

Mathematics Curriculum

Grade 6

Sixth grade students refine their understanding of patterns, relationships, and operations within the whole number system; continue working with fractions and decimals; and apply concepts of percents and ratios in problem solving situations. They estimate and apply formulas to find length, volume, and capacity; measure and construct angles and bisectors; investigate relationship between surface area and volume; identify nets for solids; and compare and sketch three-dimensional figures. Sixth graders also collect, display, and analyze data, using sampling techniques and a variety of appropriate display models; make predictions and decisions based on data; explore relationships between positive and negative integers; graph ordered pairs in four quadrants; express functions using variable expressions; and conduct probability experiments and compare results to theoretical probability.



MTH.G6

Standard 1

IDENTIFY REPRESENTATIONS OF A GIVEN PERCENT

The student will identify representations of a given percent and describe orally and in writing the equivalence relationships among fractions, decimals, and percents.



Benchmark 1.a

Identify Representations of a Given Percent

The student will identify representations of a given percent and describe orally and in writing the equivalence relationships among fractions, decimals, and percents.



Indicator 1.a.1

Recognize that percent means "out of 100" or hundredths

Recognize that *percent* means "out of 100" or *hundredths*, using the percent symbol (%).



Indicator 1.a.2

Identify decimal and percent equivalents

Identify the decimal and percent equivalents for halves, thirds, fourths, fifths, and tenths.



Indicator 1.a.3

Describe equivalent relationship among decimals, percents, & fractions

Describe orally and in writing the equivalent relationship among decimals, percents, and fractions that have denominators that are factors of 100.



Indicator 1.a.4

Draw a shaded region on a 10 x 10 grid to represent a given percent

Draw a shaded region on a 10-by-10 grid to represent a given percent.



Indicator 1.a.5

Represent in decimal/fraction/percent form a given shaded region

Draw a shaded region on a 10-by-10 grid to represent a given percent.



Indicator 1.a.6

Convert fractions/decimals/ratios/percents from one form to another

Express numbers as fractions, decimals, ratios, and percents, and recognize the equivalent relationships; convert from one form to another.



Indicator 1.a.7

Distinguish between terminating and repeating decimals

Distinguish between terminating and repeating decimals and write repeating decimals using the appropriate notation.



MTH.G6

Standard 2

DESCRIBE AND COMPARE TWO SETS OF DATA USING RATIOS

The student will describe and compare two sets of data, using ratios, and will use appropriate notations such as $\frac{a}{b}$, a to b , and $a:b$.

Benchmark 2.a

Describe and Compare Two Sets of Data Using Ratios

The student will describe and compare two sets of data, using ratios, and will use appropriate notations such as $\frac{a}{b}$, a to b , and $a:b$.

Indicator 2.a.1

Compare part of the set to the entire set

Describe a relationship within a set by comparing part of the set to the entire set.

Indicator 2.a.2

Compare part of one set to a corresponding part of the other set

Describe a relationship between two sets by comparing part of one set to a corresponding part of the other set.

Indicator 2.a.3

Compare all of one set to all of the other set

Describe a relationship between two sets by comparing all of one set to all of the other set.

Indicator 2.a.4

Compare one part of the set to another part of the same set

Describe a relationship within a set by comparing one part of the set to another part of the same set.

Indicator 2.a.5

Make a comparison by using the notations a/b , $a:b$, and a to b

Represent the relationship that makes a comparison by using the notations $\frac{a}{b}$, $a:b$, and a to b .

Indicator 2.a.6

Make predictions and solve problems using equivalent ratios

Make predictions and solve problems using equivalent ratios.

MTH.G6

Standard 3

IDENTIFY COMMON MULTIPLES/FACTORS, PRIME/COMPOSITE, EVEN/ODD INTEGERS

The student will

- a) find common multiples and factors, including least common multiple and greatest common factor;
 - b) identify and describe prime and composite numbers;
and
 - c) identify and describe the characteristics of even and odd integers.
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Benchmark 3.a

Find Common Multiples and Factors Including LCM and GCF

The student will find common multiples and factors, including least common multiple and greatest common factor.

Indicator 3.a.1

Identify common multiples and least common multiple

Identify common multiples and the least common multiple for up to three numbers less than or

equal to 50.



Indicator 3.a.2

Identify common factors and greatest common factor

Identify common factors and the greatest common factor for up to three numbers less than or equal to 50.



Benchmark 3.b

Identify and Describe Prime and Composite Numbers

The student will identify and describe prime and composite numbers.



Indicator 3.b.1

Identify which numbers are prime for numbers less than or equal to 50

Identify which numbers are prime for numbers less than or equal to 50.



Indicator 3.b.2

Identify which numbers are composite for numbers through 50

Identify which numbers are composite for numbers less than or equal to 50.



Indicator 3.b.3

Explain orally and in writing why a number is prime or composite

Explain orally and in writing why a number is prime or composite.



Indicator 3.b.4

Find factors/multiples/primes/composite numbers/prime factorization

Find factors, multiples, primes, composite numbers, and prime factorization using a variety of methods including factor trees.



Indicator 3.b.5

Write prime factorizations in exponential form

Write prime factorizations in exponential form.



Benchmark 3.c

Identify and Describe Characteristics of Even and Odd Integers

The student will identify and describe the characteristics of even and odd integers.



Indicator 3.c.1

Explain why a given integer is even or odd

Explain orally and in writing why a given integer is even (divisible by two) or odd (not divisible by two).



