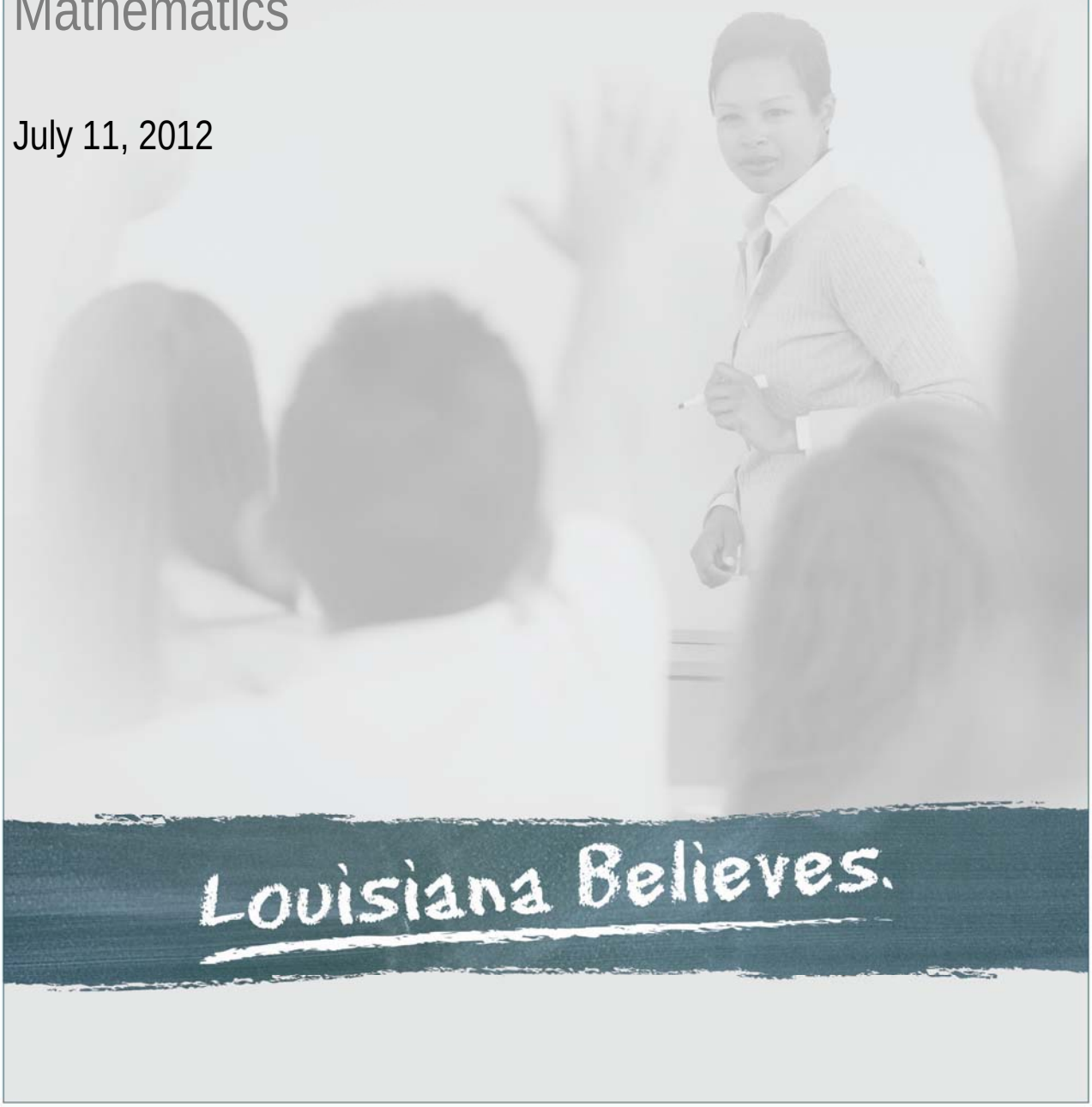
Preview of Common Core State Standards Sample EAGLE Items

Grade 4

Mathematics

July 11, 2012



Grade 4

Technology-enabled, multiple-part, constructed-response item types use a common context and contain several prompts that increase in difficulty or cognitive complexity and guide students to a culminating activity. This type of item can show where a student is within the difficulty or cognitive complexity ranges within a particular standard. It can also be a very effective item type to connect content and practices and assess both conceptual and procedural skills.

