Grade 3 - SBA Claim 1 Example Stems

This document takes publicly available information about the Smarter Balanced Assessment (SBA) in Mathematics, namely the Claim 1 Item Specifications, and combines and edits them down to hopefully be more useful for teachers and others. The SBA Consortium is not involved in producing this document, so editing choices do not reflect any guidance from the SBA Consortium.

The SBA uses evidence based design, viewing the assessment as eliciting evidence of student proficiency. That evidence is meant to support Claims, which in math are (to paraphrase):
1. A student understands **concepts** and can perform **procedures**.
2. A student can **solve problems**.
3. A student can **reason** (and critique the reasoning of others).
4. A student can analyze and **model real-world contexts** using mathematics.

These claims will be assessed in a roughly 40%-20%-20%-20% split. Given that previous assessments would heavily focus on procedures, while in this framework they constitute 20% as a focus (though of course are needed for items across all claims), this represents a significant shift in assessment.

This document only looks at Claim 1 about concepts and procedures. Items written for Claim can look much like the Example Stems below. At other Claims items can vary more widely, as one would expect for multistep problems and authentic reasoning or modeling contexts.

Claim 1 is divided into various Targets which correspond roughly to the Clusters within the Common Core State Standards in Mathematics. The items from different targets will be taken based on emphasis with [m] being major, [a] additional and [s] supporting.

Finally, in an era of anxiety about end-of-year assessment (which constitutes only part of the Smarter Balanced system), it should be said that these are offered primarily to promote teacher professional understanding. Practices such as using the Example Stems exclusively as learning targets are discouraged. SBA is designed as much as possible to assess authentic learning of mathematics as outlined in the Standards, so that authentic learning should guide instruction.

Operations and Algebraic Thinking

Target A [m]: Represent and solve problems involving multiplication and division. (DOK 1)

Stimulus: The student is presented with a one-step word problem for a situation involving an **array** composed of objects familiar to 8–9 year olds.

Example Stem 1: There are 3 rows of pictures with 2 pictures in each row. How many pictures are there?

Example Stem 4: Claire arranges 6 pictures into an array with 3 rows. How many columns of pictures are in the array?

Example Stem 6: Lisa arranges 6 pictures into an array with 2 columns. How many rows of pictures are in the array?

Response Type: Equation/Numeric

Stimulus: The student is presented with a one-step word problem for a situation involving **equal groups** composed of objects familiar to 8–9 year olds.

Example Stem 2: Mary has 27 blocks. She puts them into 3 bags. Each bag has an equal number of blocks. How many blocks are in each bag?

Stimulus: The student is presented with a word problem involving **measurement quantities** such as length, liquid volume, or mass of objects familiar to 8–9 year olds.

Example Stem 2: There are 48 liters of water in a water tank. The water is shared equally into 8 containers. How many liters of water are in each container?

Example Stem 3: Sarah has 72 inches of string. She cuts the string into pieces that are 9 inches long. How many pieces of string does Sarah have?

Stimulus: The student is presented with a multiplication equation with an unknown factor or product represented by a box (□) or "*?*".

Example Stem 1: What unknown number makes this equation true?
$8 \times \square = 56$

Example Stem 3: What unknown number makes this equation true?
$7 \times 5 = ?$

Target B [m]: Understand properties of multiplication and the relationship between multiplication and division. (DOK 1)

Stimulus: The student is presented with a multiplication expression and asked to identify an expression equal to it.

Example Stem 1: Which expression is equal to 7 × 4?
A. 4 + 7
B. 7 - 4
C. 4 × 7
D. 7 ÷ 4

Example Stem 3: Which expression is equal to 5 × 14?

A. 5 × (10 + 4)
B. (5 × 10) × 4
C. (5 × 1) + (2 × 7)
D. (5 × 4) × (5 × 10)

Example Stem 4: Which expression is equal to 8 × (4 + 3)?

A. 8 + (4 × 3)
B. (8 × 4) + 3
C. (8 × 3) × (8 × 4)
D. (8 × 4) + (8 × 3)

Response Type: Multiple Choice, single correct response

Stimulus: The student is presented with a multiplication expression with two to four factors.

Example Stem 1: Decide whether each expression is equal to
5 × 14. Select Yes or No for each expression.

	Yes	No
5 × (10 + 4)		
(5 × 10) + 4		
(5 × 10) + (5 × 4)		

Example Stem 2: Decide whether each expression is equal to
8 × (4 + 10). Select Yes or No for each expression.

	Yes	No
8 × (10 + 4)		
(8 × 10) + 4		
(8 × 4) + (8 × 10)		
(8 × 4) × (8 × 10)		

Stimulus: The student is presented with a division equation with an unknown quotient.

