



**NEW ENGLAND  
COMMON ASSESSMENT PROGRAM**

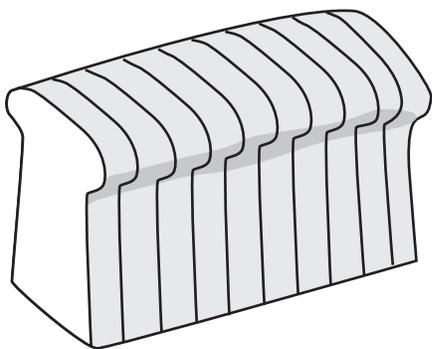
**Released Items  
Support Materials  
2012**

**Grade 5  
Mathematics**

NECAP 2012 RELEASED ITEMS  
GRADE 5 MATH

**N&O 4.1** Demonstrates conceptual understanding of rational numbers with respect to: whole numbers from 0 to 999,999 through equivalency, composition, decomposition, or place value **using models, explanations, or other representations**; and positive fractional numbers (benchmark fractions:  $\frac{a}{2}$ ,  $\frac{a}{3}$ ,  $\frac{a}{4}$ ,  $\frac{a}{5}$ ,  $\frac{a}{6}$ ,  $\frac{a}{8}$ , or  $\frac{a}{10}$ , where  $a$  is a whole number greater than 0 and less than or equal to the denominator) as a part to whole relationship in area, set, or linear models where the number of parts in the whole are equal to, and a multiple or factor of the denominator; and **decimals as hundredths** within the context of money, or tenths within the context of metric measurements (e.g., 2.3 cm) **using models, explanations, or other representations**.

- 1 Mrs. Kim's loaf of bread was cut into 10 equal slices.



After making sandwiches, Mrs. Kim had only 2 slices of bread left. What fraction of the loaf of bread did Mrs. Kim use to make sandwiches?

- A.  $\frac{1}{5}$   
B.  $\frac{2}{5}$   
C.  $\frac{3}{5}$   
D.  $\frac{4}{5}$

NECAP 2012 RELEASED ITEMS  
GRADE 5 MATH

**N&O 4.2** Demonstrates understanding of the relative magnitude of numbers from 0 to 999,999 by ordering or comparing whole numbers; and ordering, comparing, or identifying equivalent proper positive fractional numbers; or decimals using models, number lines, or explanations.

- 2 The chart below shows the height of six volcanoes in Alaska.

**Volcanoes in Alaska**

<b>Volcano</b>	<b>Height (in feet)</b>
Augustine	4205
Fisher	3593
Kanaga	4287
Little Sitkin	3942
Segula	3782
Yantarni	4382

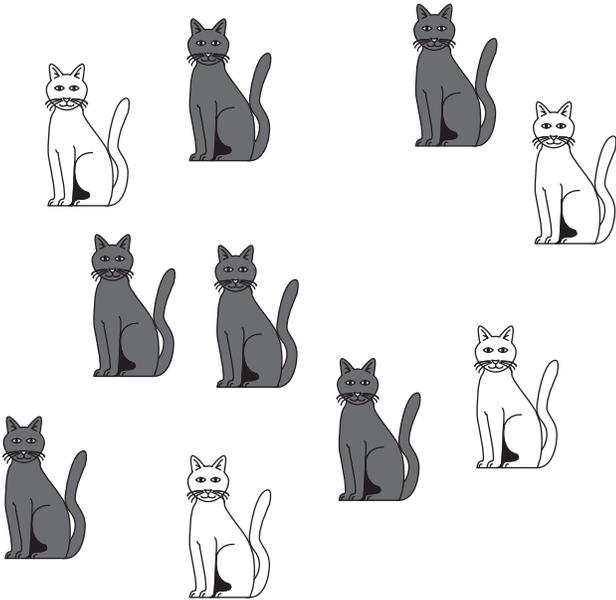
Which volcano has a height that is greater than Little Sitkin's height but less than Kanaga's height?

- A. Augustine
- B. Fisher
- C. Segula
- D. Yantarni

NECAP 2012 RELEASED ITEMS  
GRADE 5 MATH

**N&O 4.2** Demonstrates understanding of the relative magnitude of numbers from 0 to 999,999 by ordering or comparing whole numbers; and ordering, comparing, or identifying equivalent proper positive fractional numbers; or decimals using models, number lines, or explanations.

**3** Look at this set of cats.



What fraction of the cats is shaded gray?

