

Course Description

Sixth grade mathematics is about connecting ratio and rate to whole number multiplication and division and using concepts of ratio and rate to solve problems; completing understanding of division of fractions and extending the notion of number to the system of rational numbers, which includes negative numbers; writing, interpreting, and using expressions and equations; and developing understanding of statistical thinking. A general algorithm exists for solving linear equations and inequalities. Linear equations and inequalities can be solved by symbolic, graphical, and numerical methods. Variables have different meanings depending on context and purpose.

Inequalities may contain a solution set instead of a single solution. An operation can be undone by its inverse.

Algebraic equations and inequalities can be used to solve real-world problems.

Certain values make equations or inequalities true. Functional relationships can be expressed verbally, graphically, numerically, and symbolically. Some representations of a function may be more useful than others, depending on how they are used. Linear functions have a constant rate of change.

Scope and Sequence

Timeframe	Unit	Instructional Topics
6 Week(s)	Number Sense and Operations	<ol style="list-style-type: none"> 1. Solve Real-World Fraction Problems 2. Addition, subtraction, multiplication, and division of decimals. 3. Rational Numbers 4. Compute fluently with multi-digit numbers 5. Find Common Factors and Multiples
6 Week(s)	Ratios and Proportional Relationships	<ol style="list-style-type: none"> 1. Ratios 2. Unit Rate 3. Solve Problems involving ratios and rates.
6 Week(s)	Algebraic Expressions	<ol style="list-style-type: none"> 1. Apply and extend previous understanding of arithmetic to algebraic expressions. 2. Reason about and solve one-variable equations and inequalities. 3. Represent and analyze quantitative relationships between dependent and independent variables.
6 Week(s)	Geometry	<ol style="list-style-type: none"> 1. Solve real-world and mathematical problems involving area, surface area, and volume.
6 Week(s)	Statistics and Probability	<ol style="list-style-type: none"> 1. Develop understanding of statistical variability 2. Summarize and describe distribution

Prerequisites

Completion of fifth grade.

Course Instructional Resources/Textbook

McGraw Hill Education : Glenco Math Course 1 Volume 1 textbooks

Course Details**UNIT: Number Sense and Operations** -- 6 Week(s)**Unit Description**

At the end of the unit, students will be able to independently use their learning to...

- Compare, order, and plot integers on a number line, find the opposite of a number and its absolute value.
- Solve mathematical problems involving fractions using the operation of division.
- Solve real life mathematical problems involving all four operations using decimals.
- Apply the properties of math and use factors and multiple to solve real-world problems.
- Plot integers on the number line, find absolute value and graph transformations on the coordinate plane.

Enduring Understandings/Essential Learner Outcomes

Apply and extend previous understandings of multiplication and division to divide fractions by fractions.
Multiply and divide multi-digit numbers and find common factors and multiples.
Apply and extend previous understandings of numbers to the system of rational numbers.

Academic Vocabulary

positive fractions
decimals
greatest common factor (GCF)
least common multiple (LCM)
negative numbers
rational numbers
number line
additive inverse
ordered pairs
integers
cartesian coordinate plane
reciprocal
factorization
divisibility
absolute value
ordered pairs
absolute value
percentages
terminating decimals
equivalent
quotients
positive fractions

TOPIC: Solve Real-World Fraction Problems -- 6 Day(s)

Description

Students will be able to independently solve mathematical problems involving fractions using the operation of division.

Academic Vocabulary (What terms will students need to know?)

How do we problem-solve using numerical approach (numbers and tables)?
How do we communicate our mathematical findings written and verbal formats?
How do we problem-solve using an algebraic approach (symbols, patterns, and relationships)?

Learning Targets

The students will be able to divide fractions by fractions using the leave, change, flip.

MA.6.NS.A.1

TOPIC: Addition, subtraction, multiplication, and division of decimals. -- 6 Day(s)

Description

Demonstrate fluency with addition, subtraction, multiplication and division of decimals.

Academic Vocabulary (What terms will students need to know?)

rational numbers
algorithm
dividend
divisor
quotient
difference
minuend
subtrahend
sum factor
product

Learning Targets

Students will understand that the absolute value of a rational number is its distance from 0 on the number line.

Students will locate a rational number on a number line.