MTH.G6

Standard 4

COMPARE AND ORDER WHOLE NUMBERS, FRACTIONS, AND DECIMALS

The student will compare and order whole numbers, fractions, and decimals, using concrete materials, drawings or pictures, and mathematical symbols.



Benchmark 4.a

Compare and Order Whole Numbers, Fractions, and Decimals

The student will compare and order whole numbers, fractions, and decimals, using concrete materials, drawings or pictures, and mathematical symbols.



Indicator 4.a.1

Compare two whole numbers

Compare two whole numbers by representing the numbers with concrete objects or picture representations or by using the symbols $<$, \leq , $>$, \geq , or $=$.



Indicator 4.a.2

Compare two fractions with denominators of 12 or less

Compare two fractions with denominators of 12 or less by representing the fractions with fraction manipulatives or picture representations or by using the symbols $<$, \leq , $>$, \geq , or $=$.



Indicator 4.a.3

Compare two decimals through thousandths

Compare two decimals through thousandths by representing the decimals with decimal manipulatives or picture representations or by using place-value charts or the symbols $<$, \leq , $>$, \geq , or $=$.



MTH.G6

Standard 5

IDENTIFY, REPRESENT, ORDER, AND COMPARE INTEGERS

The student will identify, represent, order, and compare integers.



Benchmark 5.a

Identify, Represent, Order, and Compare Integers

The student will identify, represent, order, and compare integers.



Indicator 5.a.1

Identify an integer represented by a point on a number line

Identify an integer represented by a point on a number line.



Indicator 5.a.2

Represent an integer on a number line

Represent an integer on a number line.



Indicator 5.a.3

Compare and order integers using a number line

Compare and order integers, using a number line.



Indicator 5.a.4

Compare integers, using the mathematical symbols $<$, $>$, and $=$

Compare integers, using the mathematical symbols $<$, $>$, and $=$.



Indicator 5.a.5

Write inverse equations to solve addition and subtraction of integers

Write inverse equations to solve addition and subtraction of integers.



Indicator 5.a.6

Express positive and negative integers using the concept of opposites

Express positive and negative integers using the concept of opposites.



MTH.G6

Standard 6

SOLVE PROBLEMS INVOLVING FRACTION OPERATIONS AND DECIMAL QUOTIENTS

The student will


a) solve problems that involve addition, subtraction, multiplication, and/or division with fractions and mixed numbers, with and without regrouping, that include like and unlike denominators of 12 or less, and express their answers in simplest form; and

b) find the quotient, given a dividend expressed as a decimal through thousandths and a divisor expressed as a decimal to thousandths with exactly one non-zero digit.

 **Benchmark 6.a**


Solve Problems Involving Operations with Fractions and Mixed Numbers

The student will solve problems that involve addition, subtraction, multiplication, and/or division with fractions and mixed numbers, with and without regrouping, that include like and unlike denominators of 12 or less, and express their answers in simplest form.

 **Indicator 6.a.1**


Convert fractions to equivalent forms for addition and subtraction

Convert fractions to equivalent forms to perform the operations of addition and subtraction.

 **Indicator 6.a.2**


Simplify fractional answers to simplest form

Simplify fractional answers to simplest form.

 **Indicator 6.a.3**

Add and/or subtract with fractions and mixed numbers

Solve problems that involve addition and/or subtraction with fractions and mixed numbers, with and without regrouping, that include like and unlike denominators of 12 or less, and express answers in simplest form.

 **Indicator 6.a.4**


Multiply and/or divide with fractions and mixed numbers

Solve problems that involve multiplication and/or division with fractions and mixed numbers that include denominators of 12 or less, and express answers in simplest form.

 **Benchmark 6.b**


Find the Quotient Given a Dividend & Divisor Expressed as a Decimal

Find the quotient, given a dividend expressed as a decimal through thousandths and a divisor expressed as a decimal to thousandths with exactly one non-zero digit.

 **Indicator 6.b.1**

Find quotient with a decimal divisor with exactly one non-zero digit

Given a dividend expressed as a decimal through thousandths and a divisor expressed as a decimal to thousandths with exactly one non-zero digit, find the quotient.

 **Indicator 6.b.2**

Use a calculator to find a quotient involving decimal values

Given a dividend expressed as a decimal through thousandths and a divisor expressed as a decimal to thousandths with more than one non-zero digit, find the quotient by using a calculator.

 **MTH.G6**
Standard 7

USE ESTIMATION STRATEGIES TO SOLVE PROBLEMS INVOLVING RATIONAL NUMBERS

The student will use estimation strategies to solve multi-step practical problems involving whole numbers, decimals, and fractions (rational numbers).

 **Benchmark 7.a**

Use Estimation Strategies to Solve Problems Involving Rational Numbers

The student will use estimation strategies to solve multi-step practical problems involving whole numbers, decimals, and fractions (rational numbers).



Indicator 7.a.1

Solve multi-step practical problems involving rational numbers

Solve multi-step practical problems involving whole numbers, decimals, and fractions by using estimation strategies and checking for the reasonableness of results.



Indicator 7.a.2

Estimate percent in problem-solving situations

Estimate percent in problem-solving situations. Set up proportions and solve for an unknown.



Benchmark 7.b

Explain and Analyze Strategies for Estimation

Students explain and analyze strategies for estimation.