- A.  $\frac{4}{10}$
- B.  $\frac{1}{2}$
- C.  $\frac{3}{5}$
- D.  $\frac{2}{3}$

NECAP 2012 RELEASED ITEMS  
GRADE 5 MATH

**N&O 4.3** **Demonstrates conceptual understanding of mathematical operations** by describing or illustrating the relationship between repeated subtraction and division (no remainders); the inverse relationship between multiplication and division of whole numbers; or the addition or subtraction of positive fractional numbers with like denominators using models, number lines, or explanations.

- 4 The  $\diamond$  and the  $\bigcirc$  are different numbers greater than 1 that make this sentence true.

$$\diamond \div \bigcirc = 5$$

Which other number sentence must be true?

A.  $\diamond = 5 + \bigcirc$

B.  $\diamond = 5 - \bigcirc$

C.  $\diamond = 5 \times \bigcirc$

D.  $\diamond = 5 \div \bigcirc$

NECAP 2012 RELEASED ITEMS  
GRADE 5 MATH

**N&O 4.3** **Demonstrates conceptual understanding of mathematical operations** by describing or illustrating the relationship between repeated subtraction and division (no remainders); the inverse relationship between multiplication and division of whole numbers; or the addition or subtraction of positive fractional numbers with like denominators using models, number lines, or explanations.



- 5 Lee gave this clue to describe his favorite number.

My favorite number is 36 divided by 4.

Which other clue could Lee give to describe his favorite number?

A. My favorite number is 4 multiplied by 9.

B. My favorite number is 36 divided by 9.

C. My favorite number multiplied by 4 equals 36.

D. My favorite number multiplied by 9 equals 36.

NECAP 2012 RELEASED ITEMS  
GRADE 5 MATH

**N&O 4.4** Accurately solves problems involving multiple operations on whole numbers or the use of the properties of factors and multiples; and addition or subtraction of decimals and positive proper fractions with like denominators. (Multiplication limited to 2 digits by 2 digits, and division limited to 1 digit divisors.) (IMPORTANT: *Applies the conventions of order of operations where the left to right computations are modified only by the use of parentheses.*)



- 6 Jessica bought packages of hot dogs for a picnic. Each package contains 8 hot dogs. Which of the following could be the number of hot dogs Jessica bought?
- A. 28
  - B. 36
  - C. 44
  - D. 56

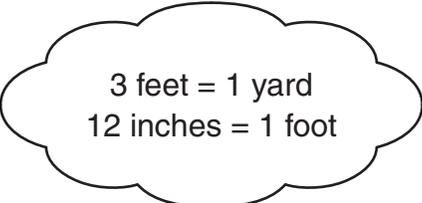
**G&M 4.3** Uses **properties or attributes** (shape of bases or number of lateral faces) **to identify, compare, or describe three-dimensional shapes** (rectangular prisms, triangular prisms, cylinders, or spheres).

- 7 Which three-dimensional shape has six faces?
- A. a sphere
  - B. a cylinder
  - C. a triangular prism
  - D. a rectangular prism

NECAP 2012 RELEASED ITEMS  
GRADE 5 MATH

**G&M 4.7** Measures and uses units of measures appropriately and consistently, and makes conversions within systems when solving problems across the content strands.

- 8 A teacher has 10 yards of ribbon to use for art projects. Each art project uses 18 inches of ribbon. How many art projects can be made with 10 yards of ribbon?



3 feet = 1 yard  
12 inches = 1 foot



- A. 5
- B. 6
- C. 15
- D. 20

NECAP 2012 RELEASED ITEMS  
GRADE 5 MATH

**F&A 4.3** Demonstrates conceptual understanding of algebraic expressions by using letters or symbols to represent unknown quantities to write simple linear algebraic expressions involving any one of the four operations; or by evaluating simple linear algebraic expressions using whole numbers.

- 9 The Youth Center is having a kickball tournament. There will be 8 people on each team. Which expression represents the total number of people in the kickball tournament if there are  $n$  teams?

- A.  $n - 8$
- B.  $n + 8$
- C.  $n \div 8$
- D.  $n \times 8$

**DSP 4.1** Interprets a given representation (line plots, tables, bar graphs, pictographs, or circle graphs) to answer questions related to the data, to analyze the data to formulate or justify conclusions, to make predictions, or to solve problems.

- 10 This chart shows the number of points each team earned during Field Day.