Assessment: Formative assessments

Summative assessments

MA.6.NS.B.3

TOPIC: Rational Numbers -- 6 Day(s)**Description**

Use positive and negative numbers to represent quantities.
Locate a rational number as a point on the number line.

- Locate rational numbers on a horizontal or vertical number line
- Write, interpret and explain problems of ordering rational numbers.
- understand that a number and its opposite (additive inverse) are located on opposite sides of zero on the number line.

Understand that the absolute value of a rational number is its distance from 0 on the number line.
Extend prior knowledge to generate equivalent representations of rational numbers between fractions, decimals, and percentages (limited to terminating decimals and/or benchmark fractions of $\frac{1}{3}$ and $\frac{2}{3}$).

Academic Vocabulary (What terms will students need to know?)

absolute value
terminating decimal
bar notation
integer
negative integer
opposites
positive integers
quadrants
rational numbers
repeating decimal

Learning Targets

Students will understand that the absolute value of a rational number is its distance from 0 on the number line.
Students will locate a rational number as a point on the number line.
Students will use positive and negative numbers to represent quantities.

Assessment: Formative assessments
Summative assessments

MA.6.NS.C.5 MA.6.NS.C.7

I can be able to precisely divide multi-digit numbers using standard algorithm.

MA.6.NS.C.5

MA.6.NS.C.6

MA.6.NS.C.8

TOPIC: Compute fluently with multi-digit numbers -- 6 Day(s)**Description**

Demonstrate fluency with division of multi-digit whole numbers.

Academic Vocabulary (What terms will students need to know?)

Divisor
Dividend
Quotient
Remainder

Learning Targets

I can be able to precisely divide multi-digit numbers using standard algorithm.

Find quotients of problems involving multi-digit numbers.

MA.6.NS.B.2

TOPIC: Ratios -- 10 Day(s)

Description

Students will understand a ratio as a comparison of two quantities and represent these comparisons.

Academic Vocabulary (What terms will students need to know?)

Ratio

Learning Targets

The students will find the greatest common factor and the least common multiple.
The students will use distributive property to express a sum of two whole numbers with a common factor as a multiple of a sum of two whole numbers.

Assessment: Formative assessments

Summative assessments

MA.6.NS.B.4

UNIT: Ratios and Proportional Relationships -- 6 Week(s)

Unit Description

At the end of the unit, students will be able to independently use their learning to...

- * Understand a ratio as a comparison of two quantities and represent these comparisons.
- * Understand the concept of a unit rate associated with a ratio, and describe the meaning of unit rate.
- * Solve problems involving ratios and rates.
- Create tables of equivalent ratios, find missing values in the tables and plot the pairs of values on the Cartesian coordinate plane.
- Solve unit rate problems.
- Solve percent problems.
- Convert measurement units within and between two systems of measurement.

Enduring Understandings/Essential Learner Outcomes

Ratios are the foundation of proportional reasoning.

Ratio and rate reasoning can be used to solve problems in multiple ways. For example, missing values, tables, equivalent ratios, and percents.

Ratio relationship exists between two quantities.

Academic Vocabulary

Ratio

Unit Rate

Equivalent Ratios

Percents

Cartesian Coordinate Plane

Convert Measurements

TOPIC: Ratios -- 10 Day(s)**Description**

Students will understand a ratio as a comparison of two quantities and represent these comparisons.

Academic Vocabulary (What terms will students need to know?)

Ratio

Learning Targets

Students will be able to make tables equivalent ratios relating quantities with whole-numbers measurements

Students will be able to make tables of equivalent ratios finding missing values.

Students will be able to plot the pairs of values on the coordinate plane.

Use ratio and rate reasoning to solve proportion and percent problems.

Solve proportion and percent problems using tables of equivalent ratio, tape diagrams, double number lines, expressions and/or equations.

Make tables of equivalent ratios relating quantities of whole-number measurements.

Assessment: Formative Assessments

Summative Assessments

Quiz

MA.6.RP.A.1

TOPIC: Unit Rate -- 10 Day(s)**Description**

Understand the concept of a unit rate associated with a ratio, and describe the meaning of unit rates.

Academic Vocabulary (What terms will students need to know?)

Rate

Unit Rate

Unit Price

Learning Targets

Students will be able to use the concept of a unit rate a/b .

Students will be able to use ratio and rate reasoning to solve real-world and mathematical problems.