Indicator 7.b.1

Estimate sums and differences of rational numbers

Estimate sums and differences of whole numbers, integers, decimal numbers, fractions, and mixed numbers.



Indicator 7.b.2

Estimate products of whole numbers and decimals

Estimate products of whole numbers with three digits in each factor, decimal numbers to thousandths, fractions, and mixed numbers.



Indicator 7.b.3

Estimate quotients of whole numbers and decimals

Estimate quotients of whole numbers (including those with zero in the quotient) and decimal numbers through thousandths by divisors through thousandths (with no more than one non-zero digit).



Indicator 7.b.4

Estimate quotients of whole numbers, fractions, and mixed numbers

Estimate quotients of whole numbers, fractions, and mixed numbers by whole numbers, fractions, and mixed numbers.



Indicator 7.b.5

Estimate what percent one number is of another

Estimate what percent one number is of another.



MTH.G6

Standard 8

SOLVE MULTI-STEP CONSUMER-APPLICATION PROBLEMS & PRESENT CONCLUSIONS

The student will solve multi-step consumer-application problems involving fractions and decimals and present data and conclusions in paragraphs, tables, or graphs. Planning a budget will be included.



Benchmark 8.a

Solve Multi-Step Consumer-Application Problems & Present Conclusions

The student will solve multi-step consumer-application problems involving fractions and decimals and present data and conclusions in paragraphs, tables, or graphs. Planning a budget will be included.



Indicator 8.a.1

Determine essential information to solve consumer application problems

Determine essential information necessary to solve consumer application problems.



Indicator 8.a.2

Choose the operation(s) required to solve the problem

Choose the operation or operations required to solve the problem.



Indicator 8.a.3

Solve multi-step consumer application problems involving fractions

Solve multi-step consumer application problems involving fractions with denominators not greater than 12 and decimals not greater than hundredths, where solutions require at least a two-step process.



Indicator 8.a.4

Represent the solution as a data table or graph

Represent the solution as a data table or graph.



Indicator 8.a.5

Represent the solution as a data table or graph

Present and justify the solution orally or in writing.



Indicator 8.a.6

Plan and maintain a budget

Plan and maintain a budget.



Indicator 8.a.7

Find the percent of a number using models

Find the percent of a number using models.



Indicator 8.a.8

Find what percent one number is of another

Find what percent one number is of another.



Indicator 8.a.9

Find the original price when given sale price and percent of discount

Find the original price when given the sale price and percent of discount.



Indicator 8.a.10

Use properties of real number to solve real life problems

Use properties of real numbers to solve real life problems.



Indicator 8.a.11

Use order of operations and properties to solve problems

Use order of operations and properties to solve problems.



Indicator 8.a.12

Solve real-life problems with whole numbers/integers/fraction/decimal

Use addition, subtraction, multiplication and division involving whole numbers, integers (+ and – only), fractions and decimals to solve real life problems.



MTH.G6

Standard 9

COMPARE & CONVERT UNITS OF MEASURE FOR LENGTH, AREA, WT./MASS & VOLUME

The student will compare and convert units of measure for length, area, weight/mass, and volume within the U.S. Customary system and the metric system and estimate conversions between units in each system:

- a) length — part of an inch ($\frac{1}{2}$, $\frac{1}{4}$, and $\frac{1}{8}$), inches, feet, yards, miles, millimeters,

centimeters, meters, and kilometers;

b) weight/mass — ounces, pounds, tons, grams, and kilograms;

c) liquid volume — cups, pints, quarts, gallons, milliliters, and liters; and

d) area — square units.*

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



Benchmark 9.a

Estimate Conversions Between Units in Length

The student will compare and convert units of measure for length, area, weight/mass, and volume within the U.S. Customary system and the metric system and estimate conversions between units in length — part of an inch ($\frac{1}{2}$, $\frac{1}{4}$, and $\frac{1}{8}$), inches, feet, yards, miles, millimeters, centimeters, meters, and kilometers;



Indicator 9.a.1

Compare & convert units of measure for length, area, wt./mass & volume

Compare and convert units of measure for length, area, weight/mass, and volume within the U.S. Customary system and the metric system.



Indicator 9.a.2

Estimate the conversion of units by using ballpark comparisons

Estimate the conversion of units of length, area, weight/mass, and volume between the U.S. Customary system and the metric system by using ballpark comparisons.



Indicator 9.a.3

Determine the most appropriate unit of measure for a given situation

Determine the most appropriate unit of measure for a given situation.



Benchmark 9.b

Estimate Conversions Between Units in Weight/Mass

The student will compare and convert units of measure for length, area, weight/mass, and volume within the U.S. Customary system and the metric system and estimate conversions between units in weight/mass — ounces, pounds, tons, grams, and kilograms



Indicator 9.b.1

Compare & convert units of measure for length, area, wt./mass & volume

Compare and convert units of measure for length, area, weight/mass, and volume within the U.S. Customary system and the metric system.



Indicator 9.b.2

Estimate the conversion of units by using ballpark comparisons

Estimate the conversion of units of length, area, weight/mass, and volume between the U.S. Customary system and the metric system by using ballpark comparisons.



Indicator 9.b.3

Determine the most appropriate unit of measure for a given situation

Determine the most appropriate unit of measure for a given situation.

Benchmark 9.c

Estimate Conversions Between Units in Liquid Volume

The student will compare and convert units of measure for length, area, weight/mass, and volume within the U.S. Customary system and the metric system and estimate conversions between units in liquid volume — cups, pints, quarts, gallons, milliliters, and liters.

