

# Mathematics Curriculum

## Grade 4

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Fourth grade students use a sense of number to read, write, order, and compare numbers to millions; recognize and use commutative and associative properties of addition and multiplication; estimate, add, and subtract four-digit whole numbers, fractions with like denominators, and decimals to hundredths; and multiply and divide two- and three-digit numbers. They estimate and measure length, volume and capacity; find area and perimeter of regular and irregular polygons; classify geometric shapes and angles; model three-dimensional shapes; investigate transformational geometry; and locate points on a grid using ordered pairs. Fourth graders collect, display, and compare survey data; recognize terms to express central tendency; determine probability; and record ratios.



### MTH.G4

#### Standard 1

#### IDENTIFY, COMPARE & ROUND WHOLE NUMBERS EXPRESSED THROUGH MILLIONS

The student will

- a) identify (orally and in writing) the place value for each digit in a whole number expressed through millions;
- b) compare two whole numbers expressed through millions, using symbols ( $>$ ,  $<$ , or  $=$ ); and
- c) round whole numbers expressed through millions to the nearest thousand, ten thousand, and hundred thousand.



#### Benchmark 1.a

##### Identify Place Value for Each Digit in a Whole Number Through Millions

The student will identify (orally and in writing) the place value for each digit in a whole number expressed through millions.



##### Indicator 1.a.1

###### Identify/communicate the place value for each digit in whole numbers

Identify and communicate, both orally and in written form, the place value for each digit in whole numbers expressed through the one millions place.



##### Indicator 1.a.2

###### Read whole numbers through the one millions place

Read whole numbers through the one millions place that are presented in standard format, and select the matching number in written format.



##### Indicator 1.a.3

###### Write whole numbers through the one millions place

Write whole numbers through the one millions place in standard format when the numbers are presented orally or in written format.



##### Indicator 1.a.4

###### Find different names based on place value for the same number

*Find different names based on place value for the same number.*



#### Benchmark 1.b

##### Compare Two Whole Numbers Expressed Through Millions

The student will compare two whole numbers expressed through millions, using symbols ( $>$ ,  $<$ , or  $=$ ).



##### Indicator 1.b.1

###### Identify and use the symbols for greater than, less than, & equal to

Identify and use the symbols for *greater than*, *less than*, and *equal to*.

##### Indicator 1.b.2



## Compare two whole numbers expressed through the one millions

Compare two whole numbers expressed through the one millions, using symbols  $>$ ,  $<$ , or  $=$ .

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### Benchmark 1.c

#### Round Whole Numbers Expressed Through Millions

The student will round whole numbers expressed through millions to the nearest thousand, ten thousand, and hundred thousand.



#### Indicator 1.c.1

##### Round to the nearest thousand, ten thousand, & hundred thousand place

Round whole numbers expressed through the one millions place to the nearest thousand, ten thousand, and hundred-thousand place.



#### Indicator 1.c.2

##### Explain rounding and derive a rule for rounding whole numbers

*Explain rounding and derive a rule for rounding whole numbers. Use the rule to round up to hundred thousands.*

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## MTH.G4

### Standard 2

#### IDENTIFY/MODEL/COMPARE RATIONAL NUMBERS & REPRESENT EQUIVALENT FORMS

The student will

- identify, model, and compare rational numbers (fractions and mixed numbers), using concrete objects and pictures;
  - represent equivalent fractions; and
  - relate fractions to decimals, using concrete objects.
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### Benchmark 2.a

#### Identify, Model, and Compare Rational Numbers

The student will identify, model, and compare rational numbers (fractions and mixed numbers), using concrete objects and pictures.



#### Indicator 2.a.1

##### Identify/model/compare fractions & mixed numbers

Identify, model, and compare fractions and mixed numbers through twelfths, using

- region/area models (e.g., fraction circles, pattern blocks, geoboards, color tiles, graph paper);
- set models (e.g., two-sided counters, chips); and
- measurement models (e.g., Cuisenaire rods, unifix cubes, fraction strips, number lines).



#### Indicator 2.a.2

##### Identify and represent equivalent fractions through twelfths

Identify and represent equivalent fractions through twelfths, using region/area models, set models, measurement models.



#### Indicator 2.a.3

##### Estimate and identify fractional parts of figures or groups

*Estimate and identify fractional parts of figures or groups.*



#### Indicator 2.a.4

##### Change mixed numbers to fractions greater than one

*Change mixed numbers to fractions greater than one by drawing representative models.*

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 **Benchmark 2.b**

**Represent Equivalent Fractions**

The student will represent equivalent fractions.

 **Indicator 2.b.1**

**Represent fractions for halves, fourths, fifths, & tenths as decimals**

Represent fractions for halves, fourths, fifths, and tenths as decimals through thousandths, using concrete objects, *symbols*, and *drawings* (e.g., demonstrate the relationship between the fraction  $\frac{1}{4}$  and its decimal equivalent 0.25).

 **Indicator 2.b.2**

**Find equivalent fractions using models, paper folding, or graphics**

*Find equivalent fractions using models, paper folding, or graphics.*

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 **Benchmark 2.c**

**Relate Fractions to Decimals Using Concrete Objects**

The student will relate fractions to decimals, using concrete objects.

 **Indicator 2.c.1**

**Relate fractions to decimals using concrete objects**

Relate fractions to decimals, using concrete objects (e.g., 10-by-10 grids, meter sticks, number lines, decimal squares, money [coins]).

 **Indicator 2.c.2**

**Demonstrate that decimals and fractions are names for the same numbers**

*Demonstrate that decimals and fractions are names for the same numbers.*

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 **MTH.G4**

**Standard 3**

**COMPARE THE NUMERICAL VALUE OF FRACTIONS**

**The student will compare the numerical value of fractions (with like and unlike denominators) having denominators of 12 or less, using concrete materials.**

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 **Benchmark 3.a**

**Compare Numerical Value of Fractions with Denominators of 12 or Less**

The student will compare the numerical value of fractions (with like and unlike denominators) having denominators of 12 or less, using concrete materials.

 **Indicator 3.a.1**

**Compare two fractions having denominators of 12 or less**

Compare two fractions having denominators of 12 or less, using manipulative models and drawings, such as

- region/area models (e.g., fraction circles, pattern blocks, geoboards, color tiles,
- graph paper, drawings);
- set models (e.g., two-sided counters, chips, drawings); and
- measurement models (e.g., Cuisenaire rods, unifix cubes, fraction strips, rulers/number lines, drawings).