Example Stem 1: Which equation has the same unknown value as 8 ÷ 2 = □?

A. 8 × □ = 2
B. 2 × □ = 8
C. □ ÷ 2 = 8
D. □ ÷ 8 = 2

Stimulus: The student is presented with paired division and multiplication equations.

Example Stem 1: The value of *n* is the same in these two equations.

n × 4 = 32
32 ÷ □ = *n*
What number belongs in the box to make the equation true?

Stimulus: The student is presented with an equation that encourages use of one or more properties to find an unknown value.

Example Stem 1: What unknown number makes the equation true?
8 × 6 = 6 x □

Example Stem 2: What unknown number makes the equation true?
8 × 6 = 8 × □ × 2

Example Stem 3: What unknown number makes the equation true?
5 × 9 = 5 × 10 - □

Example Stem 4: What unknown number makes the equation true?
5 × 8 = 10 × 8 ÷ □

Example Stem 5: What unknown number makes the equation true?
6 × 6 = 6 × 5 + □

Example Stem 6: What unknown number makes the equation true?
8 × 7 = 5 × 7 + □ × 7

Stimulus: The student is presented with a division equation with an unknown quotient.

Example Stem 1: Which equation has the same unknown value as 8 ÷ 2 = □?

E. 8 × □ = 2
F. 2 × □ = 8
G. □ ÷ 2 = 8
H. □ ÷ 8 = 2

Target C [m]: Multiply and divide within 100. (DOK 1)

Stimulus: The student is presented with whole number multiplication equation(s) presented horizontally.

Example Stem: Enter the unknown number that makes the equation true.

$1 \times 8 = \square$

Rubric: (1 point) The student enters the correct product (e.g., 8).

Example Stem: Enter the unknown numbers that make each equation true.

$9 \times 3 = \square$
$4 \times 7 = \square$

Enter the first unknown number in the first response box.
Enter the second unknown number in the second response box.

Rubric: (1 point) The student enters the correct products (e.g., 27, 28). No partial credit is available for this task model.
Response Type: Equation/Numeric (2 response boxes)

Stimulus: The student is presented with one or two whole number division equation(s) presented horizontally.

Example Stem: Enter the number in the box that makes the equation true.

$16 \div 2 = \square$

Rubric: (1 point) The student enters the correct quotient (e.g., 8).
Response Type: Equation/Numeric

Example Stem: Enter the unknown numbers that make each equation true.

$9 \div 3 = \square$

$28 \div 7 = \square$

Rubric: (1 point) The student enters the correct quotients (e.g., 3, 4).

Stimulus: The student is presented with three equations that each contains one multiplication expression and one division expression.

Example Stem: Decide whether each equation is true or false. Click True or False for each equation.

	True	False
$3 \times 6 = 18 \div 2$		
$4 \times 9 = 36 \div 4$		
$2 \times 5 = 20 \div 2$		

Target D: Solve problems involving the four operations, and identify and explain patterns in arithmetic. (DOK 2)

Stimulus: The student is presented with an ascending number line within 100 with the last number unknown.

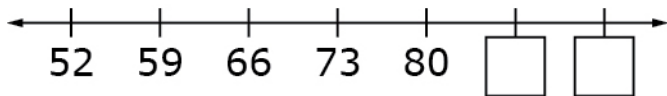**Example Stem:** Enter the number that belongs in the box on the number line.

34 37 40 43 46 49 ☐
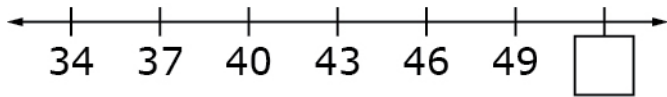
Stimulus: The student is presented with an ascending number line within 100 with the first number unknown.

Example Stem: Enter the number that belongs in the box on the number line.

☐ 9 15 21 27 33 39
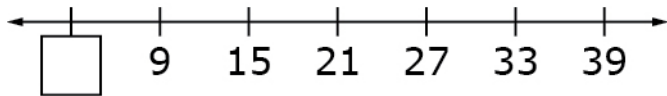
Rubric: (1 point) The student enters the correct number for the pattern (e.g., 52; 3).
Response Type: Equation/Numeric

Stimulus: The student is presented with an ascending number line within 100 with the last two numbers unknown.

Example Stem: Enter the two numbers that belong in the boxes on the number line.

52 59 66 73 80 ☐ ☐

TM1d
Stimulus: The student is presented with an ascending number line within 100 with the last number unknown and one number in the middle unknown.

Example Stem: Enter the two numbers that belong in the boxes on the number line.