Indicator 9.c.1

Compare & convert units of measure for length, area, wt./mass & volume

Compare and convert units of measure for length, area, weight/mass, and volume within the U.S. Customary system and the metric system.

Indicator 9.c.2

Estimate the conversion of units by using ballpark comparisons

Estimate the conversion of units of length, area, weight/mass, and volume between the U.S. Customary system and the metric system by using ballpark comparisons.

Indicator 9.c.3

Determine the most appropriate unit of measure for a given situation

Determine the most appropriate unit of measure for a given situation.

Benchmark 9.d

Estimate Conversions Between Units in Area - Square Units

The student will compare and convert units of measure for length, area, weight/mass, and volume within the U.S. Customary system and the metric system and estimate conversions between units in area — square units.

Indicator 9.d.1

Compare & convert units of measure for length, area, wt./mass & volume

Compare and convert units of measure for length, area, weight/mass, and volume within the U.S. Customary system and the metric system.

Indicator 9.d.2

Estimate the conversion of units by using ballpark comparisons

Estimate the conversion of units of length, area, weight/mass, and volume between the U.S. Customary system and the metric system by using ballpark comparisons.

Indicator 9.d.3

Determine the most appropriate unit of measure for a given situation

Determine the most appropriate unit of measure for a given situation

Benchmark 9.e

Determine and/or Compare Times in Different Time Zones

The student will determine and/or compare times in different time zones.

Indicator 9.e.1

Find elapsed time

Determine and/or compare times in different time zones. Find elapsed time.

MTH.G6

Standard 10

ESTIMATE, THEN DETERMINE LENGTH, WT./MASS, AREA, AND LIQUID VOLUME

The student will estimate and then determine length, weight/mass, area, and liquid volume/capacity, using standard and nonstandard units of measure.



Benchmark 10.a

Estimate, then Determine Length, Wt./Mass, Area, and Liquid Volume

The student will estimate and then determine length, weight/mass, area, and liquid volume/capacity, using standard and nonstandard units of measure.



Indicator 10.a.1

Estimate measurements by comparing object against a benchmark

Estimate measurements by comparing the object to be measured against a benchmark.



Indicator 10.a.2

Determine length using standard and nonstandard units of measure

Solve measurement problems by estimating and determining length, using standard and nonstandard units of measure.



Indicator 10.a.3

Determine weight/mass using standard and nonstandard units of measure

Solve measurement problems by estimating and determining weight/mass, using standard and nonstandard units of measure.



Indicator 10.a.4

Determine area using standard and nonstandard units of measure

Solve measurement problems by estimating and determining area, using standard and nonstandard units of measure.



Indicator 10.a.5

Determine liquid volume using standard & nonstandard units of measure

Solve measurement problems by estimating and determining liquid volume/capacity, using standard and nonstandard units of measure.



Indicator 10.a.6

Solve measurement problems by making and interpreting scale drawings

Solve measurement problems by making and interpreting scale drawings; comparing and/or converting customary and metric units; and using tables of equivalents for length, capacity, and weight.



Indicator 10.a.7

Investigate and develop procedures and formulas for volume

Investigate and develop procedures and formulas for volume of rectangular prisms, pyramids, cones, and cylinders.



Indicator 10.a.8

Solve real-life problems using units of measurement

Use addition, subtraction, multiplication and division involving measurement units to solve real life problems.



MTH.G6

Standard 11

DETERMINE IF PROBLEM SITUATION REQUIRES APPLICATION OF PERIMETER/AREA

The student will determine if a problem situation involving polygons of four or fewer sides represents the application of perimeter or area and apply the appropriate formula.



Benchmark 11.a

Determine if Problem Situation Requires Application of Perimeter/Area

The student will determine if a problem situation involving polygons of four or fewer sides represents the application of perimeter or area and apply the appropriate formula.

**Indicator 11.a.1****Determine if problem situation requires application of perimeter/area**

Determine if a problem situation involving polygons of four or fewer sides represents the application of perimeter or area.

**Indicator 11.a.2****Apply formulas to solve problems involving area and perimeter**

Apply formulas to solve problems involving area and perimeter of triangles and rectangles.

**MTH.G6****Standard 12****SOLVE CIRCLE PROBLEMS & DERIVE APPROXIMATIONS FOR PI**

The student will

a) solve problems involving the circumference and/or area of a circle when given the diameter or radius; and

b) derive approximations for pi (π) from measurements for circumference and diameter, using concrete materials or computer models.

**Benchmark 12.a****Solve Problems Involving the Circumference and/or Area of a Circle**

The student will solve problems involving the circumference and/or area of a circle when given the diameter or radius.

**Indicator 12.a.1****Find the circumference of a circle**

Find the circumference of a circle by substituting a value for the diameter or the radius into the formula $C = \pi d$ or $C = 2\pi r$.

**Indicator 12.a.2****Find area of a circle by using formula $A = \pi$ times radius squared**

Find the area of a circle by using the formula $A = \pi r^2$

**Indicator 12.a.3****Determine the circumference and/or area of a circle**

Determine the circumference and/or area of a circle, using various tools.

**Indicator 12.a.4****Find circumference and/or area when given the diameter or radius**

Create and solve problems that involve finding the circumference and/or area of a circle when given the diameter or radius.

