Math Grade 4
Assessment Anchors
and Eligible Content

Pennsylvania Department of Education

M4.A Numbers and Operations | Reporting Category

ASSESSMENT ANCHOR

M4.A.1 Demonstrate an understanding of numbers, ways of representing numbers, relationships among numbers and number systems.

ELIGIBLE CONTENT

M4.A.1.1 Use models and/or words to represent quantities as decimals, fractions or mixed numbers.

M4.A.1.1.1 Write the fraction or decimal, including mixed numbers, which corresponds to a drawing or set – no simplification necessary.

M4.A.1.1.2 Create a drawing or set that represents a given fraction or decimal, including mixed numbers (through the tenths).

M4.A.1.1.3 Match the standard number form to the word form of decimal numbers (through the tenths place).

M4.A.1.1.4 Write whole numbers in expanded, standard and/or word form through 6 digits (example of standard to expanded form: 43,076 = 40,000+3000+70+6).
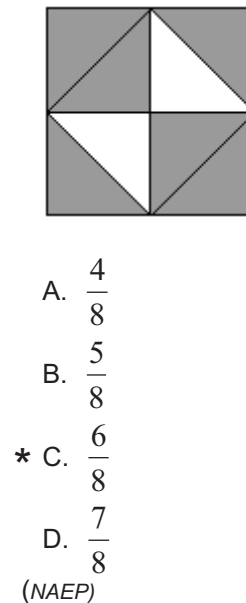
EXAMPLE ITEMS

- Which shows 3/4 of the picture shaded?

  A.

  B.

  ∗ C.

  D.
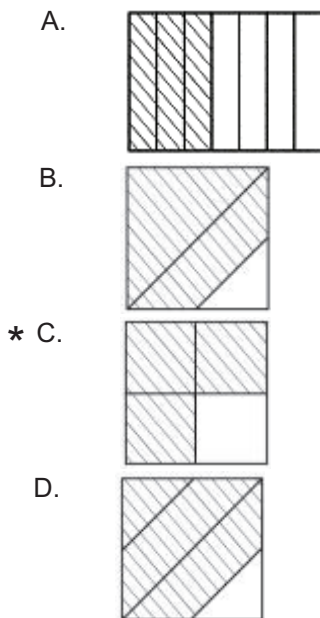
  (NAEP)

- What fraction of this large square is shaded?

  A. $\dfrac{4}{8}$

  B. $\dfrac{5}{8}$

  ∗ C. $\dfrac{6}{8}$

  D. $\dfrac{7}{8}$

  (NAEP)

  (New York State Department of Education)

M4.A Numbers and Operations   Reporting Category

ASSESSMENT ANCHOR

M4.A.1 Demonstrate an understanding of numbers, ways of representing numbers, relationships among numbers and number systems.

	ELIGIBLE CONTENT
M4.A.1.2 Compare quantities and magnitudes of numbers.	**M4.A.1.2.1** Locate/identify fractions or decimals on a number line (decimals and fractions through the tenths – do not mix fractions and decimals).
	M4.A.1.2.2 Compare and/or order whole numbers through 6 digits and amounts of money to $100 (limit sets for ordering, to no more than 4 numbers).

EXAMPLE ITEMS

M4.A Numbers and Operations — Reporting Category

ASSESSMENT ANCHOR

M4.A.1 Demonstrate an understanding of numbers, ways of representing numbers, relationships among numbers and number systems.

	ELIGIBLE CONTENT
M4.A.1.3 Develop and/or apply number theory concepts to represent numbers in various ways	**M4.A.1.3.1** Find/list/identify all factors through 10 of any given number.
	M4.A.1.3.2 Find/list/identify multiples of a number, where the multiples do not exceed 100.

EXAMPLE ITEMS

M4.A Numbers and Operations | Reporting Category

ASSESSMENT ANCHOR

M4.A.2 Understand the meanings of operations, use operations and understand how they relate to each other.

	ELIGIBLE CONTENT
M4.A.2.1 Use operations to solve problems (may include word problems).	**M4.A.2.1.1** Solve problems involving all operations with whole numbers, and/or explain the solution (limit to two-step problems; e.g., multiply then add – single digit multipliers and divisors).
	M4.A.2.1.2 Solve problems involving addition or subtraction with decimals through the tenths or money to the cent and/or explain the solution. Limit to two-step problems.