3 9 15 ☐ 27 33 ☐
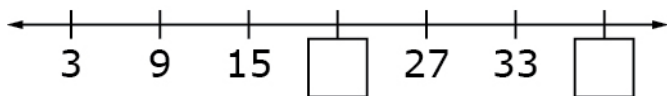
Rubric: (1 point) The student enters the correct numbers for the pattern (e.g., 87, 94; 21, 39).

Stimulus: The student is presented with a function (input/output) machine with four numbers being inputted.
- The function rule may include addition or multiplication.
- Last number on the function machine is needed.

Example Stem: An input/output machine is shown.
- The same rule is used for each number that is put in the machine.
- Three numbers that came out of the machine are shown.
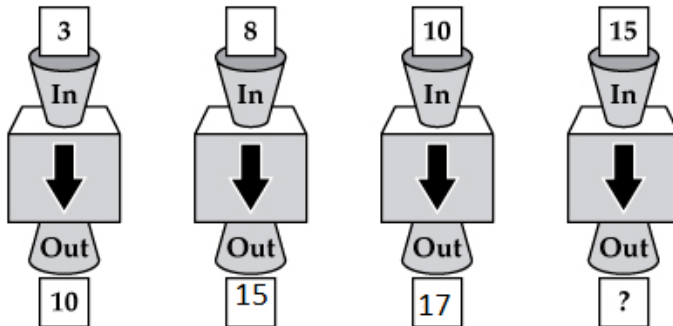
What number comes out of the machine when 15 is put in?

Rubric: (1 point) The student enters the correct number for the pattern (e.g., 22).

Stimulus: The student is presented with part of an addition table. The pattern rule should be applied to numbers in column and row headers.

Example Stem: Part of an addition table is shown.

5	8	11	14
8	11	14	17
11	14		20
14	17	20	23

What number correctly completes the pattern in the table? Enter your answer in the table.

Example Stem: Part of an addition table is shown.

5	8	11	14
8		14	17
11	14		20
14	17	20	

What three numbers correctly complete the pattern in the table? Enter your answers in the table.

Stimulus: The student is presented with part of a multiplication table. Numbers in column and row headers (which may not be shown in the presentation) should all increase by 1 or 2. One cell is blank.

Example Stem 1: Part of a multiplication table is shown.

10		20	25
12	18	24	30
14	21	28	35
16	24	32	40

What number correctly completes the pattern in the table? Enter your answer in the table

Example Stem 2: Part of a multiplication table is shown.

10			25
12	18	24	30
14	21	28	35
16	24	32	40

What two numbers correctly complete the pattern in the table? Enter your answers in the table.

Example Stem 3: Part of a multiplication table is shown.

18	24	30	36
21		35	42
24	32		48
27	36	45	

What three numbers correctly complete the pattern in the table? Enter your answers in the table.

Rubric: The student correctly enters the three numbers in the table (e.g., 17; 14, 17; 11, 17, 23; 15; 15, 20; 28, 40, 54).

Number & Operations in Base Ten

Target E [m]: Use place value understanding and properties of operations to perform multi-digit arithmetic. (DOK 1)

Stimulus: The student is presented with a two- or three-digit number then asked to round to the nearest ten or hundred.

Example Stem 1: What is 44 rounded to the nearest ten?
Example Stem 2: What is 456 rounded to the nearest ten?
Example Stem 3: What is 726 rounded to the nearest hundred?

Rubric: (1 point) The student correctly enters the number rounded to the given place (e.g., 40; 460; 700).
Response Type: Equation/Numeric

Stimulus: The student is given a two- or three-digit whole number rounded to the nearest ten or hundred.

Example Stem 1: When rounding to the nearest ten, what is the **least** whole number that rounds to 50?

Example Stem 4: When rounding to the nearest hundred, what is the **greatest** whole number that rounds to 500?

Example Stem 6: When rounding to the nearest ten, what is the **greatest** whole number that rounds to 520?

Response Type: Equation/Numeric

Stimulus: The student is presented with a non-contextual, straightforward addition (or subtraction) equation with two to four addends (or subtrahends).

Example Stem 2: What unknown number makes this equation true?
□ = 763 + 29

Example Stem 1: What unknown number makes this equation true?
763 – 96 = □

Example Stem 1: What unknown number makes this equation true?
763 + 97 = 763 + 100 – □

Example Stem 2: What unknown number makes this equation true?
763 + 103 = 763 + 100 + □

Stimulus: The student is presented with a non-contextual addition (or subtraction) equation. One addend is within 5 of 10 or a multiple of ten and one addend is a multiple of 100.

Example Stem 1: What unknown number makes this equation true?
763 + 7 = 700 + □

Example Stem 2: What unknown number makes this equation true?
763 + 43 = 800 + □

Example Stem 1: What unknown number makes this equation true?
763 − 97 = 763 − 100 + □

Example Stem 2: What unknown number makes this equation true?
763 − 103 = 763 − 100 - □

Example Stem 1: What unknown number makes this equation true?
760 − 70 = 700 − □

Example Stem 2: What unknown number makes this equation true?
763 − 43 = 723 − □

Stimulus: The student is presented with a multiplication equation including an unknown factor or product.