**Benchmark 12.b****Derive Approximations for Pi**

The student will derive approximations for pi (π) from measurements for circumference and diameter, using concrete materials or computer models.

**Indicator 12.b.1****Approximate pi by comparing the circumference to the diameter**

Derive an approximation for pi (3.14 or $\frac{22}{7}$) by gathering data and comparing the circumference to the diameter of various circles, using concrete materials or computer models.

**MTH.G6**

Standard 13

ESTIMATE/MEASURE/DRAW RIGHT, ACUTE, AND OBTUSE ANGLES AND TRIANGLES

The student will

a) estimate angle measures, using 45° , 90° , and 180° as referents, and use the appropriate tools to measure the given angles; and

b) measure and draw right, acute, and obtuse angles and triangles.



Benchmark 13.a

Estimate Angles Measures, Using 45° , 90° , and 180° as Referents

The student will estimate angle measures, using 45° , 90° , and 180° as referents, and use the appropriate tools to measure the given angles.



Indicator 13.a.1

Estimate visually the angle measure of a given angle using referents

Estimate visually the angle measure of a given angle by using 45° , 90° , and 180° as referents, and use appropriate tools to check the reasonableness of the estimate.



Benchmark 13.b

Measure and Draw Right, Acute, and Obtuse Angles and Triangles

The student will measure and draw right, acute, and obtuse angles and triangles.



Indicator 13.b.1

Draw and measure acute, right, & obtuse angles using appropriate tools

Draw and measure acute, right, and obtuse angles, using appropriate tools.



Indicator 13.b.2

Draw/measure acute, right, & obtuse triangles using appropriate tools

Draw and measure acute, right, and obtuse triangles, using appropriate tools.



MTH.G6

Standard 14

IDENTIFY, CLASSIFY, AND DESCRIBE CHARACTERISTICS OF PLANE FIGURES

The student will identify representations of a given percent and describe orally and in writing the equivalence relationships among fractions, decimals, and percents.



Benchmark 14.a

Identify, Classify, and Describe Characteristics of Plane Figures

The student will identify, classify, and describe the characteristics of plane figures, describing their similarities, differences, and defining properties.



Indicator 14.a.1

Classify triangles, quadrilaterals, pentagons, and hexagons

Classify triangles, quadrilaterals, pentagons, and hexagons.



Indicator 14.a.2

Classify a triangle based on the size of its angles and/or its sides

Classify a triangle based on the size of its angles and/or its sides.



Indicator 14.a.3

Identify sum of measures of angles of any triangle or quadrilateral

Identify the sum of the measures of the angles of any triangle or quadrilateral.

**Indicator 14.a.4****Determine that the sum of measures of angles of a triangle is 180°**

Determine that the sum of the measures of the angles of a triangle is 180°.

**Indicator 14.a.5****Classify a triangle by its angles**

Classify a triangle by its angles.

**Indicator 14.a.6****Classify/describe similarities and differences in sets of triangles**

Classify and describe the similarities and differences in sets of triangles by sorting.

**Indicator 14.a.7****Classify quadrilaterals by pairs of parallel sides by sorting**

Classify quadrilaterals by pairs of parallel sides by sorting.

**Indicator 14.a.8****Identify/describe similarities & differences in sets of quadrilaterals**

Classify quadrilaterals by pairs of parallel sides by sorting.

**Indicator 14.a.9****Apply knowledge of basic geometric forms in problem solving**

Apply knowledge of basic geometric forms (e.g., lines, segments, angles, polygons, circles, and parts of circles) in problem solving and construction.

**MTH.G6****Standard 15****DETERMINE CONGRUENCE OF SEGMENTS, ANGLES, AND POLYGONS**

The student will determine congruence of segments, angles, and polygons by direct comparison, given their attributes. Examples of noncongruent and congruent figures will be included.

**Benchmark 15.a****Determine Congruence of Segments, Angles, and Polygons**

The student will determine congruence of segments, angles, and polygons by direct comparison, given their attributes. Examples of noncongruent and congruent figures will be included.

**Indicator 15.a.1****Characterize polygons as congruent and noncongruent**

Characterize polygons as congruent and noncongruent according to the measures of their sides and angles.

**Indicator 15.a.2****Determine congruence of segments/angles/polygons by direct comparison**

Determine the congruence of segments, angles, and polygons by direct comparison, given their attributes.

**Indicator 15.a.3****Identify and draw congruent and similar figures**

Identify and draw congruent and similar figures.

**Benchmark 15.b****Transform Geometric Shapes**

The student will transform geometric shapes.



Indicator 15.b.1

Identify, draw, and define slides, flips, and turns of polygons

Identify, draw, and define slides (translations), flips (reflections), and turns (rotations) of polygons.



Indicator 15.b.2

Represent polygons and their transformations/dilations by graphing

Represent polygons and their transformations and dilations by graphing the coordinates of their respective vertices (up to and including all four quadrants of the Cartesian grid).



Indicator 15.b.3

Determine the angle of rotation of a polygon

Determine the angle of rotation of a polygon.



MTH.G6

Standard 16

CONSTRUCT THE PERPENDICULAR BISECTOR AND AN ANGLE BISECTOR

The student will construct the perpendicular bisector of a line segment and an angle bisector.



Benchmark 16.a

Construct the Perpendicular Bisector and an Angle Bisector

The student will construct the perpendicular bisector of a line segment and an angle bisector.