 **Indicator 3.a.2**

**Compare two fractions with like denominators by comparing numerators**

Compare two fractions with like denominators by comparing numerators (e.g.,  $\frac{1}{5} < \frac{3}{5}$ ).

 **Indicator 3.a.3**

**Compare two fractions by comparing the fractions to common benchmarks**

Compare two fractions having unlike denominators of 12 or less by comparing the fractions to common benchmarks (e.g.,  $\frac{1}{2}$  or 1) to determine their relationship or by finding a common denominator.

 **Indicator 3.a.4**

**Use symbols  $>$ ,  $<$  &  $=$  to compare the numerical value of two fractions**

Use the symbols  $>$ ,  $<$ , and  $=$  to compare the numerical value of two fractions having denominators of 12 or less.

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 **MTH.G4**

**Standard 4**

**READ/WRITE/REPRESENT/IDENTIFY/ROUND/COMPARE DECIMALS**

**The student will**


- a) read, write, represent, and identify decimals expressed through thousandths;
- b) round to the nearest whole number, tenth, and hundredth; and
- c) compare the value of two decimals, using symbols ( $<$ ,  $>$ , or), concrete materials, drawings, and calculators.



**Benchmark 4.a**


**Read/Write/Represent/Identify Decimals Expressed Through Thousandths**

The student will read, write, represent, and identify decimals expressed through thousandths.

 **Indicator 4.a.1**


**Investigate the ten-to-one place-value relationship for decimals**

Investigate the ten-to-one place-value relationship for decimals through thousandths, using base-10 manipulatives (e.g., place-value mats/charts, decimal squares, base-10 blocks, money).

 **Indicator 4.a.2**

**Represent and identify decimals expressed through thousandths**

Represent and identify decimals expressed through thousandths, using base-10 manipulatives, pictorial representations, calculators, and numerical symbols (e.g., relate the appropriate drawing to 0.005).

 **Indicator 4.a.3**

**Read and write decimals expressed through thousandths**


Read and write decimals expressed through thousandths, using base-10 manipulatives, drawings, calculators, and numerical symbols. Any decimal less than 1 will include a leading zero (e.g., 0.125).



**Benchmark 4.b**

**Round to the Nearest Whole Number, Tenth, and Hundredth**

The student will round to the nearest whole number, tenth, and hundredth.

 **Indicator 4.b.1**

**Round decimals to the nearest whole number, tenth, and hundredth**

Round decimals to the nearest whole number, tenth, and hundredth.



#### Indicator 4.b.2

##### Explain rounding and derive a rule for rounding fractions and decimals

*Explain rounding and derive a rule for rounding fractions and decimals. Use the rule to round decimals up to hundredths.*

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#### Benchmark 4.c

##### Compare the Value of Two Decimals

The student will compare the value of two decimals, using symbols ( $<$ ,  $>$ , or  $=$ ), concrete materials, drawings, and calculators.



#### Indicator 4.c.1

##### Compare the value of two decimals, using the symbols $<$ , $>$ , $=$

Compare the value of two decimals, using the symbols  $<$ ,  $>$ ,  $=$ .



#### Indicator 4.c.2

##### Read, write, represent, compare and order decimals through thousandths

*Read, write, represent, compare and order decimals through thousandths, using symbols, concrete materials, and drawings.*

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### MTH.G4

#### Standard 5

##### ESTIMATE WHOLE-NUMBER SUMS AND DIFFERENCES

The student will estimate whole-number sums and differences and describe the method of estimation. Students will refine estimates, using terms such as *closer to*, *between*, and *a little more than*.

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#### Benchmark 5.a

##### Estimate Whole-Number Sums and Differences

The student will estimate whole-number sums and differences and describe the method of estimation. Students will refine estimates, using terms such as *closer to*, *between*, and *a little more than*.



#### Indicator 5.a.1

##### Use a variety of methods to estimate whole-number sums and differences

Estimate whole-number sums and differences, using rounding, front-end strategies, and compatible number strategies. Describe the method of estimation used.



#### Indicator 5.a.2

##### Refine estimates by adjusting the final amount

Refine estimates by adjusting the final amount, using terms such as *closer to*, *between*, and *a little more than*.



#### Indicator 5.a.3

##### Estimate the sum or difference of four-digit numbers to solve problems

*Estimate the sum or difference of four-digit numbers to solve problems including money amounts and zeroes.*



#### Indicator 5.a.4

##### Use place value and numerical relationships in problem-solving setting

*Use place value and numerical relationships including estimation strategies (rounding, front-end, compatible numbers, or using a referent) in problem-solving settings. Refine estimates using terms such as *closer to*, *between*, and *a little more than*.*

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### MTH.G4

#### Standard 6

##### ADD AND SUBTRACT WHOLE NUMBERS

The student will add and subtract whole numbers written in vertical and horizontal form, choosing appropriately between paper and pencil methods and calculators.

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 **Benchmark 6.a**

**Add and Subtract Whole Numbers Written in Vertical & Horizontal Form**

The student will add and subtract whole numbers written in vertical and horizontal form, choosing appropriately between paper and pencil methods and calculators.

 **Indicator 6.a.1**  
**Determine the sum or difference of two whole numbers in vertical form**

Determine the sum or difference of two whole numbers, each 999,999 or less, in vertical form with or without regrouping.

 **Indicator 6.a.2**  
**Determine the sum/difference of two whole numbers in horizontal form**

Determine the sum or difference of two whole numbers, each 999,999 or less, in horizontal form with or without regrouping.

 **Indicator 6.a.3**  
**Use paper & pencil to find the sum/difference of two whole numbers**

Find the sum or difference of two whole numbers, each 999,999 or less, using paper and pencil.

 **Indicator 6.a.4**  
**Use a calculator to find the sum/difference of two whole numbers**

Find the sum or difference of two whole numbers, each 999,999 or less, using a calculator.

 **Indicator 6.a.5**  
**Add and subtract four-digit numbers to solve problems**

*Add and subtract four-digit numbers to solve problems including subtracting money amounts and subtracting across zeroes.*

 **Indicator 6.a.6**  
**Use operations involving rational numbers to solve real-life problems**

*Use addition, subtraction, multiplication, and division involving whole numbers, fractions, and decimals to solve real-life problems.*

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 **MTH.G4**  
**Standard 7**

**FIND THE PRODUCT OF TWO WHOLE NUMBERS**

The student will find the product of two whole numbers when one factor has two digits or fewer and the other factor has three digits or fewer, using estimation and paper and pencil. For larger products (a two-digit numeral times a three-digit numeral), estimation and calculators will be used.