Example Stem 1: What unknown number makes the equation true?
5 x 80 = □

Example Stem 3: What unknown number makes the equation true?
180 = □ x 3

Example Stem 4: What unknown number makes the equation true?
60 x □ = 540

Example Stem 5: What unknown number makes the equation true?
540 = □ x 60

Stem: What unknown number makes the equation true?
6 x 5 x □ = 240

Numbers and Operations – Fractions

Target F [m]: Develop understanding of fractions as numbers. (DOK 1, 2)

Example Stem 2: Which model shows $\frac{1}{8}$ of the whole figure shaded?

A.

B.

C.

D.
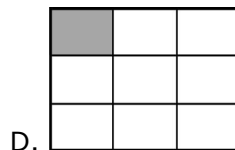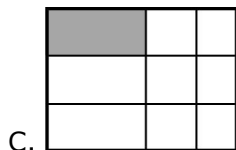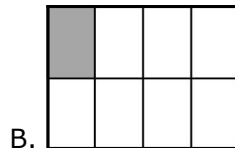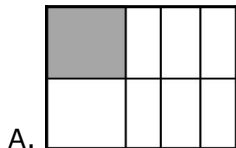
Example Stem 3: Which model shows $\frac{2}{6}$ of the whole figure shaded?

A.

B.

C.

D.
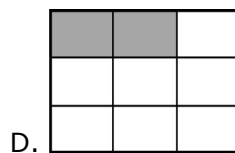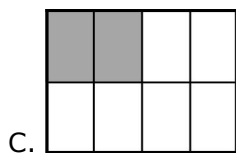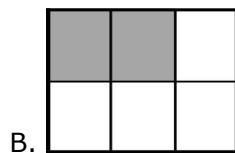
Stimulus: The student is presented with a fractional number line where a fraction is designated by a point on the number line.

Example Stem:
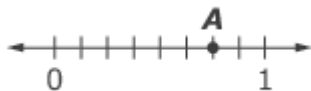
Enter the fraction located at point *A* on the number line.

Rubric: (1 point) The student enters the fraction that is located at the point on the number line (e.g., $\frac{6}{8}$).
Response Type: Equation/Numeric

Stimulus: The student is presented with a fractional number line.

Example Stem: Use the Add Point tool to place a point on the number line where $\frac{2}{4}$ should be located.
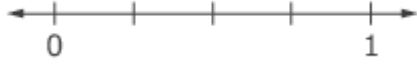
Rubric: (1 point) The student places a point at the correct location on the number line (e.g., $\frac{2}{4}$ is placed halfway between 0 and 1).
Response Type: Graphing

Example Stem 1: Drag each fraction to the number line, as close to the exact location as possible.

$\frac{3}{8}$ $\frac{1}{8}$

Rubric: (2 points) The student places both fractions at the correct location on the number line (e.g., $\frac{1}{4}$ and $\frac{2}{4}$ are placed at their approximate location). A tolerance of ± half of the unit fraction is acceptable for scoring (e.g., ± $\frac{1}{16}$ because $\frac{1}{8}$ is the unit).
(1 point) The student places one fraction within the interval of tolerance for its correct location AND places the other fraction on the correct side (less than or greater than) of the correctly placed fraction. The same tolerance level as the 2-point rubric is allowed for determining the correct location.

Example Stem 2: Place each fraction on the number line, as close to its exact location as possible.
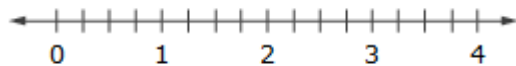
$\frac{5}{5}$ $\frac{1}{4}$ $\frac{4}{1}$ $\frac{2}{4}$

Rubric: (2 points) The student places all fractions at the correct location on the number line (e.g., $\frac{1}{4}$ and $\frac{2}{4}$ are placed at their approximate location). A tolerance of ± half of the unit fraction is acceptable for scoring (e.g., ± $\frac{1}{8}$ for fourths and ± $\frac{1}{10}$ for fifths).
(1 point) The student places three out of four fractions at the correct location, within the interval of tolerance, AND places the other fraction on the correct side (less than or greater than) of the correctly placed fractions.

Source: Illustrative Mathematics (3.NF.2a)
http://www.illustrativemathematics.org/illustrations/173

Stimulus: The student is presented with a fractional number line with a point labeled on the number line.

Example Stem: Use this number line to answer the question that follows.