Indicator 16.a.1

Construct the perpendicular bisector of a line segment

Construct the perpendicular bisector of a line segment by using a variety of tools.



Indicator 16.a.2

Construct the bisector of an angle

Construct the bisector of an angle by using a variety of tools.



MTH.G6

Standard 17

SKETCH, CONSTRUCT MODELS OF, AND CLASSIFY SOLID FIGURES

The student will sketch, construct models of, and classify solid figures (rectangular prism, cone, cylinder, and pyramid).



Benchmark 17.a

Sketch, Construct Models of, and Classify Solid Figures

The student will sketch, construct models of, and classify solid figures (rectangular prism, cone, cylinder, and pyramid).



Indicator 17.a.1

Sketch rectangular prisms, cones, cylinders, and pyramids

Sketch rectangular prisms, cones, cylinders, and pyramids from two-dimensional representations and three-dimensional models.



Indicator 17.a.2

Construct models for rectangular prisms, cones, cylinders, & pyramids

Construct models for rectangular prisms, cones, cylinders, and pyramids.



Indicator 17.a.3

Classify solid figures by their two-dimensional representations

Classify rectangular prisms, cones, cylinders, and pyramids by their two-dimensional representations.



Indicator 17.a.4

Identify a three-dimensional model from two-dimensional representation

Identify a three-dimensional model of a prism, cone, cylinder, or pyramid from its two-dimensional representation.



Indicator 17.a.5

Investigate surface area

Compare, contrast, classify, define, and sketch three-dimensional figures (e.g., cones, prisms, pyramids, cylinders). Identify and verbalize the relationships among vertices, faces, and edges of solids, including dotted lines to indicate unseen edges. Investigate surface area.



Indicator 17.a.6

Investigate the relationship between surface area and volume

Investigate the relationship between volume and surface area by building models of prisms.



Indicator 17.a.7

Determine possible nets for solid figures

Determine possible nets for solid figures (e.g., pyramids, prisms, cylinders).



MTH.G6

Standard 18

COLLECT, ANALYZE, DISPLAY, & INTERPRET DATA USING A VARIETY OF METHODS

The student, given a problem situation, will collect, analyze, display, and interpret data in a variety of graphical methods, including

- a) line, bar, and circle graphs;
- b) stem-and-leaf plots; and
- c) box-and-whisker plots.

Circle graphs will be limited to halves, fourths, and eighths.



Benchmark 18.a

Collect, Analyze, Display, & Interpret Data Using a Variety of Methods

The student, given a problem situation, will collect, analyze, display, and interpret data in a variety of graphical methods, including line, bar, and circle graphs. Circle graphs will be limited to halves, fourths, and eighths.



Indicator 18.a.1

Collect data sets by using tally sheets/surveys/observations/etc.

Collect data sets of no more than 20 items by using tally sheets, surveys, observations, questionnaires, interviews, and polls.



Indicator 18.a.2

Organize data by using lists, charts, and tables

Organize data by using lists, charts, and tables.



Indicator 18.a.3

Organize and display data in bar and line graphs

Organize and display data in bar and line graphs, displaying the information as clearly as possible by using increments of whole numbers, fractions, and decimals rounded to the nearest tenth.



Indicator 18.a.4

Organize and display data in circle graphs

Organize and display data in circle graphs by depicting information as fractional parts that are limited to halves, fourths, and eighths.



Indicator 18.a.5

Decide which type of graph is appropriate for a given situation

Decide which type of graph is appropriate for a given situation.

- Bar graphs are used to display categorical (discrete) data.
- Line graphs are used to display continuous data.
- Circle graphs are used to show a relationship of the parts to a whole.



Indicator 18.a.6

Collect data and display it in an appropriate graphic representation

Collect data and display it in an appropriate graphic representation (tables, charts, picto-, line, bar or circle graph; spreadsheets; or computer-generated graphs).



Indicator 18.a.7

Analyze the data from surveys using percentages and circle graphs

Analyze the data from surveys using percentages and circle graphs.



Benchmark 18.b

Collect, Analyze, Display, & Interpret Data Using a Stem-and-Leaf Plot

The student, given a problem situation, will collect, analyze, display, and interpret data in a variety of graphical methods, including stem-and-leaf plots.



Indicator 18.b.1

Organize and display data sets in stem-and-leaf plots

Organize and display data sets of no more than 20 numbers in stem-and-leaf plots where the stem is listed in ascending order and the leaves are in ascending order, with or without commas between leaves.



Indicator 18.b.2

Read, represent & interpret data using Venn diagrams & scatter plots

Read, represent in an appropriate graphic representation, and interpret data using Venn diagrams, stem-and-leaf plots, box-and-whisker plots, and scatter plots.



Benchmark 18.c

Collect, Analyze, Display & Interpret Data Using Box-and-Whisker Plot

The student, given a problem situation, will collect, analyze, display, and interpret data in a variety of graphical methods, including box-and-whisker plots.



Indicator 18.c.1

Organize and display data sets in box-and-whisker plots

Organize and display data sets of no more than 20 numbers in box-and-whisker plots, identifying the lower extreme (minimum), lower quartile, median, upper quartile, and upper extreme (maximum). Use the critical points in a box-and-whisker plot to determine the range and the interquartile range.



Indicator 18.c.2

Interpret data from a variety of graphical representations

Interpret data from line, bar, and circle graphs and from stem-and-leaf and box-and-whisker plots.