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 **Benchmark 7.a**  
**Find the Product of Two Whole Numbers**

The student will find the product of two whole numbers when one factor has two digits or fewer and the other factor has three digits or fewer, using estimation and paper and pencil. For larger products (a two-digit numeral times a three-digit numeral), estimation and calculators will be used.

 **Indicator 7.a.1**  
**Estimate the products of two whole numbers**

Estimate the products of two whole numbers when one factor has two digits or fewer and the other factor has three digits or fewer.

**Indicator 7.a.2****Find the product of two whole numbers using paper/pencil & calculator**

Find the product of two whole numbers when one factor has two digits or fewer and the other factor has three digits or fewer, using paper and pencil and calculators.

**Indicator 7.a.3****Use patterns to estimate products of two-digit & three-digit numbers**

Estimate products of two-digit numbers and three-digit numbers by recognizing patterns from two-digit numbers by two-digit number models.

**Indicator 7.a.4****Use money as a reference to estimate products**

Estimate products of two-digit decimal numbers by one-digit whole numbers, referring to money.

**Indicator 7.a.5****Develop strategies to learn multiplication facts not yet known**

Review multiplication facts, identifying the difficult ones not known yet. Develop strategies and learn the remaining multiplication facts.

**Indicator 7.a.6****Recognize factors and products in multiplication sentences**

Recognize factors and products in multiplication sentences and explain their relationship and the relationship between multiplication and division.

**Indicator 7.a.7****Multiply one-digit numbers by two-and three-digit numbers**

Multiply one-digit numbers by two-and three-digit numbers and mentally by multiples of 10.

**Indicator 7.a.8****Use models to illustrate multiplication**

Illustrate multiplication of two-digit numbers by two-digit numbers using models. Multiply two-digit by two-digit numbers. Recognize the regrouping pattern continues to three-digit numbers times two-digit numbers, finding the answers by using calculators.

**Indicator 7.a.9****Multiply decimal numbers by whole numbers, referring to money**

Multiply two-digit decimal numbers by one-digit whole numbers, referring to money.

**MTH.G4****Standard 8****ESTIMATE AND FIND THE QUOTIENT OF TWO WHOLE NUMBERS**

The student will estimate and find the quotient of two whole numbers, given a one-digit divisor.

**Benchmark 8.a****Estimate and Find the Quotient of Two Whole Numbers**

The student will estimate and find the quotient of two whole numbers, given a one-digit divisor.

**Indicator 8.a.1****Estimate the quotient of two whole numbers**

Estimate the quotient of two whole numbers, given a one-digit divisor and a two- or three-digit dividend.

**Indicator 8.a.2****Find the quotient of two whole numbers**

Find the quotient of two whole numbers, given a one-digit divisor and a two-or three-digit

dividend.



**Indicator 8.a.3**

**Estimate quotients by using compatible numbers**

*Estimate quotients by using compatible numbers.*



**Indicator 8.a.4**

**Estimate quotients and divide by multiples of ten**

*Estimate quotients. Divide by multiples of ten.*



**Indicator 8.a.5**

**Demonstrate division with and without remainders**

*Demonstrate division with and without remainders, using concrete materials in a problem solving setting. Decide the significance of any remainders.*



**Indicator 8.a.6**

**Use models to illustrate division**

*Illustrate division of two-digit and three-digit numbers by one-digit divisor using models. Find the quotient.*



**MTH.G4**

**Standard 9**

**SOLVE PROBLEMS INVOLVING ADDITION/SUBTRACTION OF FRACTIONS & DECIMALS**

The student will

- a) add and subtract with fractions having like and unlike denominators of 12 or less, using concrete materials, pictorial representations, and paper and pencil;
- b) add and subtract with decimals through thousandths, using concrete materials, pictorial representations, and paper and pencil; and
- c) solve problems involving addition and subtraction with fractions having like and unlike denominators of 12 or less and with decimals expressed through thousandths, using various computational methods, including calculators paper and pencil, mental computation, and estimation.



**Benchmark 9.a**

**Add and Subtract Fractions Using a Variety of Methods**

The student will add and subtract with fractions having like, and unlike denominators of 12 or less, using concrete materials, pictorial representations, and paper and pencil.



**Indicator 9.a.1**

**Add and subtract with fractions having like denominators of 12 or less**

Add and subtract with fractions having like denominators of 12 or less, using concrete materials, pictorial representations, and paper and pencil.



**Indicator 9.a.2**

**Add/subtract with fractions having unlike denominators of 12 or less**

Add and subtract with fractions having unlike denominators of 12 or less, using concrete materials, pictorial representations and paper and pencil.



**Indicator 9.a.3**

**Solve problems that involve adding and subtracting with fractions**

Solve problems that involve adding and subtracting with fractions having like and unlike denominators of 12 or less.



**Indicator 9.a.4**

**Estimate sum or difference of fractions with like denominators = 12**

*Estimate the sum and difference of fractions with like denominators of twelve or less.*

**Indicator 9.a.5****Estimate sum or difference of mixed numbers with like denominators**

*Estimate the sum and difference of mixed numbers with like denominators.*

**Indicator 9.a.6****Add and subtract mixed numbers with like denominators**

*Add and subtract mixed numbers with like denominators.*

**Benchmark 9.b****Add and Subtract Decimals Through Thousandths**

The student will add and subtract decimals through thousandths, using concrete materials, pictorial representations, and paper and pencil.

**Indicator 9.b.1****Add and subtract with decimals through thousandths**

Add and subtract with decimals through thousandths, using concrete materials, pictorial representations, and paper and pencil.

**Indicator 9.b.2****Estimate the sum and difference of decimals to thousandths**

*Estimate the sum and difference of decimals to thousandths by using models, pictorial representations, and paper and pencil.*

**Benchmark 9.c****Solve Problems Involving Addition/Subtraction of Fractions & Decimals**

The student will solve problems involving addition and subtraction with fractions having like and unlike denominators of 12 or less and with decimals expressed through thousandths, using various computational methods, including calculators, paper and pencil, mental computation, and estimation.