P

0   1
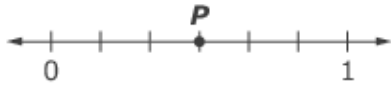
Choose **all** the number lines that show a fraction equal to the fraction shown by point *P*.

A.

B.

C.

D.

E.
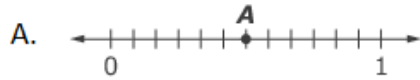
Rubric: (1 point) The student selects all number lines that show $\frac{1}{2}$ (e.g., A, B).
Response Type: Multiple Choice, multiple correct response

Stimulus: The student is presented with a blank visual fraction model to generate an equivalent fraction.

Example Stem: Use this model to solve the problem.

Click parts of the model to shade $\frac{2}{4}$ of the whole model.

Response Type: Hot Spot

Example Stem 1: Use the number line to help you complete the equation.
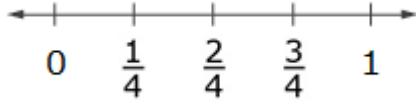
$$1 = \frac{\square}{4}$$

What number goes in the box to make a true equation?

Example Stem 3: The fraction model shows $\frac{1}{8}$ of the whole figure shaded.
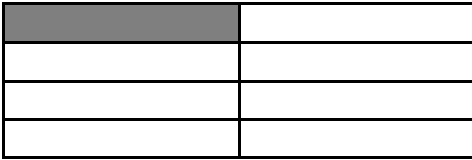
Enter a numerator in the box to make the equation true.

$$\frac{\square}{8} = 1$$

Example Stem 2: What number goes in the box to make the equation true?

$$\frac{\square}{1} = 2$$

Example Stem 2: What number goes in the box to make the equation true?

$$1 = \frac{2}{\square}$$

Example Stem: Enter the greater than (>), less than (<), or equal to (=) symbol that goes in the box that makes this comparison true.

$$\frac{5}{8} \ \square \ \frac{3}{8}$$

Stem: Which number goes in the box to make the comparison true?

$$\frac{5}{8} > \frac{\square}{8}$$

A.   3   B.   5   C.   7   D.   9

Measurement and Data

Target G [m]: Solve problems involving measurement and estimation of intervals of time, liquid volumes, and masses of objects. (DOK 1, 2)

Example Stem: Use this clock to answer the question.
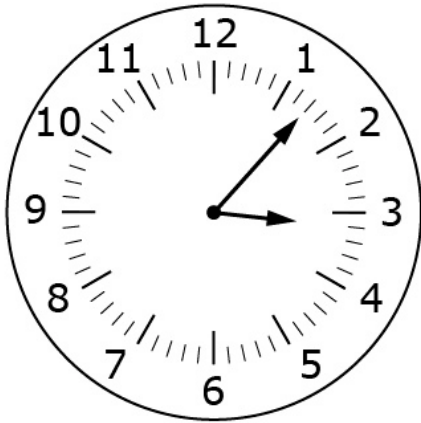
Select the time, to the nearest minute, shown on the clock.

A. 1:15   B. 2:07   C. 3:07   D. 7:15

Example Stem: A music class starts at 1:32 p.m and ends at 2:55 p.m.

Enter the length, in minutes, of the music class.

Rubric: (1 point) The student correctly enters the length of the class in minutes (e.g., 83). **Response Type:** Equation/Numeric

Stimulus: The student is presented with a one-step contextual word problem.

Example Stem 1: A piece of celery has a mass of 48 grams. A carrot has a mass of 35 grams more than the piece of celery.
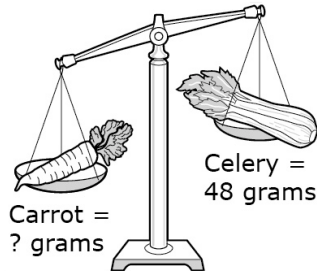
Enter the mass, in grams, of the carrot.

Example Stem 2: A farmer takes 46 kilograms of potatoes to the market. The farmer sells 29 kilograms of the potatoes.

Enter the number of kilograms of potatoes the farmer has left.

Example Stem 3: Harold buys 2-liter bottles of juice for a picnic. He buys 8 bottles.

How many liters of juice did Harold buy?

Example Stem 4: Mrs. Ross made 48 liters of fruit juice for a school picnic. She gives all of the juice to 8 classrooms with each classroom getting the same amount of juice.

How many liters of juice does Mrs. Ross give each classroom?

Rubric: (1 point) The student writes the correct solution (e.g., 83; 17; 16; 6).

Response Type: Equation/Numeric

Target H [m]: Represent and interpret data. (DOK 2)

Stimulus: The student is presented with a data set with two to four categories.
Example Stem 1: Marco and Beth each read the number of books shown.

Student	Number of Books Read
Marco	12
Beth	21

Click in each row to create a picture graph that shows the number of books each student reads.