EXAMPLE ITEMS

- Add:

    238
  + 462

  A. 600
  B. 690
  ∗ C. 700
  D. 790

  (NAEP)

- Carl has 3 empty egg cartons and 34 eggs. If each carton holds 12 eggs, how many more eggs are needed to fill all 3 cartons?

  ∗ A. 2
  B. 3
  C. 4
  D. 6

  (NAEP)

- Carla has 12 boxes that each weighs the same amount. What would be a quick way for her to find the total weight of the 12 boxes?

  A. Add 12 to the weight of one of the boxes
  B. Subtract 12 from the weight of one of the boxes
  C. Divide the weight of one of the boxes by 12
  ∗ D. Multiply the weight of one of the boxes by 12

  (NAEP)

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SEA DOG TICKETS
Adult…………………….$4.00
Child…………………….$2.00
Tuesday Night is Family Night
Bring your entire family for $9.00

  A family of 2 adults and 3 children go to a Sea Dogs baseball game on Tuesday night. How much money will they save by going to the game on Tuesday night rather than to any other regular night game?

  A. $4.00
  B. $4.50
  ∗ C. $5.00
  D. $5.50

  (Maine State Department of Education)

- Find the exact value of $568 \div 4$.

  A. 564
  ∗ B. 142
  C. 140
  D. 112

  (New Jersey Department of Education)

M4.A Numbers and Operations   **Reporting Category**

ASSESSMENT ANCHOR

M4.A.3 Compute accurately and fluently and make reasonable estimates.

	ELIGIBLE CONTENT
M4.A.3.1 Apply rounding and/or estimation strategies to solve problems.	**M4.A.3.1.1** Round whole numbers to the nearest ten, hundred, thousand, ten-thousand or hundred-thousand.
	M4.A.3.1.2 Round amounts of money to the nearest dollar.
	M4.A.3.1.3 Estimate the answer to addition, subtraction and multiplication problems using whole numbers through 6 digits (for multiplication, no more than 2 digits X 1 digit, excluding powers of 10).

EXAMPLE ITEMS

- Estimate 39×11. The product is between what numbers?

  A. 30 and 80
  B. 100 and 150
  ∗ C. 300 and 800
  D. 1000 and 1500

  (New Jersey Department of Education)

M4.A Numbers and Operations | Reporting Category

ASSESSMENT ANCHOR

M4.A.3 Compute accurately and fluently and make reasonable estimates.

ELIGIBLE CONTENT

M4.A.3.2 Compute using fractions or decimals (written vertically or horizontally - straight computation only).

M4.A.3.2.1 Solve addition or subtraction problems involving decimals through hundredths (decimal numbers must have the same number of places).

M4.A.3.2.2 Solve addition or subtraction problems with fractions with like denominators (denominators to 10, no simplifying necessary).

EXAMPLE ITEMS

- Maria's cat eats $\frac{1}{2}$ can of food a day.

  How many cans will her cat eat in 1 week?

  A. $1\frac{1}{2}$

  B. 3

  * C. $3\frac{1}{2}$

  D. 4

  There are 7 days in 1 week.

(Maine State Department of Education)

M4.B Measurement | Reporting Category

ASSESSMENT ANCHOR

M4.B.1 Demonstrate an understanding of measurable attributes of objects and figures, and the units, systems and processes of measurement.

	ELIGIBLE CONTENT
M4.B.1.1 Determine time and/or calculate elapsed time.	**M4.B.1.1.1** Match/construct analog time (a picture of a clock), to the same time written in digital.
	M4.B.1.1.2 Identify time (analog or digital) as the amount of minutes before and/or after the hour (e.g., 2:50 is the same as 10 minutes before 3:00; quarter past six is the same as 6:15).
	M4.B.1.1.3 Calculate the elapsed time, to the minute, in a given situation (limited to 2 adjacent hours).
	M4.B.1.1.4 Determine the beginning or ending time, given the elapsed time (limited to 2 adjacent hours).

EXAMPLE ITEMS

M4.B Measurement   Reporting Category

ASSESSMENT ANCHOR

M4.B.2 Apply appropriate techniques, tools and formulas to determine measurements.

ELIGIBLE CONTENT

M4.B.2.1 Select and/or use appropriate tools and/or attributes for measuring quantities.

M4.B.2.1.1 Use or read a ruler (provided) to measure to the nearest 1/4 inch or centimeter.

EXAMPLE ITEMS

M4.B Measurement | Reporting Category

ASSESSMENT ANCHOR

M4.B.2 Apply appropriate techniques, tools and formulas to determine measurements.