The first item in this set utilizes text-entry boxes and drag-and-drop functionality to provide an in-depth assessment of standard 4.NF.4. The item asks students to construct a viable argument and to critique another person's work (MP.3), which includes attending to precision (MP.6) by correcting a run-on mathematical sentence in part A. In parts B and C, students demonstrate their understanding of multiplying a fraction by a whole number by using and explaining fraction area models (MP.4).

The second item assesses fluency expectations given by 4.NBT.4. This item asks the student to select all of the multi-digit addition and subtraction expressions that are equal to a given number. The format of the item greatly reduces the probability that the student can obtain credit by guessing. Also, the item elicits five statements of evidence regarding the student's fluency. Standards involving fluency may be assessed directly or indirectly. To directly assess fluency, both speed and accuracy need to be assessed. This item is an example of a task model that assesses fluency indirectly because it does not measure the speed. Direct task models may be similar to this item but also include a timer so that a student is scored by their accuracy within time intervals.

The third item illustrates a graphing tool technology-enhancement that enables the direct assessment of standards that require drawing. Historically, online assessment of a standard that stated "draw a line of symmetry" indirectly assessed students by asking them to identify a given line of symmetry. Also, the item elicits four statements of evidence, one for each shape, regarding the student's ability to draw lines of symmetry.

The fourth item is an opportunity to connect mathematical content (4.OA.3) with several practices (MP.1, MP.2). The student makes sense of the problem (MP.1) by first finding the number of sets that can be purchased and then interpreting the meaning of the remainder as the money remaining that can be used to buy additional packages of paper. The student then divides the money remaining by the cost of paper. The student perseveres in solving the problem by subtracting the remainder from the total amount. Throughout the solution method, the student must alternate between representing the word problem abstractly and interpreting the meaning of the numbers (MP.2).

The fifth item is an example of a formative task that scaffolds the content to make connections between closely related mathematical concepts and to enable many parts of the standard (4.OA.4) to be assessed. Historically, a standard similar to 4.OA.4 would be assessed by measuring individual sentences from the standard. This task will also give information that can lead to better inferences about where the student needs instruction.

UIN:	E14001	Subject:	Math	Grade:	4	Item Type:	CR
CCSS:	4.NF.4	Apply and extend previous understandings of multiplication to multiply a fraction by a whole number. a. Understand a fraction a/b as a multiple of 1/b. For example, use a visual fraction model to represent 5/4 as the product 5 × (1/4), recording the conclusion by the equation 5/4 = 5 × (1/4). b. Understand a multiple of a/b as a multiple of 1/b, and use this understanding to multiply a fraction by a whole number. For example, use a visual fraction model to express 3 × (2/5) as 6 × (1/5), recognizing this product as 6/5. (In general, n × (a/b) = (n × a)/b.).					
Practice Standards:		3. Construct viable arguments and critique the reasoning of others. 4. Model with mathematics. 6. Attend to precision.					

MC Key:	NA	Item Name:	Multiplying a fraction by a whole number	Calculator:	NC	Est. Difficulty:	H	DOK	3
Points:	0–6	Accommodations:			Scoring Method:		Mixed		
Passage Title(s):									
Source info:									

Jennifer's teacher asked her to write $2 \times \frac{2}{3}$ as a whole number times a unit fraction. Jennifer made some mistakes in her work. In this task, you will correct Jennifer's work.