Student	Number of Books Read
Marco	
Beth	
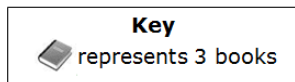
Key
represents 3 books

Rubric: (1 point) The student creates a picture or a bar graph to show the correct number for each category of data (e.g., shown below).

Student	Number of Books Read
Marco	📕 📕 📕 📕
Beth	📕 📕 📕 📕 📕 📕 📕

Key
represents 3 books
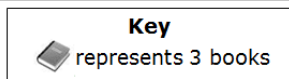
Example Stem 2: Four students read the number of books shown.

Student	Number of Books Read
Bob	15
Lisa	50
Nancy	25
Juan	40

Click in each column to create a bar graph that shows the number of books that each student reads.

Books Read
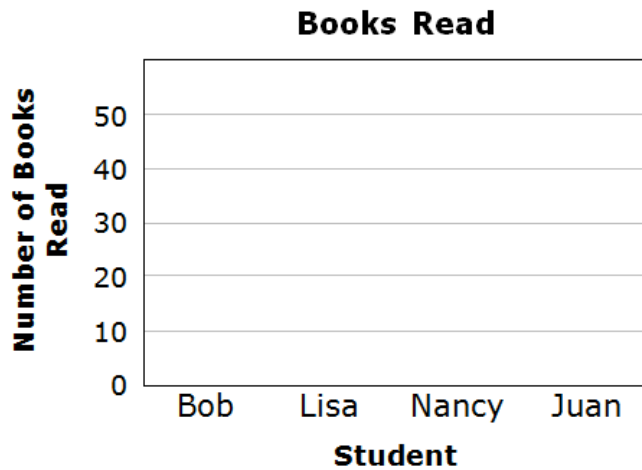
Rubric: (2 points) The student creates a picture or a bar graph to show the correct number for each category of data (e.g., shown below).

(1 point) The student creates a picture or bar graph to show the correct number for two out of three categories or three out of four categories and the incorrect symbol(s) is within one scaled interval of the graph. In other words, the student made an error in the level of precision, not in understanding.
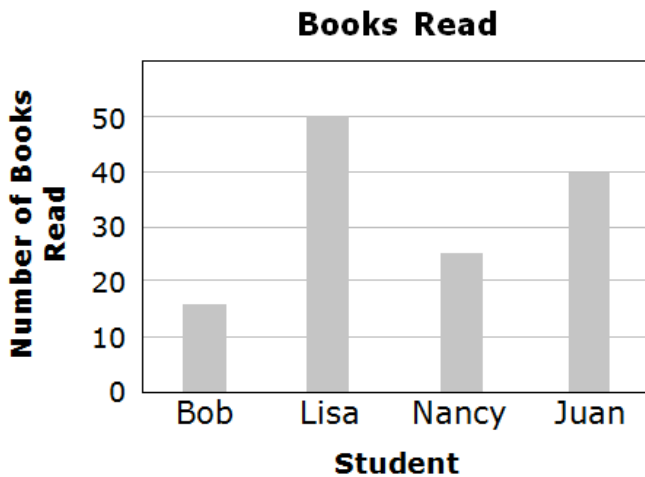
Books Read

Response Type: Hot Spot

Stimulus: The student is presented with a data set including up to four categories.

Example Stem: Use the data in the table to complete a scaled picture graph. You may only use whole pictures.

Student	Number of Books Read
Marco	12
Beth	21

Part A:
Click on the key to use to complete the graph using only whole books.
A. Key: 📕 = 3
B. Key: 📕 = 4
C. Key: 📕 = 7

Part B: Using the key selected, click to complete the picture graph.

Student	Number of Books Read
Marco	
Beth	

Rubric: (2 points) The student selects the correct key and correctly creates the graph (e.g., book = 3; Marco 4 books; Beth 7 books).
(1 point) The student selects the correct key or correctly creates the graph.
Response Type: Hot Spot

Example Stem 1: Students vote for their favorite colors. Use the bar graph to answer the question.
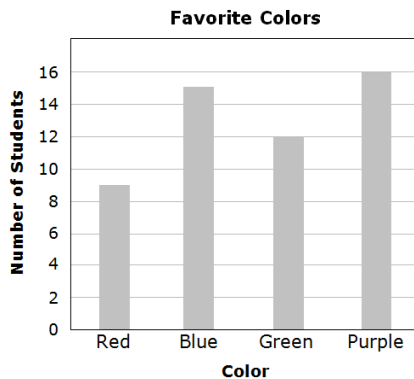
How many more students voted for purple than red?

Target I [m]: Geometric measurement: understand concepts of area and relate area to multiplication and to addition. (DOK 2)

Stimulus: The student is presented with a shaded figure in a grid and determines the total area, in square units, of the figure.