ELIGIBLE CONTENT

M4.B.2.2 Estimate measurements of figures.

M4.B.2.2.1 Make reasonable estimates of weights, lengths and capacities of familiar objects (measurements in the same system).

EXAMPLE ITEMS

M4.C Geometry | **Reporting Category**

ASSESSMENT ANCHOR

M4.C.1 Analyze characteristics and properties of two- and three- dimensional geometric shapes and demonstrate understanding of geometric relationships.

	ELIGIBLE CONTENT
M4.C.1.1 Identify/describe the basic properties of geometric figures in two or three dimensions.	**M4.C.1.1.1** Identify, classify and/or compare two-dimensional figures (circle, triangle, square, parallelogram, trapezoid, rhombus, rectangle, pentagon, hexagon, octagon).
	M4.C.1.1.2 Identify or classify three-dimensional figures (cube, sphere, rectangular prism and pyramid).

EXAMPLE ITEMS

- I am a shape.
  - I have NO flat faces.
  - I have NO corners.
  - I look the same from all directions.

What shape am I?

* A.

sphere

B.

cone

C.

cylinder

D.

pyramid

(*Maine State Department of Education*)

- Alan says that if a figure has four sides, it must be a rectangle. Gina does not agree. Which of the following figures shows that Gina is correct?

A.

B.

C.

* D.

(*NAEP*)

ASSESSMENT ANCHOR

M4.C.1 Analyze characteristics and properties of two- and three- dimensional geometric shapes and demonstrate understanding of geometric relationships.
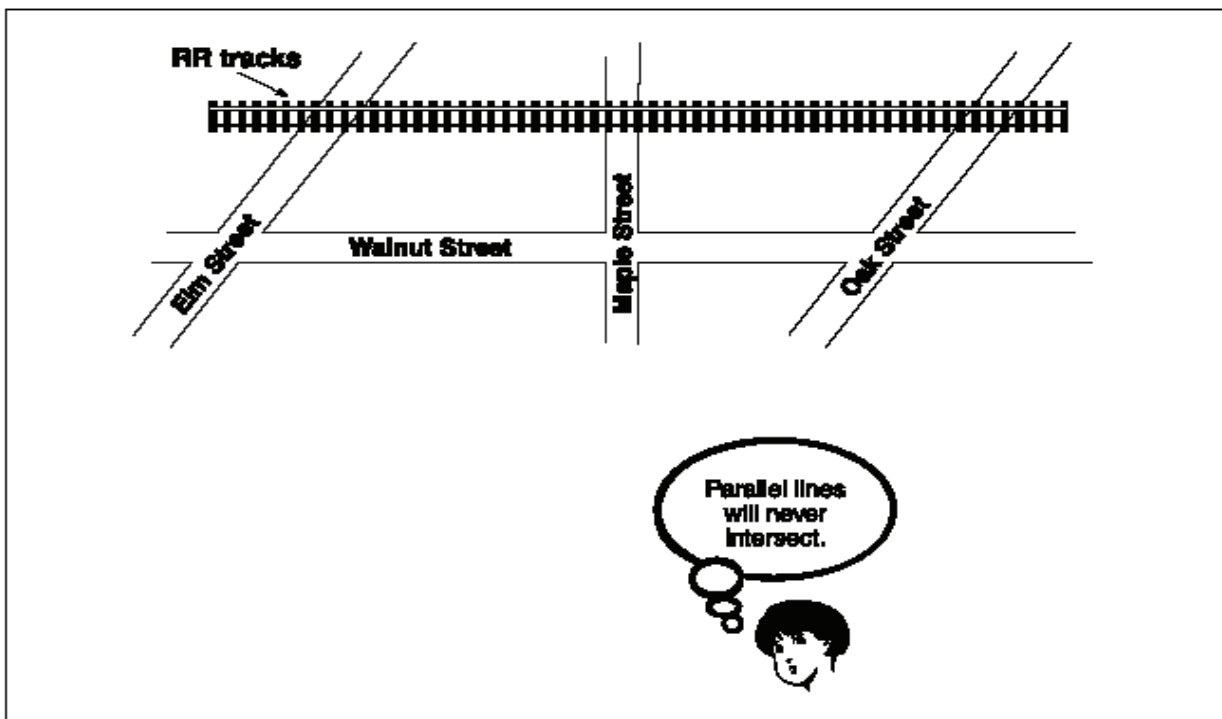
ELIGIBLE CONTENT

M4.C.1.2 Represent and/or use properties or relationships of points, lines, line segments, rays and angles.