Part A

Jennifer tried to write $2 \times \frac{2}{3}$ as a whole number times a unit fraction. Her work is shown in the box below.

$$2 \times \frac{2}{3} = \frac{4}{6} = 4 \times \frac{1}{6}$$

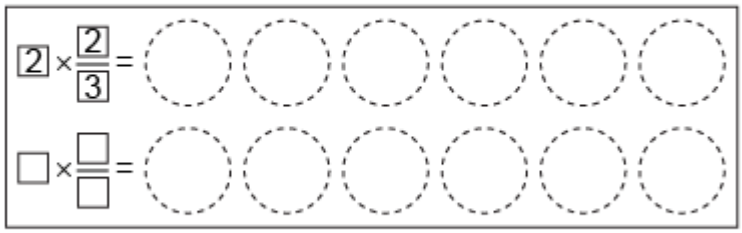
$$2 \times \frac{2}{3} = 4 \times \frac{1}{6}$$

Explain Jennifer's mistakes and write the correct equations in this box.

Part B

Complete the area models to justify your answer in part A.

Enter numbers in the boxes to write the equal expressions from part A. The first expression, $2 \times \frac{2}{3}$, has been entered as an example. Next, drag the partially-shaded circles onto the empty circles to represent the expressions. To remove a partially-shaded circle, drag and release it outside of the box. To remove all work and start again, click the Reset button.



RESET

Part C

Explain how the area models you completed in part B justify your answer in part A.

Rubric

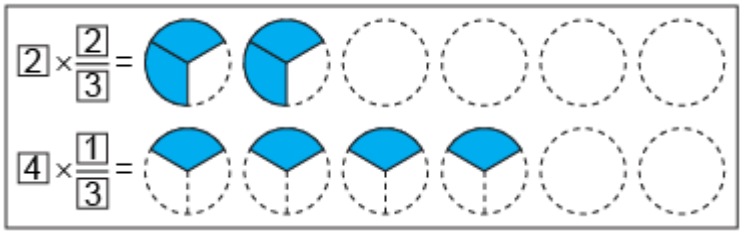
Exemplary Response

Part A

Jennifer made two mistakes in her work. First, she incorrectly wrote 2 x 2/3 = 4/6 because she multiplied the numerator and the denominator of 2/3 by 2 instead of just multiplying the numerator by 2.
Second, she incorrectly used the equal sign by using it twice in the same statement, 2 x 2/3 = 4/6 = 4 x 1/6.

2 x 2/3 = 4/3
4/3 = 4 x 1/3
2 x 2/3 = 4 x 1/3

Part B



Part C

The area models for $2 \times \frac{2}{3}$ and $4 \times \frac{1}{3}$ each show the same total area, so $2 \times \frac{2}{3}$ and $4 \times \frac{1}{3}$ are equal.

Points Assigned

- 1 point for a valid explanation that Jennifer multiplied the numerator and denominator of the fraction, $\frac{2}{3}$, by 2
- 1 point for a valid explanation that Jennifer used the equal sign inappropriately
- 1 point for correct work showing that $2 \times \frac{2}{3} = 4 \times \frac{1}{3}$
- 1 point for correctly modeling $2 \times \frac{2}{3}$
- 1 point for correctly modeling $4 \times \frac{1}{3}$
- 1 point for correctly describing that the models show the area is the same for the two expressions and therefore the expressions are equal

Note: The student is awarded 2 points for part B if they provide a correct area model for $2 \times \frac{2}{3}$ and enter an incorrect

expression (other than $4 \times \frac{1}{3}$) with an area model that correctly represents the given expression. In part C, students can describe the area as being the same or that each expression shows the same number of parts.

Scoring Rubric

Score	Description
6	6 points
5	5 points
4	4 points
3	3 points
2	2 points
1	1 point
0	The student's response is incorrect, irrelevant, too brief to evaluate, or blank.

UIN:	E14002	**Subject:**	Math	**Grade:**	4	**Item Type:**	SR
CCSS:	4.NBT.4	Fluently add and subtract multi-digit whole numbers using the standard algorithm.					
Practice Standards:							

MC Key:	NA	**Item Name:**	Multi-digit addition and subtraction	**Calculator:**	NC	**Est. Difficulty:**	E	**DOK**	1
Points:	0–2	**Accommodations:**			**Scoring Method:**		AS		
Passage Title(s):									
Source info:									

Check the box next to each expression that equals 1,753.