**Field Day**

Team	Points
Blue	8
Red	10
Yellow	9
Green	3

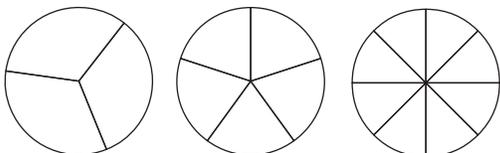
Which team earned one-third of the total points?

- A. Blue
- B. Red
- C. Yellow
- D. Green

NECAP 2012 RELEASED ITEMS  
GRADE 5 MATH

**N&O 4.2** Demonstrates understanding of the relative magnitude of numbers from 0 to 999,999 by ordering or comparing whole numbers; and ordering, comparing, or identifying equivalent proper positive fractional numbers; or decimals using models, number lines, or explanations.

11 Look at these fraction models.



Write the fractions  $\frac{2}{3}$ ,  $\frac{2}{5}$ , and  $\frac{2}{8}$  in order from least to greatest.

**Scoring Guide:**

Score	Description
1	for correct answer, $\frac{2}{8}$ , $\frac{2}{5}$ , $\frac{2}{3}$
0	Response is incorrect or contains some correct work that is irrelevant to the skill or concept being measured.
Blank	No response

NECAP 2012 RELEASED ITEMS  
GRADE 5 MATH

SCORE POINT 1

11

$$\frac{2}{8}, \frac{2}{5}, \frac{2}{3}$$

The student's response is correct.

SCORE POINT 0

11

$$\frac{2}{9}, \frac{2}{8}, \frac{2}{3}$$

The student's response is incorrect.

NECAP 2012 RELEASED ITEMS  
GRADE 5 MATH

DSP 4.2 Analyzes patterns, trends, or distributions in data in a variety of contexts by determining or using measures of central tendency (median or mode), or range.



- 12 Mrs. Sarandon asked the students in her class how many pieces of fruit they ate on Tuesday. This list shows the results.

1, 5, 3, 0, 1, 2, 4, 4, 6, 1, 2, 3, 1, 0, 5, 2

What is the mode of this set of data?

**Scoring Guide:**

Score	Description
1	for correct answer, 1
0	Response is incorrect or contains some correct work that is irrelevant to the skill or concept being measured.
Blank	No response

NECAP 2012 RELEASED ITEMS  
GRADE 5 MATH

SCORE POINT 1  
(EXAMPLE A)

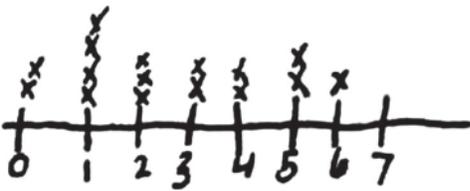
12

|

The student's response is correct.

SCORE POINT 1  
(EXAMPLE B)

12



*(Key is 1)*  
Answer  
1

The student's response is correct.  
(Showing work is not required.)

SCORE POINT 0

12

*Mode = Most*  
00111, 22, 2, 33, 44, 55, 6 6

The student's response is incorrect.

**NECAP 2012 RELEASED ITEMS  
GRADE 5 MATH**

**N&O 4.3** **Demonstrates conceptual understanding of mathematical operations** by describing or illustrating the relationship between repeated subtraction and division (no remainders); the inverse relationship between multiplication and division of whole numbers; or the addition or subtraction of positive fractional numbers with like denominators using models, number lines, or explanations.

- 13** At a sports camp, a group of 132 campers is playing volleyball. Each volleyball team has 6 players.
- Write a number sentence, using division, that shows how many volleyball teams are at the camp.
  - Write a number sentence, using multiplication, that shows how many volleyball teams are at the camp.

**Scoring Guide:**

<b>Score</b>	<b>Description</b>
<b>2</b>	for correct answers to both parts
<b>1</b>	for correct answer to one part
<b>0</b>	Response is incorrect or contains some correct work that is irrelevant to the skill or concept being measured.
<b>Blank</b>	No response

**Sample Responses:**

Part a:  $132 \div 6 = 22$ , also accept the equivalent of  $132 \div 6 = \square$

Part b:  $22 \times 6 = 132$ , also accept the equivalent of  $\square \times 6 = 132$

NECAP 2012 RELEASED ITEMS  
GRADE 5 MATH

SCORE POINT 2

13

$$132 \div 6 = 22 \text{ teams}$$
$$6 \times 22 \text{ teams} = 132 \text{ players}$$

Part a: The student's response is correct.

Part b: The student's response is correct.