M4.C.1.2.1 Identify points, lines, line segments or rays.

M4.C.1.2.2 Identify parallel and perpendicular lines.

**EXAMPLE ITEMS**

- Which street is parallel to the railroad tracks?


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A.  Oak Street
*  B.  Walnut Street
C.  Maple Street
D.  Elm Street
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(Maine State Department of Education)

M4.C Geometry — Reporting Category

ASSESSMENT ANCHOR

M4.C.2 Identify and/or apply concepts of transformations or symmetry.

M4.C.2.1 Apply the concepts of reflection and symmetry.

ELIGIBLE CONTENT

M4.C.2.1.1 Identify or create figures that have one, two or no lines of symmetry.

EXAMPLE ITEMS

- Which figure does NOT have a line of symmetry?

A.

* B.

C.

D.

(Maine State Department of Education)

M4.C Geometry   Reporting Category
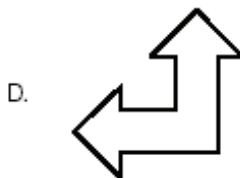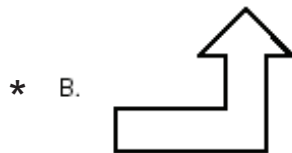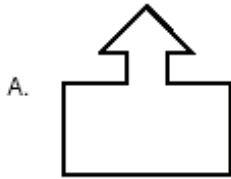
ASSESSMENT ANCHOR
M4.C.3 Locate and describe relationships using the coordinate plane.
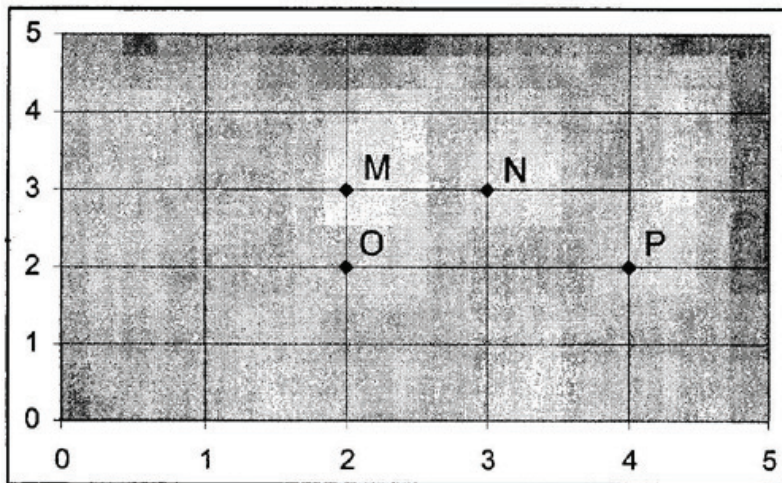
ELIGIBLE CONTENT

M4.C.3.1 Locate points on a simple grid.

M4.C.3.1.1 Match or plot the ordered pair with the appropriate point (or object) on a simple grid.
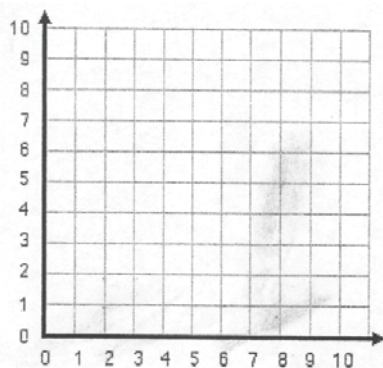
EXAMPLE ITEMS

- What is the location of point M?

    A. (2, 2)
 * B. (2, 3)
    C. (3, 3)
    D. (4, 2)

(New Jersey Department of Education)

- Plot these points and connect them in order. What shape is it?
  (2,1) (8,1) (8,5) (2,1)

    A. square
 * B. triangle
    C. rectangle
    D. rhombus

(Pennsylvania Department of Education)

M4.D Algebraic Concepts — Reporting Category

ASSESSMENT ANCHOR

M4.D.1 Demonstrate an understanding of patterns, relations and functions.

ELIGIBLE CONTENT

M4.D.1.1 Recognize, describe, extend, create and/or replicate a variety of patterns.