- ☐ 963 + 890
- ☐ 1,048 + 705
- ☐ 2,264 – 511
- ☐ 4,361 – 2,608
- ☐ 18,725 – 15,972

Rubric

Exemplary Response

- ☐ 963 + 890
- ☒ 1,048 + 705
- ☒ 2,264 – 511
- ☒ 4,361 – 2,608
- ☐ 18,725 – 15,972

Points Assigned

- 1 point for four boxes marked correctly
- 1 point for five boxes marked correctly

Scoring Rubric

Score	Description
2	2 points
1	1 point
0	The student's response is incorrect.

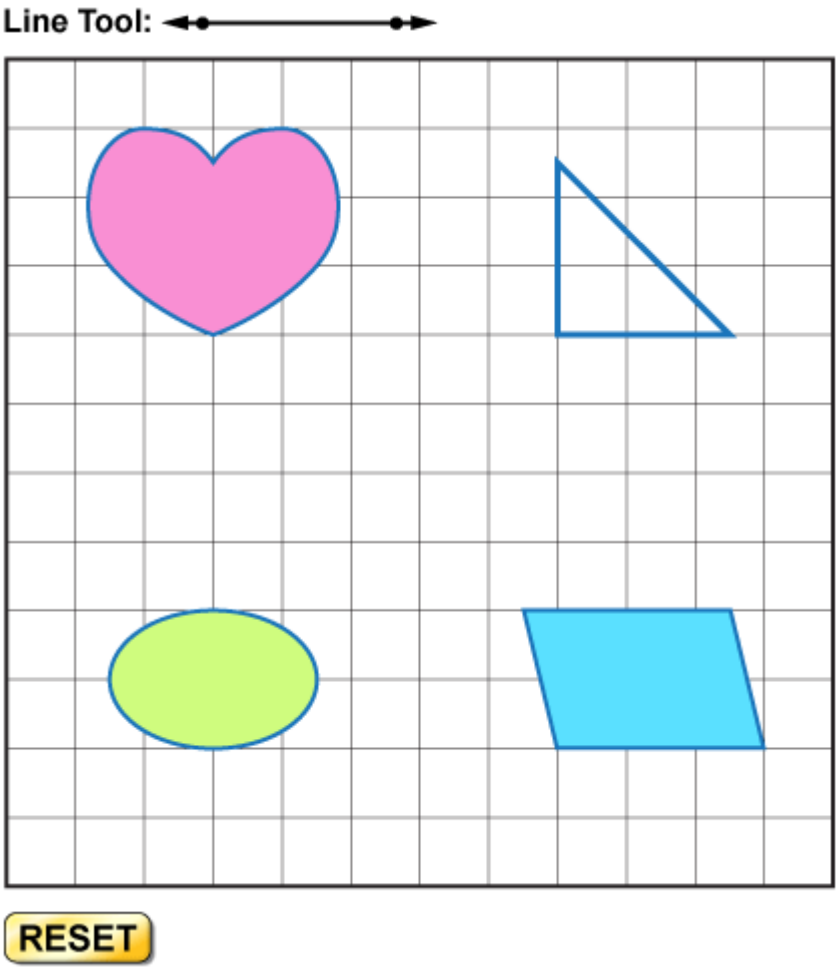
UIN:	E14003	Subject:	Math	Grade:	4	Item Type:	CR
CCSS:	4.G.3	Recognize a line of symmetry for a two-dimensional figure as a line across the figure such that the figure can be folded along the line into matching parts. Identify line-symmetric figures and draw lines of symmetry.					
Practice Standards:							

MC Key:	NA	Item Name:	Lines of symmetry	Calculator:	NC	Est. Difficulty:	M	DOK	2
Points:	0–4	Accommodations:		Scoring Method:	AS				
Passage Title(s):									
Source info:									

Draw **all** lines of symmetry for the four shapes in the grid below.