**Indicator 9.c.1****Solve problems that involve adding and subtracting with decimals**

Solve problems that involve adding and subtracting with decimals through thousandths.

**Indicator 9.c.2****Count coins and bills up to \$20.00; make change by counting on**

*Count coins and bills up to \$20.00. Make change by counting on.*

**Indicator 9.c.3****Use amounts greater than \$20.00**

*Use amounts greater than \$20.00.*

**MTH.G4****Standard 10****ESTIMATE & MEASURE WEIGHT/MASS IN U.S. CUSTOMARY/METRIC UNITS**

The student will

a) estimate and measure weight/mass, using actual measuring devices, and describe the results in U.S. Customary/metric units as appropriate, including ounces, pounds grams, and kilograms;

b) identify equivalent measurements between units within the U.S. Customary system (ounces and pounds) and between units within the metric system (grams and kilograms); and

c) estimate the conversion of ounces and grams and pounds and kilograms, using approximate comparisons (1

ounce is about 28 grams, or 1 gram is about the weight of a paper clip; 1 kilogram is a little more than 2 pounds).\*


*\*The intent of this standard is for students to make ballpark comparisons and not to memorize conversion factors between U.S. Customary and metric units.*

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 **Benchmark 10.a**


**Use Actual Measuring Devices to Estimate/Measure Weight/Mass**

The student will estimate and measure weight/mass, using actual measuring devices, and describe the results in U.S. Customary/metric units as appropriate, including ounces, pounds, grams, and kilograms.

 **Indicator 10.a.1**


**Determine an appropriate unit of measure to use when measuring objects**

Determine an appropriate unit of measure (e.g., ounce, pound, gram, kilogram) to use when measuring everyday objects in both metric and U.S. Customary units.

 **Indicator 10.a.2**

**Measure objects in both metric and US Customary units**

Measure objects in both metric and U.S. Customary units (e.g., ounce, pound, gram, or kilogram) to the nearest appropriate measure, using a variety of measuring instruments.

 **Indicator 10.a.3**

**Record the mass of an object including the appropriate unit of measure**

Record the mass of an object including the appropriate unit of measure (e.g., 24 grams).

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 **Benchmark 10.b**

**Identify Equivalent Measurements Between Units within a Given System**

The student will identify equivalent measurements between units within the U.S. Customary system (ounces and pounds) and between units within the metric system (grams and kilograms).

 **Indicator 10.b.1**

**Use a variety of measuring devices to measure objects**

Measure objects in both metric and U.S. Customary units (e.g., ounce, pound, gram, or kilogram) to the nearest appropriate measure, using a variety of measuring instruments.

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 **Benchmark 10.c**

**Estimate the Conversion of Ounces/Grams and Pounds/Kilograms**

The student will estimate the conversion of ounces and grams and pounds and kilograms, using approximate comparisons (1 ounce is about 28 grams, or 1 gram is about the weight of a paper clip; 1 kilogram is a little more than 2 pounds).\*

*\*The intent of this standard is for students to make ballpark comparisons and not to memorize conversion factors between U.S. Customary and metric units.*

 **Indicator 10.c.1**

**Use ballpark comparisons to estimate conversions**

Estimate conversions between U.S. Customary and metric units, using ballpark comparisons, such as

- 1 ounce is about 28 grams;
- 1 nickel has the mass of about 5 grams; and
- 1 kilogram is a little more than 2 pounds.



## MTH.G4

### Standard 11

#### ESTIMATE & MEASURE LENGTH IN U.S. CUSTOMARY/METRIC UNITS

The student will

- estimate and measure length, using actual measuring devices, and describe the results in both metric and U.S. Customary units, including part of an inch ( $\frac{1}{2}$ ,  $\frac{1}{4}$ , and  $\frac{1}{8}$ ), inches, feet, yards, millimeters, centimeters, and meters;
- identify equivalent measurements between units within the U.S. Customary system (inches and feet; feet and yards; inches and yards) and between units within the metric system (millimeters and centimeters; centimeters and meters; and millimeters and meters); and
- estimate the conversion of inches and centimeters, yards and meters, and miles and kilometers, using approximate comparisons (1 inch is about 2.5 centimeters; 1 meter is a little longer than 1 yard; 1 mile is slightly farther than 1.5 kilometers, or 1 kilometer is slightly farther than half a mile). \*

*\*The intent of this standard is for students to make ballpark comparisons and not to memorize conversion factors between U.S. Customary and metric units.*



#### Benchmark 11.a

##### Use Actual Measuring Devices to Estimate/Measure Length

The student will estimate and measure length, using actual measuring devices, and describe the results in both metric and U.S. Customary units, including part of an inch ( $\frac{1}{2}$ ,  $\frac{1}{4}$ , and  $\frac{1}{8}$ ), inches, feet, yards, millimeters, centimeters, and meters.



##### Indicator 11.a.1

###### Determine an appropriate unit of measure to use when measuring objects

Determine an appropriate unit of measure (e.g., inch, foot, yard, millimeter, centimeter, and meter) to use when measuring everyday objects in both metric and U.S. Customary units.



##### Indicator 11.a.2

###### Estimate length of everyday objects in metric & U.S. Customary units

Estimate the length of everyday objects (e.g., books, windows, tables) in both metric and U.S. Customary units of measure.



##### Indicator 11.a.3

###### Measure lengths of objects in both metric and U.S. Customary units

Measure the lengths of objects in both metric and U.S. Customary units, measuring to the nearest inch ( $\frac{1}{2}$ ,  $\frac{1}{4}$ ,  $\frac{1}{8}$ ), foot, yard, millimeter, centimeter, or meter, and record the length including the appropriate unit of measure (e.g., 24 inches).



##### Indicator 11.a.4

###### Compare estimates of the length of objects with the actual measurement

Compare estimates of the length of objects with the actual measurement of the length of objects.



#### Benchmark 11.b

##### Identify Equivalent Measurements Between Units within a Given System

The student will identify equivalent measurements between units within the U.S. Customary system (inches and feet; feet and yards; inches and yards) and between units within the metric system (millimeters and centimeters; centimeters and meters).



##### Indicator 11.b.1

###### Identify equivalent measures of length between customary/metric

Identify equivalent measures of length between U.S. Customary measurements and between metric measurements.