M4.D.1.1.1 Extend or find a missing element in a numerical or geometric pattern (+, - or x may be used – numerical patterns must be whole numbers).

M4.D.1.1.2 Identify/describe the rule for a numerical or geometric pattern shown (+, - or x may be used - numerical patterns must be whole numbers).

M4.D.1.1.3 Create or replicate a numerical or geometric pattern showing 3 repetitions (+, - or x may be used - numerical patterns must be whole numbers or money).

EXAMPLE ITEMS

- If this pattern continues, what is the next number?

    5, 8, 7, 10, 9, 12, 11

  * A. 14
    B. 13
    C. 12
    D. 10

  (New Jersey Department of Education)

- Katie made the number pattern shown below.

    4, 12, 20, __

  What number comes next in Katie's pattern?

    A. 49
    B. 32
  * C. 28
    D. 24

  (Maine State Department of Education)

M4.D Algebraic Concepts | Reporting Category

ASSESSMENT ANCHOR

M4.D.1 Demonstrate an understanding of patterns, relations and functions.

	ELIGIBLE CONTENT
M4.D.1.2 Apply simple function rules.	**M4.D.1.2.1** Determine the missing elements in a function table (functions may use +, - or x and whole numbers or money).
	M4.D.1.2.2 Determine the rule for a function given a table (functions may use +, - or x and whole numbers).

EXAMPLE ITEMS

- What number is missing in the output column of the table below?

Input	Output
4	12
6	18
7	
9	27

   A. 20

* B. 21

   C. 22

   D. 24

(New Jersey Department of Education)

M4.D Algebraic Concepts   Reporting Category

ASSESSMENT ANCHOR

M4.D.2 Represent and/or analyze mathematical situations and structures using algebraic symbols, words, tables and graphs.

ELIGIBLE CONTENT

M4.D.2.1 Use numbers and symbols to model the concepts of expressions and/or equations.

M4.D.2.1.1 Correlate story situations with expressions or equations (may use numbers and one operation +, - or x; no variables).

EXAMPLE ITEMS

M4.D Algebraic Concepts   Reporting Category

ASSESSMENT ANCHOR

M4.D.2 Represent and/or analyze mathematical situations and structures using algebraic symbols, words, tables and graphs.

ELIGIBLE CONTENT

M4.D.2.2 Determine the missing number or symbol in a number sentence.

M4.D.2.2.1 Solve for a missing number in an equation (using estimation, guess & check, etc.). May use +, - or single digit x or ÷.

M4.D.2.2.2 Identify the missing symbol (+, -, x, ÷, =, <, >) that makes a number sentence true (single digit x or ÷ only).

EXAMPLE ITEMS

M4.D Algebraic Concepts

ASSESSMENT ANCHOR

M4.D.3 Analyze change in various contexts.

ELIGIBLE CONTENT

Not assessed at Grade 4.

EXAMPLE ITEMS

M4.D Algebraic Concepts   Reporting Category

ASSESSMENT ANCHOR

M4.D.4 Describe or use models to represent quantitative relationships.

ELIGIBLE CONTENT

Not assessed at Grade 4.

EXAMPLE ITEMS

M4.E Data Analysis and Probability   Reporting Category

ASSESSMENT ANCHOR

M4.E.1 Formulate questions that can be addressed with data and/or collect, organize, display and analyze data.

	ELIGIBLE CONTENT
M4.E.1.1 Interpret data shown on tables, charts, line graphs, bar graphs or pictographs.	**M4.E.1.1.1** Describe, interpret and/or answer questions based on data shown in tables, charts, bar graphs or pictographs.

EXAMPLE ITEMS

- The principal challenged Mrs. Brown's class to read 100 books in February. The graph below shows the number of books they read.
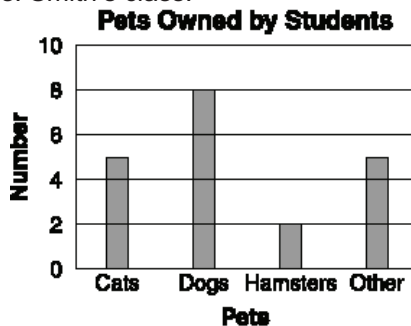
Number of Books Read

Key: = 10 Books
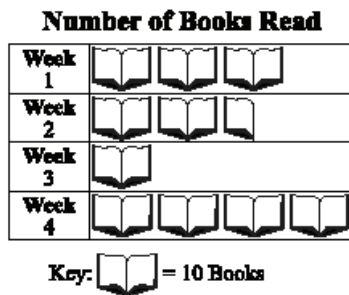
How many books did the class read?