SCORE POINT 1

13

$$132 \div 6 = 22 \text{ teams}$$

campers      players

$$132 \times 6 = 22 \text{ teams}$$

Part a: The student's response is correct.

Part b: The student's response is incorrect.

SCORE POINT 0

13

Six divided by one hundred thirty two is  
twenty groups with one person remaining.

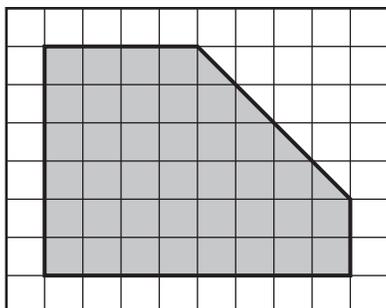
Part a: The student's response is incorrect.

Part b: The student did not attempt.

**NECAP 2012 RELEASED ITEMS  
GRADE 5 MATH**

**G&M 4.6** Demonstrates conceptual understanding of perimeter of polygons, and the area of rectangles, polygons or irregular shapes on grids using a variety of models, manipulatives, or formulas. Expresses all measures using appropriate units.

- 14 Erin drew this plan for a flower garden.



**Key**  
 represents 1 square foot of Erin's flower garden

One package of flower seeds covers an area of 10 square feet. What is the fewest number of packages of flower seeds Erin will need to completely cover her flower garden? Show your work or explain how you know.

**Scoring Guide:**

Score	Description
2	for correct answer, <b>4</b> , with sufficient explanation or work shown to indicate correct strategy
1	for correct answer with insufficient or no explanation or work shown OR for sufficient strategy with incorrect or no answer
0	Response is incorrect or contains some correct work that is irrelevant to the skill or concept being measured.
<b>Blank</b>	No response

NECAP 2012 RELEASED ITEMS  
GRADE 5 MATH

SCORE POINT 2

14

(A) There is 40 square feet.  $40 \div 10 = 4$

The student's response is correct, with sufficient work shown.

SCORE POINT 1

14

She will have to get 4 packages for her flower garden.

The student's response is correct, with no work shown or explanation given.

SCORE POINT 0

14

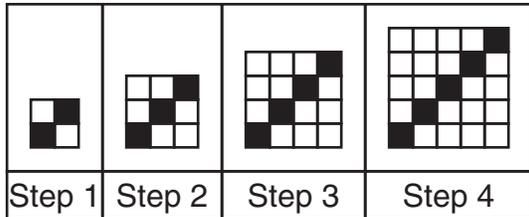
40 because I added them up

The student's response is incorrect.

**NECAP 2012 RELEASED ITEMS  
GRADE 5 MATH**

**F&A 4.1** Identifies and extends to specific cases a variety of patterns (linear and nonlinear) represented in models, tables or sequences; and writes a rule in words or symbols to find the next case.

- 15 Mr. Randall is tiling his kitchen floor in a pattern of black tiles and white tiles. This table shows the first four steps of the pattern.



- a. Copy and complete this table in your Student Answer Booklet.

**Mr. Randall's Tile Pattern**

Step Number	Number of Black Tiles	Number of White Tiles
1	2	2
2		
3		
4		

- b. What will be the total number of each color tile in Step 5? Show your work or explain how you found your answer.

**NECAP 2012 RELEASED ITEMS  
GRADE 5 MATH**

**Scoring Guide:**

Score	Description
<b>4</b>	4 points
<b>3</b>	3 points
<b>2</b>	2 points
<b>1</b>	1 point
<b>0</b>	Response is incorrect or contains some correct work that is irrelevant to the skill or concept being measured.
<b>Blank</b>	No response

**Training Notes:**

Part a: 2 points for correctly completing the table for both black and white tiles

OR

1 point for correctly completing the table for one of the colors  
or  
for all correct data values, not in table form

Part b: 2 points for correct answers, **Black Tiles = 6 White Tiles = 30**, with sufficient explanation or work shown to indicate correct strategy for at least the white tiles

OR

1 point for correct strategy with incorrect, incomplete, or no answer  
or  
for two correct answers with insufficient or no work shown

**Sample Response:**

Part a:

**Mr. Randall's Tile Pattern**

Step Number	Number of Black Tiles	Number of White Tiles
1	2	2
2	3	6
3	4	12
4	5	20

Part b: The black tiles increase by 1 at each step. So there will be  $5 + 1 = 6$  black tiles in Step 5.

OR

The white tiles increase by 4, then 6, then 8. The next increase will be 10. So there will be  $20 + 10 = 30$  white tiles in Step 5.