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 **Benchmark 11.c**

**Estimate Conversion of Inches/Centimeters, Yards/Meters, Miles/KM**

The student will estimate the conversion of inches and centimeters, yards and meters, and miles and kilometers, using approximate comparisons (1 inch is about 2.5 centimeters; 1 meter is a little longer than 1 yard; 1 mile is slightly farther than 1.5 kilometers, or 1 kilometer is slightly farther than half a mile).\*

*\*The intent of this standard is for students to make ballpark comparisons and not to memorize conversion factors between U.S. Customary and metric units.*

 **Indicator 11.c.1**

**Use ballpark comparisons to estimate conversions**

Estimate conversions between the U.S. Customary and metric units, using ballpark comparisons, such as

- 1 inch is about 2.5 centimeters;
- 1 meter is a little longer than 1 yard;
- 1 mile is slightly farther than 1.5 kilometers; and

-1 kilometer is slightly farther than half a mile.

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 **MTH.G4**  
**Standard 12**

**ESTIMATE & MEASURE LIQUID VOLUME IN U.S. CUSTOMARY/METRIC UNITS**

The student will

- a) estimate and measure liquid volume, using actual measuring devices and using metric and U.S. Customary units, including cups, pints, quarts, gallons, milliliters, and liters;
- b) identify equivalent measurements between units within the U.S. Customary system (cups, pints, quarts, and gallons) and between units within the metric system (milliliters and liters); and
- c) estimate the conversion of quarts and liters, using approximate comparisons (1 quart is a little less than 1 liter, 1 liter is a little more than 1 quart). \*


*\*The intent of this standard is for students to make ballpark comparisons and not to memorize conversion factors between U. S. Customary and metric units.*

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 **Benchmark 12.a**


**Use Actual Measuring Devices To Estimate/Measure Liquid Volume**

The student will estimate and measure liquid volume, using actual measuring devices and using metric and U.S. Customary units, including cups, pints, quarts, gallons, milliliters, and liters.

 **Indicator 12.a.1**


**Determine an appropriate unit of measure to use when measuring volume**

Determine an appropriate unit of measure (cups, pints, quarts, gallons, milliliters, or liters) to use when measuring liquid volume in both metric and U.S. Customary units.

 **Indicator 12.a.2**

**Estimate liquid volume of containers in both customary & metric units**

Estimate the liquid volume of containers in both metric and U.S. Customary units of measure to the nearest cup, pint, gallon, milliliter, or liter.

 **Indicator 12.a.3**

**Measure liquid volume of everyday objects in metric/customary units**

Measure the liquid volume of everyday objects in both metric and U.S. Customary units, including cups, pints, quarts, gallons, milliliters, and liters, and record the volume including the appropriate unit of measure (e.g., 24 gallons).



#### **Indicator 12.a.4**

##### **Count cubes to determine the volume of a rectangular prism**

*Determine the volume of a rectangular prism by counting the number of cubes contained in it.*



#### **Indicator 12.a.5**

##### **Investigate contexts in which volume is measured**

*Investigate contexts in which volume is measured using a variety of boxes and materials.*



#### **Benchmark 12.b**

##### **Identify Equivalent Measurements Between Units within Given System**

The student will identify equivalent measurements between units within the U.S. Customary system (cups, pints, quarts, and gallons) and between units within the metric system (milliliters and liters).



#### **Indicator 12.b.1**

##### **Identify equivalent measures of volume between customary/metric**

Identify equivalent measures of volume between U.S. Customary and metric measurements.



#### **Benchmark 12.c**

##### **Estimate Conversion of Quarts And Liters Using Approximate Comparisons**

The student will estimate the conversion of quarts and liters, using approximate comparisons (1 quart is a little less than 1 liter, 1 liter is a little more than 1 quart).\*



#### **Indicator 12.c.1**

##### **Use ballpark comparisons to estimate conversions**

Estimate conversion between U.S. Customary and metric units, using ballpark comparisons, such as 1 quart is a little less than 1 liter, and 1 liter is a little more than 1 quart.



### **MTH.G4**

#### **Standard 13**

##### **IDENTIFY/DESCRIBE SITUATIONS REPRESENTING USE OF PERIMETER & AREA**

The student will

- a) identify and describe situations representing the use of perimeter and area; and
- b) use measuring devices to find perimeter in both standard and nonstandard units of measure.



#### **Benchmark 13.a**

##### **Identify/Describe Situations Representing Use of Perimeter & Area**

The student will identify and describe situations representing the use of perimeter and area.



#### **Indicator 13.a.1**

##### **Identify & describe situations where perimeter should be found**

Identify and describe situations where the perimeter of an object should be found (e.g., the distance around the edge of walls of the classroom; the length of fencing needed to enclose a playground).



#### **Indicator 13.a.2**

##### **Identify & describe situations where area should be found**

Identify and describe situations in which the area should be found (e.g., laying tile for the floor of the classroom).



### **Benchmark 13.b**

#### **Use Measuring Devices to Find Perimeter**

The student will use measuring devices to find perimeter in both standard and nonstandard units of measure.



#### **Indicator 13.b.1**

##### **Use nonstandard units of measure to find the perimeter of an object**

Measure the perimeter of an object, using nonstandard units of measure (e.g., unsharpened pencil, board eraser, toothpick, chalk, crayon, paper clip) and record the perimeter including the nonstandard unit of measure used (e.g., 24 paper clips).



#### **Indicator 13.b.2**

##### **Use both metric & U.S. Customary units to measure perimeter**

Measure the perimeter of concrete objects in both metric and U.S. Customary units of measure to the nearest inch, foot, yard, millimeter, centimeter, or meter.



#### **Indicator 13.b.3**

##### **Determine perimeter of an object & label with appropriate units**

Determine the perimeter of an object or pictorial representation of an object and label it with the appropriate standard or nonstandard unit of measure.



#### **Indicator 13.b.4**

##### **Find the area of regular & irregular polygons by counting squares**

*Find the area of regular and irregular polygons by covering and counting squares.*



#### **Indicator 13.b.5**

##### **Find surface area of cubes and rectangular prisms**

*Find the area of the faces of cubes and rectangular prisms; combine to find surface area.*



### **MTH.G4**

#### **Standard 14**

#### **INVESTIGATE/DESCRIBE RELATIONSHIPS: POINTS/LINES/LINE SEGMENTS/RAYS**

The student will investigate and describe the relationships between and among points, lines, line segments, and rays.