Example Stem 1: Use this diagram to solve the problem.
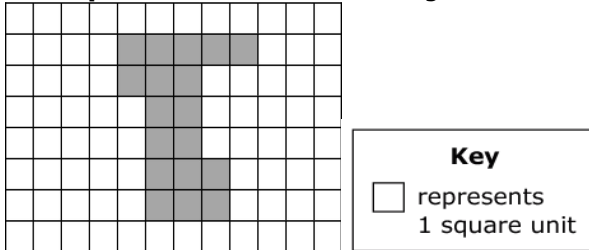
Enter the area, in square units, of the shaded figure.

Example Stem 2: Use this diagram to solve the problem.
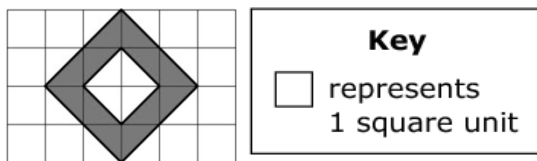
Enter the area, in square units, of the shaded figure.

Rubric: (1 point) The student correctly enters the area, in square units, of the shaded figure (e.g., 18; 6).

Response Type: Equation/Numeric

Example Stem: This figure is made by joining two rectangles.
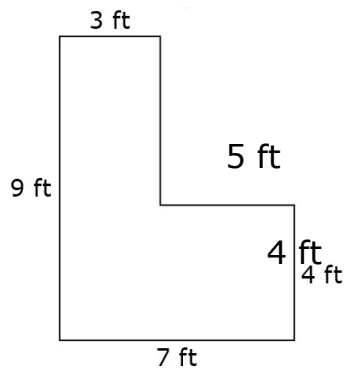
Enter the total area, in square feet, of the figure.

Example Stem: This figure is tiled with square units.
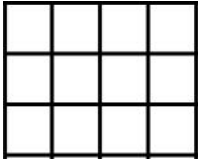
Which expression could be used to find the area of this figure in square units?

    A. 3 + 4
    B. 3 × 4
    C. 3 + 3 + 4 + 4
    D. 3 × 3 × 4 × 4

Target J [m]: Geometric measurement: recognize perimeter as an attribute of plane figures and distinguish between linear and area measures. (DOK 1)

Stimulus: The student is presented with a mathematical or real-world perimeter problem and is prompted to find the perimeter.

Example Stem 1: The length of each side of the polygon is shown.
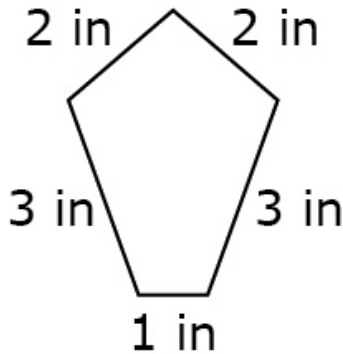
Enter the perimeter, in inches, of the polygon.

Example Stem 2: Ms. Smith needs to find the perimeter of her rectangular garden. She wants to put a fence around her entire garden. Her garden measures 8 feet by 4 feet as shown.
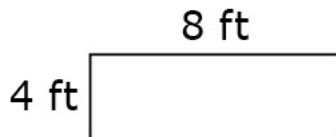
Enter the perimeter, in feet, of the garden.

Example Stem 3: The rulers give the measurement for two sides of the rectangle.
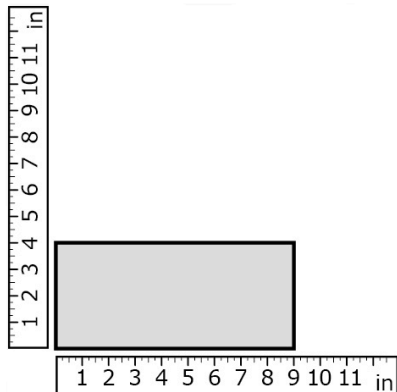
Enter the perimeter, in inches, of the rectangle.

Stimulus: The student is presented with a rectangle on a grid.

Example Stem: A shaded rectangle is shown on the grid.

Key

☐ represents
1 square unit
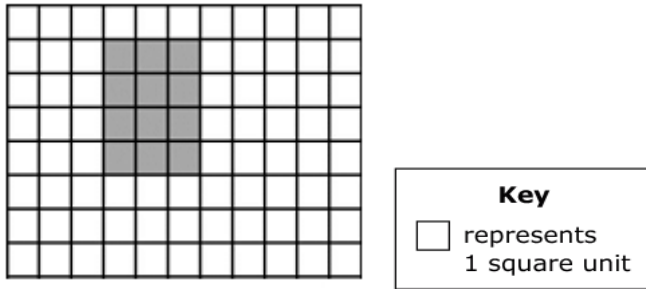
Part A: What is the perimeter, in units, of the rectangle?
Enter your answer in the first response box.