Unit rates are a comparison of different units with a denominator of one.

Write ratios and rates for real-world contexts.

Write rates and unit rates associated with the ratio $a:b$ when b is not equal to 0.

Assessment: Formative Assessments

Summative Assessments

Quiz

MA.6.RP.A.2

TOPIC: Solve Problems involving ratios and rates. -- 10 Day(s)**Description**

Create tables of equivalent ratios, find missing values in tables and plot the pairs of values on the Cartesian coordinate plane.
Solve unit rate problems.
Solve percent problems.
Convert measurement units within and between two systems of measurements.

Academic Vocabulary (What terms will students need to know?)

Ratio Table
Y-coordinate
Equivalent Ratios
Graph
Scaling
Percent
Coordinate Plane
Convert Measurement
Origin
X-axis
Y-axis
Ordered Pair
x-coordinate

Learning Targets

Students will be able to make tables equivalent ratios relating quantities with whole-numbers measurements
Students will be able to make tables of equivalent ratios finding missing values.
Students will be able to plot the pairs of values on the coordinate plane.
Students will be able to use tables to compare ratios.
Students will be able to solve unit rate problems.
Students will be able to find a percent of a quantity as a rate per 100.
Students will be able to find the whole, given a part and the percent.
Students will use ratio reasoning to convert measurement units.
Students will be able to manipulate and transform units appropriately.
Use ratio and rate reasoning to solve proportion and percent problems.
Solve proportion and percent problems using tables of equivalent ratio, tape diagrams, double number lines, expressions and/or equations.
Make tables of equivalent ratios relating quantities of whole-number measurements.
Find missing values in tables, and the pairs of values on the coordinate plan.
Find the percent of quantity as a rate out of 100.
Solve percent problems involving find the whole, given a part and a percent.
Use ratio reasoning to convert units.
Use appropriate units with multiplying or dividing quantities.
Construct and use tape diagrams and double-line diagrams.
Solve unit rate problems including those involving unit pricing and constant speed.

Assessment: Formative Assessments
Summative Assessments
Quiz
MA.6.RP.A.3

UNIT: Algebraic Expressions -- 6 Week(s)**Unit Description**

At the end of the unit, students will be able to independently use their learning to: represent repeated multiplication with exponents. Evaluate expressions containing exponents to solve mathematical and real world problems. Translate verbal phrases and situations into algebraic expressions. Identify parts of a given expression. Use the properties to identify equivalent expressions. Use the properties and mathematical models to generate equivalent expressions.

Enduring Understandings/Essential Learner Outcomes

Students will understand that...
Expressions are powerful tools for exploring, reasoning about and representing situations.
Properties are powerful tools for exploring, reasoning about and representing situations.
Variables have different meanings depending on context and purpose.
Using variables permits writing expressions whose values are not known or vary under different circumstances.

The equal sign can indicate that two expressions are equivalent.
expressions are equivalent when the two expressions name the same number regardless of what value is substituted into them.

Academic Vocabulary

algebraic equivalent expressions properties
algebraic expression evaluate term
associative properties exponent variable
base factor the expressions
coefficient identify properties
commutative properties like terms
constant numerical expression
defining the variable perfect square
distributive property powers

TOPIC: Apply and extend previous understanding of arithmetic to algebraic expressions. -- 10 Day(s)**Description**

Students will be able to describe real-world situations using positive and negative rational numbers and inequalities. They will be able to explain the relationship of positive and negative rational numbers, and 0.

Academic Vocabulary (What terms will students need to know?)

Associative property of addition order of operations
associative property of multiplication term
coefficient variable
commutative property of addition
commutative property of multiplication
constant
distributive property
exponent
like terms

Learning Targets

I will be able to write numerical expressions involving whole-number exponents.
I will be able to evaluate numerical expressions involving whole-number exponents.
I will be able to write, read, and evaluate expressions in which letters stand for numbers.
I will be able to identify parts of an expression using mathematical terms (sum, term, product, factor, quotient, coefficient)
I will be able to view one or more parts of an expression as a single entity.
I will be able to evaluate expressions as specific values of their variables.
I will be able to apply the properties of operations to generate equivalent expressions.
I will be able to identify when two expressions are equivalent i.e., when the two expressions name the same numbers regardless of which value is substituted into the.
I will be able to use algebraic language to describe expressions.