### **Benchmark 14.a**

#### **Investigate/Describe Relationships: Points/Lines/Line Segments/Rays**

The student will investigate and describe the relationships between and among points, lines, line segments, and rays.



#### **Indicator 14.a.1**

##### **Differentiate among point/line/line segment/ray by using definitions**

Differentiate among a point, line, line segment, and ray by using the definitions to compare.



#### **Indicator 14.a.2**

##### **Investigate/describe relationships: points/lines/line segments/rays**

Investigate and describe the relationships between and among points, lines, line segments, and rays.



### **MTH.G4**

#### **Standard 15**

#### **IDENTIFY/DRAW/DESCRIBE: POINT/LINE/LINE SEGMENT/RAY/ANGLE**

The student will

a) identify and draw representations of points, lines, line segments, rays, and angles, using a straightedge or

ruler; and  
b) describe the path of shortest distance between two points on a flat surface.

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 **Benchmark 15.a**  
**Identify & Draw Points/Lines/Line Segments/ Rays/Angles**

The student will identify and draw representations of points, lines, line segments, rays, and angles, using a straightedge or ruler.

 **Indicator 15.a.1**  
**Use definitions to identify points/lines/line segments/rays/angles**

Identify points, lines, line segments, rays, and angles, using their definitions.


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 **Benchmark 15.b**  
**Describe Path of Shortest Distance Between Two Points on Flat Surface**


The student will describe the path of shortest distance between two points on a flat surface.

 **Indicator 15.b.1**  
**Draw representations of lines, line segments, rays, and angles**

Draw representations of lines, line segments, rays, and angles, using a straightedge, ruler, or angle ruler.

 **Indicator 15.b.2**  
**Identify shortest distance between two points on a plane**

*Identify the shortest distance between two points on a plane as being a line segment.*

 **Indicator 15.b.3**  
**Classify angles as less than, equal to, or greater than a right angle**

*Classify angles as less than, equal to, or greater than a right angle.*

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 **MTH.G4**  
**Standard 16**

**IDENTIFY/DRAW INTERSECTING, PARALLEL, & PERPENDICULAR LINES**

The student will identify and draw representations of lines that illustrate intersection, parallelism, and perpendicularity.

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 **Benchmark 16.a**  
**Identify/Draw Intersecting, Parallel, & Perpendicular Lines**

The student will identify and draw representations of lines that illustrate intersection, parallelism, and perpendicularity.

 **Indicator 16.a.1**  
**Identify parallel/intersecting/perpendicular lines using definitions**

Identify lines that are parallel, intersecting, or perpendicular, using their definitions.

 **Indicator 16.a.2**  
**Draw representations of parallel/intersecting/perpendicular lines**

Draw representations of intersecting, parallel, and perpendicular lines.

 **Indicator 16.a.3**  
**Define point/line/line seg/ray/angle/parallel/perpendicular/intersect**

*Identify, define, and draw points, lines, line segments, rays, angles, parallel lines, perpendicular lines, and intersecting lines.*



## MTH.G4

### Standard 17

#### ANALYZE & COMPARE PROPERTIES OF TWO- & THREE-DIMENSIONAL FIGURES

The student will

- a) analyze and compare the properties of two-dimensional (plane) geometric figures (circle, square, rectangle, triangle, parallelogram, and rhombus) and three-dimensional (solid) geometric figures (sphere, cube, and rectangular solid [prism]);
- b) identify congruent and noncongruent shapes; and
- c) investigate congruence such as reflection (flip), translation (slide), and rotation (turn), using mirrors, paper folding, and tracing.



### Benchmark 17.a

#### Analyze & Compare Properties of Two- & Three-Dimensional Figures

The student will analyze and compare the properties of two-dimensional plane geometric figures (circle, square, rectangle, triangle, parallelogram, and rhombus) and three-dimensional (solid) geometric figures (sphere, cube, and rectangular solid [prism]).



#### Indicator 17.a.1

##### Identify/describe properties of triangles, quadrilaterals & circles

Identify and describe the properties of squares, rectangles, triangles, parallelograms, rhombi, and circles.



#### Indicator 17.a.2

##### Identify/describe properties of spheres, cubes, & rectangular solids

Identify and describe the properties of spheres, cubes, and rectangular solids (prisms).



#### Indicator 17.a.3

##### Analyze/compare properties of related two- & three-dimensional shapes

Analyze and compare the properties of

- circles and spheres;
- squares and cubes; and
- rectangles and rectangular solids (prisms).



#### Indicator 17.a.4

##### Draw lines of symmetry in plane shapes and pictures

*Draw lines of symmetry in plane shapes and pictures.*



#### Indicator 17.a.5

##### Identify and sort geometric shapes

*Identify and sort geometric shapes including triangles, quadrilaterals, pentagons, hexagons, octagons, and circles.*



#### Indicator 17.a.6

##### Analyze and compare properties of three-dimensional solids

*Analyze and compare the properties of three-dimensional solids (spheres, cubes, rectangular prisms).*



### Benchmark 17.b

## Identify Congruent and Noncongruent Shapes

The student will identify congruent and noncongruent shapes.



### Indicator 17.b.1

#### Identify congruent and noncongruent shapes

Identify congruent and noncongruent shapes.

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### Benchmark 17.c

#### Investigate Congruence of Plane Figures After Geometric Transformation

The student will investigate congruence of plane figures after geometric transformations such as reflection (flip), translation (slide), and rotation (turn), using mirrors, paper folding, and tracing.



### Indicator 17.c.1

#### Investigate moving figures using slides, flips, and turns

*Investigate moving figures using slides (translations), flips (reflections), and turns (rotations).*



### Indicator 17.c.2

#### Build tessellations with congruent shapes using slides/flips/turns

*Build tessellations with congruent shapes using slides, flips, and turns.*

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### Benchmark 17.d

#### Model Geometric Shapes

*The student will model geometric shapes.*



### Indicator 17.d.1

#### Make models of cubes and rectangular prisms

*Make models of cubes and rectangular prisms.*



### Indicator 17.d.2

#### Solve problems by using geometric models and applying properties

*Solve problems by using geometric models (manipulatives, pictorial representations, real-world examples ) and applying properties.*

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## MTH.G4

### Standard 18

#### IDENTIFY ORDERED PAIR FOR A POINT AND LOCATE IN THE FIRST QUADRANT

The student will identify the ordered pair for a point and locate the point for an ordered pair in the first quadrant of a coordinate plane.