Part B: What is the area, in square units, of the rectangle?
Enter your answer in the second response box.

Rubric: (2 points) The student correctly enters the perimeter and area of the rectangle (e.g., 14, 12).
(1 point) The student correctly enters either the perimeter or area of the rectangle.

Response Type: Equation/Numeric

Geometry

Target K [a]: Reason with shapes and their attributes. (DOK 1, 2)

Stimulus: The student is presented with a description of a shape which may include:
*   the name of the shape (e.g., quadrilateral, parallelogram)
*   the attributes of the shape (e.g., 4 sides)

Example Stem: Decide whether each shape is a quadrilateral. Click Yes or No for each shape.

	Yes	No

Stimulus: The student is presented with a collection of shapes.

Example Stem: Click **all** of the shapes that appear to be parallelograms.
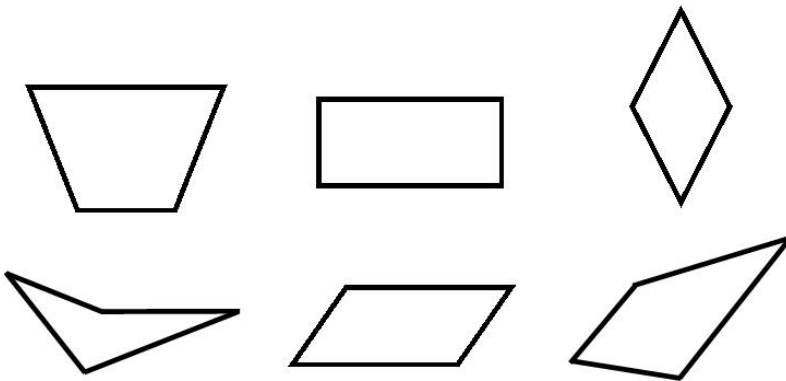
Rubric: (1 point) The student correctly selects all of the parallelograms (e.g., see image below).
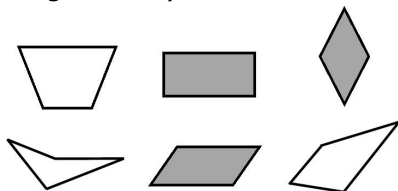

Response Type: Hot Spot

Stimulus: The student is presented with a collection of four or five shapes.

Example Stem: Drag the figures to each box or boxes where they belong.

A figure may belong to more than one category or to none of these categories.

Rubric: (1 point) The student correctly classifies each shape (e.g., see chart below).


Response Type: Drag and Drop

Stimulus: The student is presented with a grid.

Example Stem 1: Use the Connect Line tool to draw a quadrilateral where every side is the same length.

Example Stem 2: Use the Connect Line tool to draw a quadrilateral where every side is a different length.
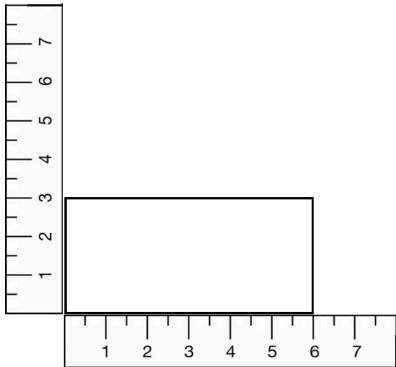
Example Stem 3: Use the Connect Line tool to draw a quadrilateral that is **not** a rhombus or a rectangle.

Rubric: (1 point) The student correctly draws a quadrilateral that meets the given attributes (e.g., see quadrilaterals below).
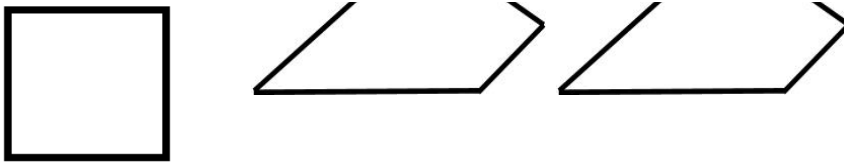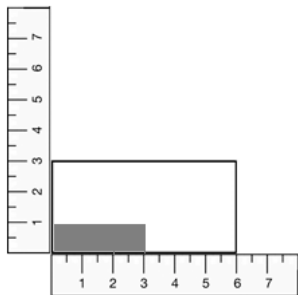

Response Type: Graphing

Example Stem: This rectangle can be divided into equal parts.
Click to shade $\frac{1}{6}$ of the rectangle.

Rubric: (1 point) The student clicks on the Hot Spots in the background to represent the unit fraction provided.

(e.g.,   , or any 3 squares shaded)

Response Type: Hot Spot