounds to 300 because the digit to the immediate right of the hundreds place (4) is less than 5. The sum of 300 and 300 is 600; therefore, answer option C is the correct answer.

Improvement Idea Statements

Reporting category	Grade	Low statement (scored below ACT Readiness Range)	High statement (scored at or above ACT Readiness Range)
Grade Level Progress	3	Complete your homework when assigned. Ask questions in class.	Explain one of your assignments to a parent, grandparent, brother, or sister.
Number and Operations in Base 10	3	Add and subtract numbers up to 1,000, and know when it's easier to do the calculation in your head and when it's easier to do it a different way. Do you know all of the answers when multiplying 1-digit numbers?	Play a game with your classmates to see who can list all the multiples of 10 up to 100 the fastest.

Question 5

Grace wanted to know how many hours she worked in the library over the last 4 weeks.
- She worked 5 days each week.
- She worked 4 hours each day.

What is the total number of hours Grace worked over the last 4 weeks?

- A. 17
- B. 20
- C. 24
- D. 80
- E. 320

Question type	CCSSM topic	Correct response
Selected Response	3.OA.D, Perform one-operation computation with whole numbers and decimals (N 13–15)	D

Appropriate grade level(s)	Integrating Essential Skills and Grade Level Progress reporting categories	Modeling	DOK level
3	Grade Level Progress > Operations and Algebraic Thinking	No	3
4–5	Integrating Essential Skills	No	2

This selected-response (multiple-choice) question assesses a student's ability to solve two-step word problems using the four operations (CCSSM.3.OA.D.8). The combination of skills needed for this question makes it a DOK level 3. Students must decide which operation(s) to use, filter out unnecessary information (4 weeks is mentioned twice), and demonstrate fluency in multiplying within 100.

For the Grade 3 test, this question would be part of the Operations and Algebraic Thinking category within the Grade Level Progress reporting category. This question would also be appropriate for the Grades 4 and 5 tests, but would be DOK level 2 since the skills needed have become more established. For Grades 4 and 5, this question would be part of the Integrating Essential Skills reporting category.

Correct Response

Students must multiply 4 (hours per day) by 5 (days per week) by 4 (weeks). 4 times 5 equals 20, and 20 times 4 equals 80. Answer option D is the correct answer.

Improvement Idea Statements

Reporting category	Grade	Low statement (scored below ACT Readiness Range)	High statement (scored at or above ACT Readiness Range)
Grade Level Progress	3	Complete your homework when assigned. Ask questions in class.	Explain one of your assignments to a parent, grandparent, brother, or sister.
Operations and Algebraic Thinking	3	Work on multiplying and dividing within 100 and writing expressions using multiplication and division.	Find 5 real-world situations where you need to multiply or divide. Explain how you use multiplication and division in these situations.

Question 6

This question is the first of four problems related to common information. These four problems are independent of each other in that it is unnecessary to obtain the correct solution to one question in order to answer any of the other three questions.

A total of 8 students decorated the front surface of 2 different bulletin boards, 1 in the computer lab and 1 in the library.

The computer lab bulletin board has 4 sides and 4 right angles and is 10 feet long and 9 feet tall.

The library bulletin board is divided into 6 equal parts, as shown below, and is shaded to show the fraction of the front surface the students finished decorating on Tuesday.

What is the area, in square feet, of the front surface of the **computer lab** bulletin board?

- A. 19
- B. 38
- C. 76
- D. 90
- E. 94

Question type	CCSSM topic	Correct response
Selected Response	3.MD.C, Compute the area of rectangles when whole number dimensions are given (G 16–19)	D

Appropriate grade level(s)	Integrating Essential Skills and Grade Level Progress reporting categories	Modeling	DOK level
3	Grade Level Progress > Measurement and Data	No	1

Correct Response

In this question, students must recognize that the computer lab bulletin board is a rectangle, given the unequal side lengths, the number of right angles, and the number of sides of the board. Knowing this, students can recall the elementary area formula for a rectangle to arrive at a final answer (CCSSM.3.MD.C.7). Recognizing that the bulletin board is a rectangle from the given information about sides and angles, students will compute 10(9) to find the area of the board, answer option D. Computing this area with the given information is a DOK level 1 skill.