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### Benchmark 18.a

#### Identify Ordered Pair for a Point and Locate in the First Quadrant

The student will identify the ordered pair for a point and locate the point for an ordered pair in the first quadrant of a coordinate plane.



### Indicator 18.a.1

#### Identify ordered pair for a point in the first quadrant

Identify the ordered pair for a point in the first quadrant of a coordinate plane, given the coordinates  $(x, y)$ .



### Indicator 18.a.2

#### Locate points in the first quadrant on a coordinate grid

Locate points in the first quadrant on a coordinate grid, given the coordinates  $(x, y)$ .



### Indicator 18.a.3

#### Create a design on grid paper and list coordinate pairs

Create a design on grid paper and list the coordinate pairs in the order necessary to reproduce it.



## MTH.G4

### Standard 19

#### PREDICT LIKELIHOOD OF OUTCOMES & DETERMINE PROBABILITY OF SIMPLE EVENT

The student will

- a) predict the likelihood of outcomes of a simple event, using the terms *certain*, *likely*, *unlikely*, *impossible*; and
- b) determine the probability of a given simple event, using concrete materials.



### Benchmark 19.a

#### Predict the Likelihood of Outcomes of a Simple Event

The student will predict the likelihood of outcomes of a simple event, using the terms *certain*, *likely*, *unlikely*, *impossible*.



### Indicator 19.a.1

#### Use manipulatives to model & determine all possible outcomes

Model and determine all possible outcomes of a given simple event where there are no more than 12 possible outcomes, using a variety of manipulatives, such as coins, number cubes, and spinners.



### Indicator 19.a.2

#### Conduct experiments to determine the probability of an event

Conduct experiments to determine the probability of an event occurring for a given number of trials (no more than 12 trials), using manipulatives (e.g., the number of times "heads" occurs when flipping a coin 10 times; the chance that when the names of 12 classmates are put in a shoebox, a name that begins with *D* will be drawn).



### Benchmark 19.b

#### Determine Probability of a Given Simple Event

The student will determine the probability of a given simple event using concrete materials.



### Indicator 19.b.1

#### Write the probability of a given simple event as a fraction

Write the probability of a given simple event as a fraction, where the total number of possible outcomes is 12 or fewer.



### Indicator 19.b.2

#### Identify likelihood of an event occurring & relate to fraction

Identify the likelihood of an event occurring and relate it to its fractional representation (e.g., impossible /0; equally likely  $\frac{1}{2}$ ; certain /1).



### Indicator 19.b.3

#### Make tree diagrams to show possible outcomes and determine probability

Show possible outcomes for single events by making tree diagrams. Determine probability using tree diagrams.



## MTH.G4

### Standard 20

## COLLECT, ORGANIZE, DISPLAY, AND INTERPRET DATA

The student will collect, organize, and display data in line and bar graphs with scale increments of one or greater than one and use the display to interpret the results, draw conclusions, and make predictions.

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### **Benchmark 20.a**

#### **Collect, Organize, Display, and Interpret Data**

The student will collect, organize, and display data in line and bar graphs with scale increments of one or greater than one and use the display to interpret the results, draw conclusions, and make predictions.

#### **Indicator 20.a.1**

##### **Collect data using a variety of methods**

Collect data, using, for example, observations, measurement, surveys, scientific experiments, polls, or questionnaires.

#### **Indicator 20.a.2**

##### **Organize data into a chart or table**

Organize data into a chart or table.

#### **Indicator 20.a.3**

##### **Construct and display data in bar graphs**

Construct and display data in bar graphs, labeling one axis with equal whole-number increments of 1 or more (numerical data) (e.g., multiples of 5, 10, or 100) and the other axis with categories related to the title of the graph (categorical data) (e.g., swimming, fishing, boating, and water skiing as the categories of "Favorite Summer Sports").

#### **Indicator 20.a.4**

##### **Construct and display data in line graphs**

Construct and display data in line graphs, labeling the vertical axis with equal whole-number increments of 1 or more and the horizontal axis with continuous data commonly related to time (e.g., hours, days, months, years, and age). Line graphs will have no more than four identified points along a continuum for continuous data. For example, growth charts showing age versus height place age on the horizontal axis (e.g., 1 month, 2 months, 3 months, and 4 months).

#### **Indicator 20.a.5**

##### **Title the given graph or identify the title and label the axes**

Title the given graph or identify the title in a given graph and label the axes.

#### **Indicator 20.a.6**

##### **Analyze information from simple line and bar graphs**

Analyze information from simple line and bar graphs by describing the characteristics of the data and the data as a whole (e.g., the category with the greatest/least, categories with the same number of responses, similarities and differences, the total number). Data points will be limited to 20 and categories to 4.

#### **Indicator 20.a.7**

##### **Interpret the data to answer a question & compare to the prediction**

Interpret the data to answer the question posed, and compare the answer to the prediction (e.g., "The summer sport preferred by most is swimming, which is what I predicted before collecting the data.").

#### **Indicator 20.a.8**

##### **Write at least one sentence to describe the analysis/interpretation**

Write at least one sentence to describe the analysis and interpretation of the data, identifying parts of the data that have special characteristics, including categories with the greatest, the least, or the same.

#### **Indicator 20.a.9**

##### **Select from among 4 choices a correct analysis of the data presented**

Select from among four choices a correct analysis of the data presented in a bar or line graph. For example, given a line graph showing the number of soccer players (in millions) in the U.S.

over the time period 1980 to 2000 in five-year intervals, select the correct answer response that relates to the graphs, such as, "The greatest increase in number of soccer players occurred between 1985 and 1990."