MTH.G6

Standard 19

DESCRIBE MEAN, MEDIAN, MODE, AND RANGE AND DETERMINE THEIR MEANING

The student will describe the mean, median, and mode as measures of central tendency, describe the range, and determine their meaning for a set of data.



Benchmark 19.a

Describe Mean, Median, Mode, and Range and Determine Their Meaning

The student will describe the mean, median, and mode as measures of central tendency, describe the range, and determine their meaning for a set of data.



Indicator 19.a.1

Find the mean for a set of data

Find the mean for a set of data.



Indicator 19.a.2

Find the median for a set of data

Find the median for a set of data.



Indicator 19.a.3

Find the mode for a set of data

Find the mode for a set of data.



Indicator 19.a.4

Find the range for a set of data

Find the range for a set of data.



Indicator 19.a.5

Describe the measure that would best represent a set of data

Describe the three measures of central tendency and a situation in which each would best represent a set of data.



Indicator 19.a.6

Find the mean, median, & mode from data given in a graph

Find the mean, median, and mode from data given in a graph.



MTH.G6

Standard 20

MAKE A SAMPLE SPACE & DETERMINE/INTERPRET PROBABILITY OF AN EVENT

The student will

- a) make a sample space for selected experiments and represent it in the form of a list, chart, picture, or tree diagram; and
 - b) determine and interpret the probability of an event occurring from a given sample space and represent the probability as a ratio, decimal, or percent, as appropriate for the given situation.
-



Benchmark 20.a

Make a Sample Space & Represent it in a Variety of Ways

The student will make a sample space for selected experiments and represent it in the form of a list, chart, picture, or tree diagram.



Indicator 20.a.1

Perform experiments that use concrete materials to find a sample space

Plan and carry out experiments that use concrete materials to find a sample space.



Indicator 20.a.2

Determine sample space & represent as list/chart/picture/tree diagram

Determine the sample space for selected experiments and represent the sample space for up to 20 possibilities as a list, chart, picture, and/or tree diagram.



Indicator 20.a.3

Compare experimental probability with theoretical probability

Compare experimental probability with theoretical probability. Use simulations to determine probability, applying the concept of randomness.



Indicator 20.a.4

Use sampling and simulations to solve real-life problems

Solve real-life problems using sampling and simulations to determine possible outcomes.



Benchmark 20.b

Interpret Probability of an Event Occurring from a Given Sample Space

The student will determine and interpret the probability of an event occurring from a given sample space and represent the probability as a ratio, decimal, or percent, as appropriate for the given situation.



Indicator 20.b.1

Given a sample space, determine the probability of a simple event

Given a sample space, determine the probability of a simple event. Represent the probability as a ratio, fraction, decimal, or percent where the fraction's denominator does not exceed 20, decimals are rounded to tenths, and percent is rounded to $\frac{1}{10}$ of a percent.



Indicator 20.b.2

Determine the probability of single outcome and interpret 0 and 1

Determine the probability of single outcome (independent) events, recognizing that the probability of events which are certain is 1, impossible is 0, and all others lie between 0 and 1.



Indicator 20.b.3

Collect data using sampling & make predictions and/or recommendations

Collect data from a representative portion of a group using sampling and make predictions and/or recommendations about the larger group using that sample.



Indicator 20.b.4

Explore/describe the probability of dependent events

Explore and describe how the probability changes when each outcome is dependent upon previous outcomes.



MTH.G6

Standard 21

INVESTIGATE, DESCRIBE, AND EXTEND NUMERICAL AND GEOMETRIC PATTERNS

The student will investigate, describe, and extend numerical and geometric patterns, including triangular numbers, patterns formed by powers of 10, and arithmetic sequences.



Benchmark 21.a

Investigate, Describe, and Extend Numerical and Geometric Patterns

The student will investigate, describe, and extend numerical and geometric patterns, including triangular numbers, patterns formed by powers of 10, and arithmetic

sequences.



Indicator 21.a.1

Recognize/describe the change between terms in numerical patterns

Investigate and apply strategies to recognize and describe the change between terms in numerical patterns.



Indicator 21.a.2

Recognize/describe the change between terms in geometric patterns

Investigate and apply strategies to recognize and describe geometric patterns.



Indicator 21.a.3

Describe relationships between terms in numerical/geometric patterns

Describe verbally and in writing the relationships between consecutive terms in a numerical or geometric pattern.



Indicator 21.a.4

Extend & apply numerical and geometric patterns to similar situations

Extend and apply numerical and geometric patterns to similar situations.



Indicator 21.a.5

Create patterns by using a given rule or mathematical relationship

Create numerical and geometric patterns by using a given rule or mathematical relationship.



Indicator 21.a.6

Describe numerical & geometric patterns, including triangular numbers

Describe numerical and geometric patterns, including triangular numbers.



Indicator 21.a.7

Use function tables and exponents to represent patterns

Represent number patterns using function tables and exponents



Indicator 21.a.8

Extend/compare patterns of additive/multiplicative growth & ratio

Extend and compare patterns of additive and multiplicative growth and ratio.



Indicator 21.a.9

Represent numeric patterns using variable notation

Represent numeric patterns using variable notation.



Benchmark 21.b

Represent Geometric Patterns on a Coordinate Plane

The student will represent geometric patterns on a coordinate plane.



Indicator 21.b.1

Locate points in all four quadrants on a coordinate grid

Locate points in all four quadrants on a coordinate grid using ordered pairs of integers.