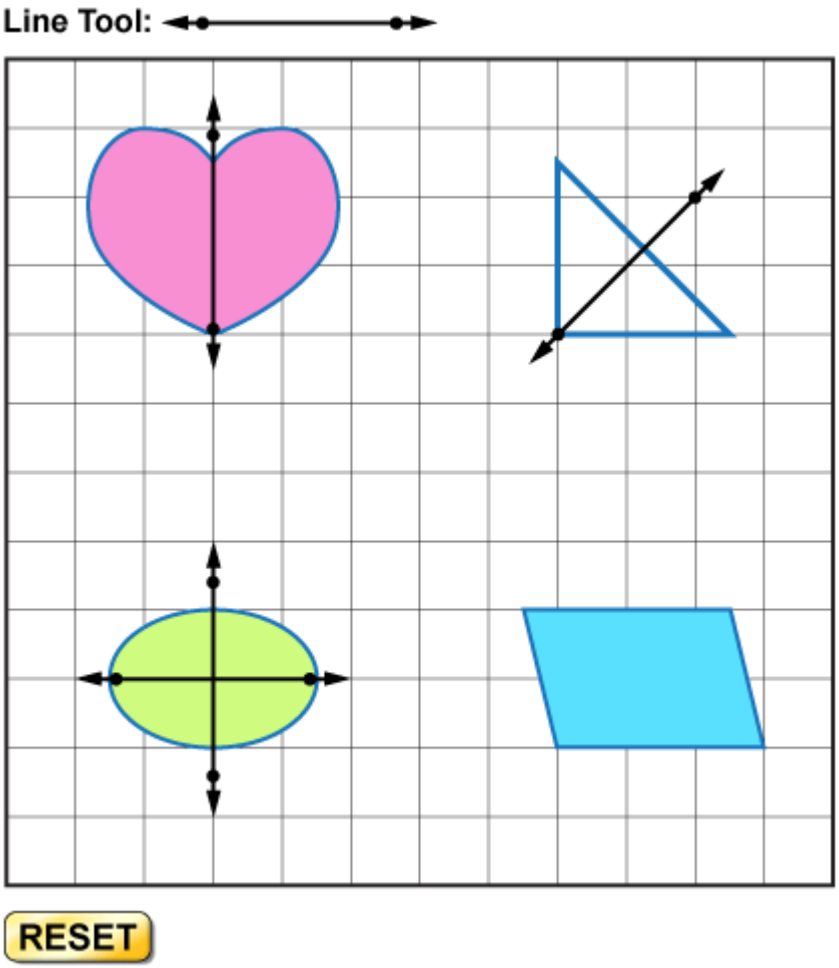
To draw a line, drag the line tool to the grid. Rotate the line by using the points near the ends of the line.

To remove a single line, drag the line outside of the grid. To remove all lines, click the Reset button below the grid.



Rubric

Exemplary Response



Points Assigned

- 1 point for the heart shape with a correct line of symmetry
- 1 point for the right triangle with the correct line of symmetry
- 1 point for the oval with two correct lines of symmetry
- 1 point for the parallelogram without a line of symmetry

Note: For each shape, a point will be awarded if the line of symmetry is drawn within a distance of $\frac{1}{5}$ unit from the correct line of symmetry.

Scoring Rubric

Score	Description
4	4 points
3	3 points
2	2 points
1	1 point
0	The student's response is incorrect, incomplete, or blank.

UIN:	E14004	Subject:	Math	Grade:	4	Item Type:	MC
CCSS:	4.OA.3	Solve multistep word problems posed with whole numbers and having whole-number answers using the four operations, including problems in which remainders must be interpreted. Represent these problems using equations with a letter standing for the unknown quantity. Assess the reasonableness of answers using mental computation and estimation strategies including rounding.					
Practice Standards:		1. Make sense of problems and persevere in solving them. 2. Reason abstractly and quantitatively.					
MC Key:		Item Name:	Interpreting Remainders	Calculator:	NC	Est. Difficulty:	M	DOK	2
Points:	0–1	Accommodations:			Scoring Method:		AS		
Passage Title(s):									
Source info:									

Use the picture to answer the questions.