Incorrect answers to selected-response questions can give possible insight into misconceptions in student reasoning. Students who select 19 as the answer, for example, may have used addition instead of multiplication to compute the area.

Improvement Idea Statements

Reporting category	Grade	Low statement (scored below ACT Readiness Range)	High statement (scored at or above ACT Readiness Range)
Grade Level Progress	3	Complete your homework when assigned. Ask questions in class.	Explain one of your assignments to a parent, grandparent, brother, or sister.
Measurement and Data	3	Work on showing sets of measurements on bar graphs and solving problems about perimeter and area.	Find the perimeter and area of at least 4 rectangular surfaces in your home or neighborhood.

Question 7

This question is the second of four problems related to common information.

A total of 8 students decorated the front surface of 2 different bulletin boards, 1 in the computer lab and 1 in the library.

The computer lab bulletin board has 4 sides and 4 right angles and is 10 feet long and 9 feet tall.

The library bulletin board is divided into 6 equal parts, as shown below, and is shaded to show the fraction of the front surface the students finished decorating on Tuesday.

Each student decorated one or the other of the bulletin boards. More students decorated the computer lab bulletin board than the library bulletin board. Which of the following numbers could be the fraction of students who decorated the computer lab bulletin board?

- A. $\frac{1}{3}$
- B. $\frac{1}{5}$
- C. $\frac{4}{8}$
- D. $\frac{4}{5}$
- E. $\frac{5}{8}$

In this question, students must represent quantities as proper fractions (CCSSM.3.NF.A.1) in an applied setting.

Question type	CCSSM topic	Correct response
Selected Response	3.NF.A, MP4	E

Appropriate grade level(s)	Integrating Essential Skills and Grade Level Progress reporting categories	Modeling	DOK level
3	Grade Level Progress > Number and Operations—Fractions	Yes	2

Students must be able to relate the comparison of the number of students who decorated each board (sentence 2 in the question) to the total number of students who decorated the boards (sentence 1 of the common information).

Correct Response

Students can take various approaches from here to arrive at the correct solution. Knowing that more than half of the 8 students decorated the computer lab bulletin board, a student can conclude that either 5, 6, or 7 of the students decorated the computer lab bulletin board. The only answer option that is equivalent to 5/8, 6/8, or 7/8 is E. Other students might interpret the comparison of the number of students to say, "The fraction of students decorating the computer lab bulletin board must be greater than 1/2." From there, these students could use their knowledge of fraction equivalence to select from the two fractions whose values exceed 1/2, which limits the possible answer options to D and E. Answer option D can then be eliminated since the answer must be equivalent to a proper fraction involving eighths. These approaches demonstrate DOK level 2 skills. Students are interpreting a model and judging fit, so this question contributes to the Modeling reporting category (MP4).

Improvement Idea Statements

Reporting category	Grade	Low statement (scored below ACT Readiness Range)	High statement (scored at or above ACT Readiness Range)
Grade Level Progress	3	Complete your homework when assigned. Ask questions in class.	Explain one of your assignments to a parent, grandparent, brother, or sister.
Number and Operations— Fractions	3	Work on understanding and comparing unit fractions and understanding equivalent fractions. Why is 1/4 more than 1/6 ?	Make a drawing that has pictures that represent 5 different fractions. Show on the drawing how you know which picture represents the greatest fraction and which represents the least fraction.
Modeling	3	Work on creating picture representations of numerical statements and use the pictures to solve problems.	Create a 3-dimensional math problem by using everyday objects to represent numbers.

Question 8

This problem is the third of four problems related to common information.

A total of 8 students decorated the front surface of 2 different bulletin boards, 1 in the computer lab and 1 in the library.

The computer lab bulletin board has 4 sides and 4 right angles and is 10 feet long and 9 feet tall.

The library bulletin board is divided into 6 equal parts, as shown below, and is shaded to show the fraction of the front surface the students finished decorating on Tuesday.