  A. 10
  B. 11
✶ C. 105
  D. 110

(Maine State Department of Education)

- The graph below shows the numbers of different kinds of pets owned by students in Mrs. Smith's class.
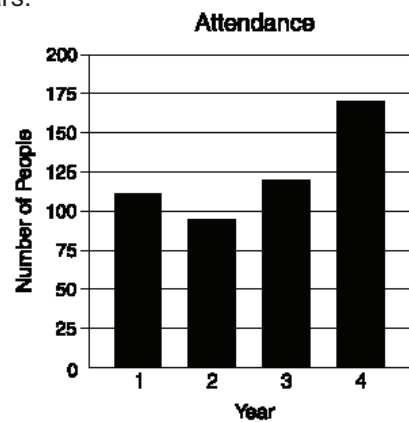
Pets Owned by Students

How many pets in all are owned by the students?

  A. 4
  B. 8
  C. 18
✶ D. 20   *(Maine State Department of Education)*

- The graph below shows the number of people attending the talent show in the last four years.

Attendance

Which is a true statement about this graph?

✶ A. The attendance increased two years in a row.
  B. The attendance in Year 4 doubled the attendance in Year 1.
  C. The attendance decreased every year.
  D. The attendance increased every year.

(Maine State Department of Education)

M4.E Data Analysis and Probability   Reporting Category

ASSESSMENT ANCHOR

M4.E.1 Formulate questions that can be addressed with data and/or collect, organize, display and analyze data.

ELIGIBLE CONTENT

M4.E.1.2 Organize or display data using tables, bar graphs, line graphs or pictographs.

M4.E.1.2.1 Graph data or complete a graph given the data (bar graph or pictograph – grid is provided).

M4.E.1.2.2 Translate information from one type of display to another (table, chart, bar graph, or pictograph).

EXAMPLE ITEMS

-

Favorite Colors

Red	⊮
Green	‖
Purple	⊮ ⊮
Yellow	⊮ ‖
Blue	⊮ ‖‖‖

Which chart below shows the data from the tally chart above?

Favorite Colors

* A.
Red	5
Green	2
Purple	10
Yellow	7
Blue	9

Favorite Colors

B.
Red	4
Green	2
Purple	10
Yellow	6
Blue	9

Favorite Colors

C.
Red	5
Green	2
Purple	2
Yellow	7
Blue	8

Favorite Colors

D.
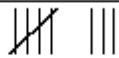| Red | 4 |
Green	2
Purple	8
Yellow	6
Blue	8

M4.E Data Analysis and Probability — Reporting Category

ASSESSMENT ANCHOR

M4.E.2 Select and/or use appropriate statistical methods to analyze data.

ELIGIBLE CONTENT

Not assessed at Grade 4.

EXAMPLE ITEMS

M4.E Data Analysis and Probability   Reporting Category

ASSESSMENT ANCHOR

M4.E.3 Understand and apply basic concepts of probability or outcomes.

	ELIGIBLE CONTENT
M4.E.3.1 Predict and/or measure the likelihood of events.	**M4.E.3.1.1** Make a prediction based on data or chance (data may be shown in tables, charts, line graphs, bar graphs or pictographs)

EXAMPLE ITEMS

- Karla's teacher put 10 marbles in a bag. Without looking into the bag, Karla took a marble out, recorded its color in the chart below, and put it back into the bag. She did this 20 times.

Color	Number of Times
red	ⅢⅡ Ⅲ
blue	Ⅲ
green	ⅢⅠ
yellow	ⅢⅠ

If Karla takes one more marble from the bag without looking, what color will it MOST LIKELY be?

  * A. red
      B. blue
      C. green
      D. yellow

(Maine State Department of Education)

- A gum ball machine has 7 red gum balls, 4 white gum balls, 9 orange gum balls, and 5 blue gum balls. If Jack puts in a nickel and turns the handle for one gum ball, which color does he have the LEAST chance of getting?

      A. red
  * B. white
      C. orange
      D. blue

(New Hampshire Department of Education)

M4.E Data Analysis and Probability

ASSESSMENT ANCHOR

M4.E.4 Develop and/or evaluate inferences and predictions or draw conclusions based on data or data displays.

ELIGIBLE CONTENT

Not assessed at Grade 4.

EXAMPLE ITEMS