NECAP 2012 RELEASED ITEMS  
GRADE 5 MATH

SCORE POINT 4  
(EXAMPLE A)

15

Part a: The student correctly completes the table.

A

	Number of black tiles	Number of white tiles
1	2	2
2	3	6
3	4	12
4	5	20

B.  $2+4+6+8+10=30$

$2+3+4+5+1=6$

30 white tiles 6 black tiles.

Part b: The student's responses are correct, with sufficient work shown.

NECAP 2012 RELEASED ITEMS  
GRADE 5 MATH

SCORE POINT 4  
(EXAMPLE B)

15

Step Number	Number of black tiles	Number of white tiles
1	2	2
2	3	6
3	4	12
4	5	20

for black 6,  
because it is  
always the step  
number plus 1

Part a: The student correctly completes the table.

white 30, because all the steps have <sup>for</sup>  
been adding 1 to the step number then  
multiplying the step number by the number  
of black tiles

Part b: The student's responses are correct,  
with sufficient explanation given.

NECAP 2012 RELEASED ITEMS  
GRADE 5 MATH

SCORE POINT 3

15

Step number	Number of black tiles	Number of white tiles
1	2	2
2	3	6
3	4	12
4	5	20
5	6	30

Part a: The student correctly completes the table.

Part b: The student's responses are correct, with no work shown or explanation given.

NECAP 2012 RELEASED ITEMS  
GRADE 5 MATH

SCORE POINT 2

15

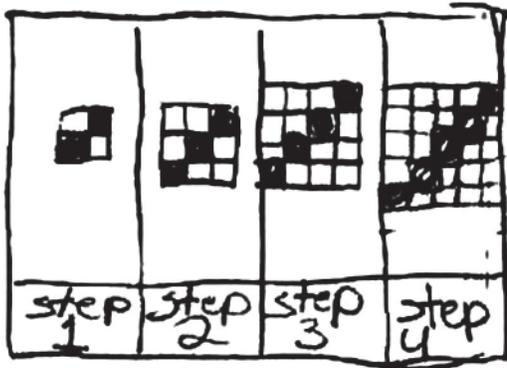
Step number	Number of black tiles	Number of white tiles
1	2	2
2	3	6
3	4	12
4	5	20

Part a: The student correctly completes the table.

Part b: The student did not attempt.

15

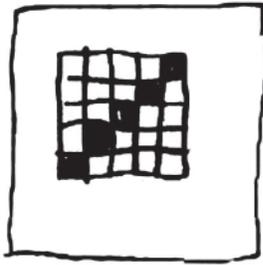
a



step number	# of b +	# of w +
1	2	2
2	3	3
3	4	4
4	5	5

Part a: The student correctly completes the table for black tiles only.

B



The total  
 in all is  
 25 tiles

Part b: The student's response is incorrect.

NECAP 2012 RELEASED ITEMS  
GRADE 5 MATH

SCORE POINT 0

15

A.

$$\begin{array}{r} 1 \\ \times 24 \\ \hline 3 \\ 72 \\ \hline \end{array}$$

Number Step	Number Blacks	Number of white Tiles
1	2	2
2	4	8
3	24	72
4	8	28
5	8	40

Part a: The student does not correctly complete the table.

Part b: The student's response is incorrect.

B. I Found my answer  
By I put step 5 in the  
table

## Grade 5 Mathematics Released Item Information – 2012

Released Item Number	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
No Tools Allowed					✓	✓						✓			
Content Strand <sup>1</sup>	NO	NO	NO	NO	NO	NO	GM	GM	FA	DP	NO	DP	NO	GM	FA
GLE Code	4-1	4-2	4-2	4-3	4-3	4-4	4-3	4-7	4-3	4-1	4-2	4-2	4-3	4-6	4-1
Depth of Knowledge Code	3	1	2	2	2	2	2	2	1	2	1	1	1	2	2
Item Type <sup>2</sup>	MC	SA	SA	SA	SA	CR									
Answer Key	D	A	C	C	C	D	D	D	D	B					
Total Possible Points	1	1	1	1	1	1	1	1	1	1	1	1	2	2	4

<sup>1</sup>Content Strand: NO = Numbers & Operations, GM = Geometry & Measurement, FA = Functions & Algebra, DP = Data, Statistics, & Probability

<sup>2</sup>Item Type: MC = Multiple Choice, SA = Short Answer, CR = Constructed Response