Select all the words below that **must** describe the shape of the front surface of the **computer lab** bulletin board.

square | rectangle | quadrilateral | rhombus | parallelogram

Question type	CCSSM topic	Correct response
Technology Enhanced	3.G.A, MP4	square **rectangle** **quadrilateral** rhombus **parallelogram**

Appropriate grade level(s)	Integrating Essential Skills and Grade Level Progress reporting categories	Modeling	DOK level
3	Grade Level Progress > Geometry	Yes	2

This problem assesses skills at DOK level 2. Students in Grade 3 classify figures of various types; they will use those classifications to help them select an appropriate formula when computing areas and perimeters of those figures in Grades 6 and 7.

Correct Response

This problem targets the ability of a student to classify a figure based on its properties (CCSSM.3.G.A.1). The board has four sides, making it a quadrilateral. Given that the board has four right angles and a width unequal to its length, it must be more specifically a rectangle. The board can also be classified as a parallelogram, since a rectangle is a specific type of parallelogram. The board is not a rhombus or a square because all of the sides are not the same length. This is a modeling task, where the student must consider the definition of each figure and see if the definition fits the real-world description given in the question, and so this problem contributes to the Modeling reporting category (MP4).

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Improvement Idea Statements

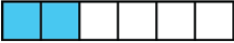| Reporting category	Grade	Low statement (scored below ACT Readiness Range)	High statement (scored at or above ACT Readiness Range)
Grade Level Progress	3	Complete your homework when assigned. Ask questions in class.	Explain one of your assignments to a parent, grandparent, brother, or sister.
Geometry	3	Work on understanding sets of shapes and their characteristics and dividing shapes into parts with equal areas.	Consider the properties of different types of quadrilaterals; what things are the same? What things are different?
Modeling	3	Work on creating picture representations of numerical statements and use the pictures to solve problems.	Create a 3-dimensional math problem by using everyday objects to represent numbers.

Question 9

This question is the fourth and final problem of a set related to common information.

A total of 8 students decorated the front surface of 2 different bulletin boards, 1 in the computer lab and 1 in the library.

The computer lab bulletin board has 4 sides and 4 right angles and is 10 feet long and 9 feet tall.

The library bulletin board is divided into 6 equal parts, as shown below, and is shaded to show the fraction of the front surface the students finished decorating on Tuesday.

What fraction of the front surface of the **library** bulletin board did the students finish decorating on Tuesday?

Drag numbers below to the boxes to show a correct fraction.

Question type	CCSSM topic	Correct response
Technology Enhanced	3.G.A, MP4	$\frac{2}{6}$, $\frac{1}{3}$, $\frac{3}{9}$

Appropriate grade level(s)	Integrating Essential Skills and Grade Level Progress reporting categories	Modeling	DOK level
3	Grade Level Progress > Geometry	Yes	2

Correct Response

This problem provides evidence of a student's ability to express the area of part of a figure as a fraction (CCSSM.3.G.A.2). Such a skill has value in advanced courses like statistics, where the concepts of probability (written as a fraction, decimal, or percent) and area play a large role in solving problems involving normal distributions.

Students must find the relevant information from the common information and translate the picture provided into a fractional representation, a DOK level 2 skill. Producing fractions from the area diagram is a part of the Modeling reporting category at Grade 3 (MP4). Giving students a drag-and-drop approach to answer the question allows students to provide any one of three correct solutions: 1/3, 2/6, or 3/9.

Improvement Idea Statements

Reporting category	Grade	Low statement (scored below ACT Readiness Range)	High statement (scored at or above ACT Readiness Range)
Grade Level Progress	3	Complete your homework when assigned. Ask questions in class.	Explain one of your assignments to a parent, grandparent, brother, or sister.
Geometry	3	Work on understanding sets of shapes and their characteristics and dividing shapes into parts with equal areas.	Consider the properties of different types of quadrilaterals; what things are the same? What things are different?
Modeling	3	Work on creating picture representations of numerical statements and use the pictures to solve problems.	Create a 3-dimensional math problem by using everyday objects to represent numbers.