A teacher has $60 to spend on supplies for her classroom. The teacher buys as many sets of paper, pencils, and erasers as she can with $60 and then spends the remaining money on paper. A set is one package of paper, one package of pencils, and one package of erasers.

How much money did the teacher spend? Do not include tax.

A. $56
B. $59
C. $60
D. $63

Rubric

Answer Choice	Rationale
A. $56	finds the amount spent on complete sets
B. $59	correct response
C. $60	assumes that all of the money is spent
D. $63	finds the amount spent by rounding the number of complete sets up

UIN:	E14005	**Subject:**	Math	**Grade:**	4	**Item Type:**	CR			
CCSS:	4.OA.4	Find all factor pairs for a whole number in the range 1–100. Recognize that a whole number is a multiple of each of its factors. Determine whether a given whole number in the range 1–100 is a multiple of a given one-digit number. Determine whether a given whole number in the range 1–100 is prime or composite.								
Practice Standards:		7. Look for and make use of structure.								
MC Key:	NA	**Item Name:**	Determining Prime and Composite Numbers	**Calculator:**	NC	**Est. Difficulty:**	M	**DOK**	2	
Points:	0–7	**Accommodations:**				**Scoring Method:**	AS			
Passage Title(s):										
Source info:										

Part A

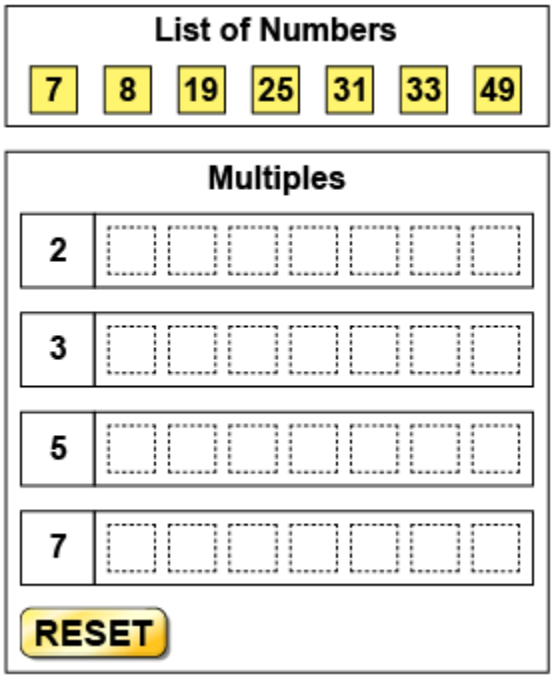
List all the factor pairs for the numbers at the top of the tables.

Write your pairs like this: 18 x 1. If you write 18 x 1, you do not need to write 1 x 18.

18	83

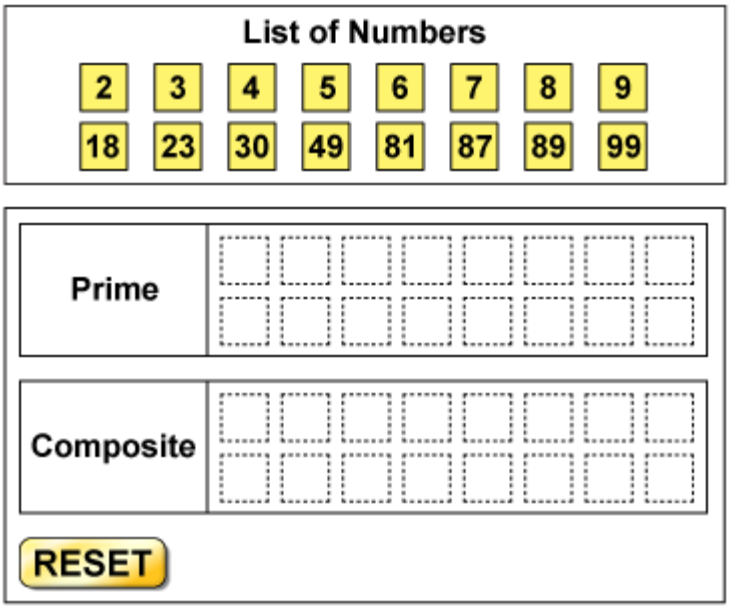
Part B

Drag the numbers in the list to sort them into multiples of 2, 3, 5, or 7. If a number in the list is not a multiple of 2, 3, 5, or 7, leave it in the list. To remove all work and start again, click the Reset button.