Indicator 21.b.2

Plot points on a coordinate plane to represent a function

Plot points on a coordinate plane to represent a function (i.e., $y = x + 4$).



MTH.G6

Standard 22


DESCRIBE CONCEPTS OF POSITIVE EXPONENTS/PERFECT SQ/SQ ROOTS/SCI. NOT.

The student will investigate and describe concepts of positive exponents, perfect squares, square roots, and, for numbers greater than 10, scientific notation. Calculators will be used to develop exponential patterns.

 **Benchmark 22.a**


Describe Concepts of Positive Exponents/Perfect Sq/Sq Roots/Sci. Not.

The student will investigate and describe concepts of positive exponents, perfect squares, square roots, and, for numbers greater than 10, scientific notation. Calculators will be used to develop exponential patterns.

 **Indicator 22.a.1**


Recognize and describe patterns with exponents by using a calculator

Recognize and describe patterns with exponents by using a calculator.

 **Indicator 22.a.2**


Recognize and describe patterns of perfect squares

Recognize and describe patterns of perfect squares.

 **Indicator 22.a.3**


Recognize and describe patterns with square roots and squares

Recognize and describe patterns with square roots and squares by using squares, grid paper, and calculators.

 **Indicator 22.a.4**


Recognize powers of ten by examining patterns in a place value chart

Recognize powers of ten by examining patterns in a place value chart: $10^4 = 10,000$, $10^3 = 1000$, $10^2 = 100$, $10^1 = 10$.

 **Indicator 22.a.5**


Write scientific notation for a number greater than 10

Write scientific notation for a number greater than 10.

 **Indicator 22.a.6**

Write powers of ten as products of tens and in exponential form

Write powers of ten as products of tens and in exponential form.

 **Indicator 22.a.7**

Multiply and divide by powers of 10

Multiply and divide by powers of 10.

 **MTH.G6**

Standard 23

MODEL AND SOLVE ALGEBRAIC EQUATIONS & USE TERMS APPROPRIATELY

The student will

- a) model and solve algebraic equations, using concrete materials;
 - b) solve one-step linear equations in one variable, involving whole number coefficients and positive rational solutions; and
 - c) use the following algebraic terms appropriately: *variable, coefficient, term, and equation.*
-

 **Benchmark 23.a**

Model & Solve Algebraic Equations, Using Concrete Materials

The student will model and solve algebraic equations, using concrete materials.

Indicator 23.a.1



Represent a one-step equation, using a variety of concrete materials

Represent a one-step equation, using a variety of concrete materials such as colored chips on an equation mat, algebra tiles, or weights on a balance scale.



Benchmark 23.b

Solve One-Step Linear Equations in One Variable

The student will solve one-step linear equations in one variable, involving whole number coefficients and positive rational solutions.



Indicator 23.b.1

Solve a one-step equation by demonstrating the steps algebraically

Solve a one-step equation by demonstrating the steps algebraically.



Indicator 23.b.2

Simplify/solve equations by applying properties of equality

Simplify and/or solve equations by applying the same operation to each side of an equation.



Indicator 23.b.3

Solve real-life problems by writing equations with one variable

Solve real life problems by writing equations with one variable.



Indicator 23.b.4

Express inequalities using symbols

Express inequalities using the symbols for less than or equal to

(\lessdot), greater than or equal to (\gtrdot), or not equal to (\neq). Solve inequalities recognizing that more than one number can be used to solve an inequality.



Benchmark 23.c

Use Algebraic Terms Appropriately: Variable/Coefficient/Term/Equation

The student will use the following algebraic terms appropriately: variable, coefficient, term, and equation.



Indicator 23.c.1

Use algebraic terms appropriately: variable/coefficient/term/equation

Use the following algebraic terms appropriately: variable, coefficient, term, and equation.



Indicator 23.c.2

Identify examples of equations, variables, terms, and coefficients

Identify examples of equations, variables, terms, and coefficients.



MTH.G6

Standard 24

USE PROBLEM SOLVING APPROACHES TO UNDERSTAND NUMERICAL RELATIONSHIPS

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 24.a

Solve Routine, Non-Routine, and Multi-Step Problems

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 24.a.1****Develop and apply strategies to solve a wide variety of problems**

Develop and apply 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, use a formula) to solve a wide variety of non-routine and multi-step problems.

**Indicator 24.a.2****Solve problems using logical procedure**

Solve problems using logical procedure.

**Indicator 24.a.3****Solve problems & present data & conclusions in a variety of formats**

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

**Indicator 24.a.4****Pose problems from everyday life situations**

Pose problems from everyday life situations.

**Indicator 24.a.5****Select and use appropriate materials & tools to solve a problem**

Select and use appropriate materials and tools needed to solve a problem.

**Indicator 24.a.6****Identify information that is available, but not needed**

Identify information that is available but is not needed to solve problems.

**Indicator 24.a.7****Work collaboratively with peers; entertain others' viewpoints**

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

**Indicator 24.a.8****Share, explain, and justify reasoning; verify & interpret results**

Share, explain (verbalize/record), and justify (defend) reasoning during and after solving a problem. Verify and interpret results with respect to the original problem situation. Compare and analyze solution paths (process used to solve problems.)

**Indicator 24.a.9****Investigate alternative ways of solving a problem**

Investigate alternative ways of solving a problem. Compare and analyze solution paths. Generalize solutions and strategies to new problem situations including problems without numbers.