#### **Indicator 20.a.10**

##### **Collect/organize/display data on line plots and pictographs**

*Collect, organize, and display data on line graphs, line plots, bar graphs, and pictographs with scale increments of one or more than one.*



#### **Indicator 20.a.11**

##### **Interpret results & make predictions based on graphs**

*Interpret the results and make predictions based on those results*



#### **Indicator 20.a.12**

##### **Read and interpret circle graphs**

*Read and interpret circle graphs.*



#### **Indicator 20.a.13**

##### **Compare circle graphs to data organized in other ways**

*Compare circle graphs to data organized in other ways.*



#### **Indicator 20.a.14**

##### **Solve problems by collecting/displaying/interpreting data**

*Solve problems by collecting and displaying data; interpret the results and make predictions based on those results.*



#### **Benchmark 20.b**

##### **Recognize and Find Averages**

*The student will recognize and find averages.*



#### **Indicator 20.b.1**

##### **Explain the concept of average using concrete models**

*Explain the concept of average using concrete models.*



#### **Indicator 20.b.2**

##### **Recognize that mean/median/mode/range are diff. ways to describe data**

*Recognize that the mean, median, mode and range are different ways to describe the same data.*



#### **Indicator 20.b.3**

##### **Find and record averages**

*Find and record averages.*



#### **MTH.G4**

##### **Standard 21**

##### **RECOGNIZE, CREATE, AND EXTEND NUMERICAL AND GEOMETRIC PATTERNS**

**The student will recognize, create, and extend numerical and geometric patterns, using concrete materials, number lines, symbols, tables, and words.**



#### **Benchmark 21.a**

##### **Recognize, Create, and Extend Numerical and Geometric Patterns**

The student will recognize, create, and extend numerical and geometric patterns, using concrete materials, number lines, symbols, tables, and words.

**Indicator 21.a.1****Describe geometric/numerical patterns using tables/symbols/words**

Describe geometric and numerical patterns, using tables, symbols, or words.

**Indicator 21.a.2****Create geometric and numerical patterns using a variety of methods**

Create geometric and numerical patterns, using concrete materials, number lines, tables, and words.

**Indicator 21.a.3****Extend geometric and numerical patterns using a variety of methods**

Extend geometric and numerical patterns, using concrete materials, number lines, tables, and words.

**Indicator 21.a.4****Recognize/create/extend numerical and geometric patterns**

*Recognize, create, and extend numerical and geometric patterns using concrete materials, number line, symbols, tables, and words.*

**Indicator 21.a.5****Multiply and divide by ten using patterns**

*Recognize, create, and extend numerical and geometric patterns using concrete materials, number line, symbols, tables, and words.*

**Indicator 21.a.6****Investigate patterns of multiples in a multiplication table**

*Investigate patterns of multiples in a multiplication table.*

**Indicator 21.a.7****Find/describe/explain other patterns on a multiplication table**

*Find other patterns on a multiplication table, describing and explaining them in written form.*

**Indicator 21.a.8****Identify/use patterns or functions to solve real-life problems**

*Identify and use patterns or functions to solve real-life problems.*

**MTH.G4****Standard 22****RECOGNIZE AND DEMONSTRATE THE MEANING OF EQUALITY**

The student will recognize and demonstrate the meaning of equality, using symbols representing numbers, operations, and relations [e.g.,  $3 + 5 = 5 + 3$  and  $15 + (35 + 16) = (15 + 35) + 16$ ].

**Benchmark 22.a****Recognize and Demonstrate the Meaning of Equality**

The student will recognize and demonstrate the meaning of equality, using symbols representing numbers, operations, and relations [e.g.,  $3 + 5 = 5 + 3$  and  $15 + (35 + 16) = (15 + 35) + 16$ ].

**Indicator 22.a.1****Recognize that the equals sign (=) relates equivalent quantities**

Recognize that the equals sign (=) relates equivalent quantities.

**Indicator 22.a.2****Write number sentences to represent equivalent math relationships**

Write number sentences to represent equivalent mathematical relationships (e.g.,  $4 \times 3 = 2 \times 6$ ).

**Indicator 22.a.3****Identify/find missing addends and/or missing factors in equations**

Identify and find the missing addends and/or missing factors in equations.

**Indicator 22.a.4****Recognize and use commutative and associative properties**

Recognize and use commutative (order) and associative (grouping) properties.

**Indicator 22.a.5****Find the value of a function using positive integers as "input"**

Find the value of a function using positive integers as "input" (e.g., find the value ( $n$ ) of the function  $n = x + 4$  by substituting positive integers for  $x$ ).

**Indicator 22.a.6****Write a number sentence with one unknown to solve a problem**

Write a number sentence with one unknown to solve a problem (i.e.,  $4 + x = 9$ ).

**MTH.G4****Standard 23****USE PROBLEM SOLVING APPROACHES TO UNDERSTAND CONCEPTS AND SKILLS**

*The student will use problem solving approaches to understand concepts and skills involving numerical relationships. Students pose problems; solve routine, non-routine and multi-step problems.*

**Benchmark 23.a****Use Problem Solving Approaches to Understand Concepts and Skills**

*The student will use problem solving approaches to understand concepts and skills involving numerical relationships. Students pose problems; solve routine, non-routine and multi-step problems.*

**Indicator 23.a.1****Develop and apply operations and strategies to solve problems**

Develop and apply operations and strategies (e.g., act it out, build a model, draw a picture or diagram, guess and check, make a chart or table, make a list, make a graph, use a pattern, use logical reasoning, solve a simpler problem, work backward) to solve a wide variety of routine and non-routine problems.

**Indicator 23.a.2****Solve problems using a logical procedure (a plan)**

Solve problems using a logical procedure (a plan).

**Indicator 23.a.3****Present data and conclusions in a variety of formats**

Solve problems and present data and conclusions in a variety of formats, including paragraphs, tables, and graphs.

**Indicator 23.a.4****Identify and/or pose problems from everyday life and math situations**

Identify and/or pose problems from everyday life and mathematical situations including problems to fit a given equation.

**Indicator 23.a.5****Simplify and/or solve a problem using appropriate materials & tools**

Simplify and/or solve a problem using appropriate materials and tools (e.g., calculator, grid paper, collectibles, manipulatives, computer software).

**Indicator 23.a.6****Identify extra and insufficient information needed to solve a problem**

*Identify information that is available but not needed. Identify additional information needed to solve a problem.*



**Indicator 23.a.7**

**Work collaboratively with peers; entertain others' point of view**

*Solve problems by working collaboratively with peers; entertain others' point of view.*



**Indicator 23.a.8**

**Share/explain thinking; verify and interpret results**

*Share and explain (verbalize/record) thinking during and after solving a problem. Verify and interpret results with respect to the original problem situation to determine if answers are reasonable.*



**Indicator 23.a.9**

**Investigate alternative ways of solving a problem**

*Investigate alternative ways of solving a problem*



**Indicator 23.a.10**

**Compare and analyze solution paths**

*Compare and analyze solution paths (process used to solve a problem).*