Part C

Drag all the numbers in the list to sort them into prime numbers and composite numbers. To remove all work and start again, click the Reset button.

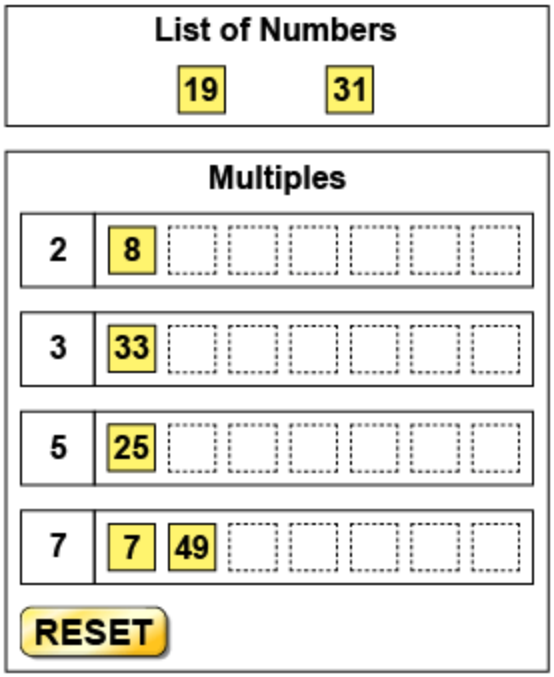


Exemplary Response

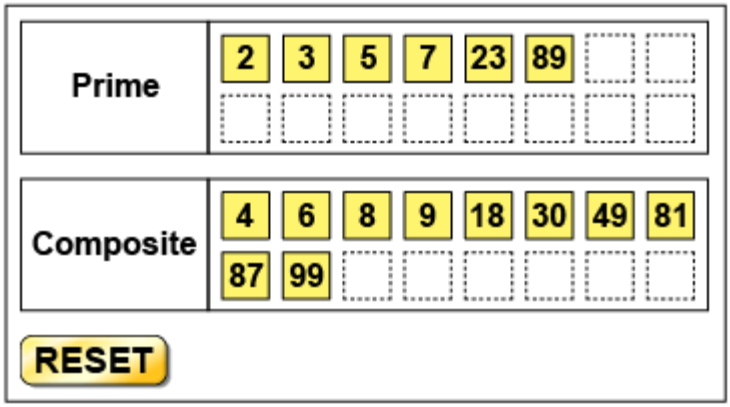
Part A

18	83
18 × 1	83 × 1
9 × 2	
6 × 3	

Part B



Part C



Points Assigned

- 1 point for providing the correct factor pairs for 18
- 1 point for providing the correct factor pair for 83
- 1 point for identifying 19 and 31 as not being a multiple of 2, 3, 5, or 7
- 1 point for identifying three or four numbers correctly as multiples of 2, 3, 5, or 7
- 1 point for identifying all five numbers correctly as multiples of 2, 3, 5, or 7
- 1 point for identifying sixteen numbers correctly as either prime or composite
- 1 point for identifying eleven to fifteen numbers correctly as prime or composite

Note: A student does not lose points for writing equivalent factor pairs such as 18 x 1 and 1 x 18.

Scoring Rubric

Score	**Description**
7	7 points
6	6 points
5	5 points
4	4 points
3	3 points
2	2 points
1	1 point
0	The student's response is incorrect, irrelevant, too brief to evaluate, or blank.