Using order of operations

Assessment: formative and summative assessments

MA.6.EE.1.A.1

MA.6.EE.1.A.2

MA.6.EE.1.A.3

TOPIC: Reason about and solve one-variable equations and inequalities. -- 10 Day(s)

Description

Students will understand that...

A general algorithm exists for solving linear equations and inequalities.

Linear equations and inequalities can be solved by symbolic, graphical, and numerical methods.

Variables have different meanings depending on context and purpose.

Inequalities may contain a solution set instead of a single solution.

An operation can be undone by its inverse.

Algebraic equations and inequalities can be used to solve real-world problems.

Inequalities can be used and graphed to interpret and solve real-world.

Certain values make equations or inequalities true.

Academic Vocabulary (What terms will students need to know?)

arithmetic sequence

inequality

sequence

term

Learning Targets

I will be able to identify variables and their relationships in a real-world situation.

I will be able to identify variables and their relationships in a table.

I will be able to identify variables and their relationship in a graph.

I will be able to convert real-world situations into equations using models.

I will be able write the equation of a graph using a table.

I will be able to create equivalent algebraic representations (table, graph, equation, word problem).

Assessment: formative and summative assessments

MA.6.EE.I.B.4

MA.6.EE.I.B.5

MA.6.EE.I.B.6

MA.6.EE.I.B.7

MA.6.EE.I.B.8

TOPIC: Solve real-world and mathematical problems involving area, surface area, and volume. -- 30 Day(s)**Description**

Students will independently compose and decompose geometric figures and apply the understanding to real-world problems involving mathematical reasoning and strategic thinking.

Academic Vocabulary (What terms will students need to know?)

base
composite figure
congruent
formula
height
parallelogram

Learning Targets

I will be able to identify variables and their relationships in a real-world situation.
I will be able to identify variables and their relationships in a table.
I will be able to identify variables and their relationship in a graph.
I will be able to convert real-world situations into equations using models.
I will be able to write the equation of a graph using a table.
I will be able to create equivalent algebraic representations (table, graph, equation, word problem).

Assessment: formative and summative assessments

MA.6.EE.1.C.9

UNIT: Geometry -- 6 Week(s)**Unit Description**

Students will make sense of problems and persevere in solving them.
Students will construct viable arguments and critique the reasoning of others.
Students will model with mathematics.
Students will look for and make use of structure.
Students will look for and express regularity in repeated reasoning.

Enduring Understandings/Essential Learner Outcomes

Students will understand that...
Composing and decomposing polygons leads to finding the area of 2-D shapes.
Using triangle and rectangle areas will result in finding the surface area of 3-D shapes.
Formulas and developed from finding the patterns and relationships between attributes of a shape.

Academic Vocabulary

BaseLateral Face
Composite FigurePrism
CongruentPryamid
FormulaRectangular Prism
HeightSlant Height
ParallelogramSurface Area
PolygonThree-dimensional Figure
RhombusVertrex
Cubic UnitsVolume

TOPIC: Solve real-world and mathematical problems involving area, surface area, and volume. -- 30 Day(s)**Description**

Students will independently compose and decompose geometric figures and apply the understanding to real-world problems involving mathematical reasoning and strategic thinking.

Academic Vocabulary (What terms will students need to know?)

base
composite figure
congruent
formula
height
parallelogram
polygon
rhombus
cubic units
lateral face
prism
pyramid
rectangular prism
slant height
surface area
three-dimensional figure
triangular prism
vertex
volume

Learning Targets

I will be able to find the area of polygons by composing and/or decomposing into triangles, rectangles, parallelograms, and trapezoids.

I will be able to find the area of triangles by composing rectangles.

I will be able to find the volume of a rectangular prism by developing and applying a formula.

I will be able to draw polygons using coordinates as vertices.

I will be able to use coordinates to find the length of a side in a polygon on the coordinate plane.

I will be able to solve real-world and mathematical problems involving polygons in the coordinate plane.

I will be able to represent three-dimensional figures using nets.

I will be able to use nets to find the surface area of triangular and rectangular prisms.

I will be able to solve real-world and mathematical problems using surface area.

The distance between vertices is confined to points with the same first coordinate or the same second coordinate.

Nets are restricted to a composition of triangles and rectangles.

Surface area should be restricted to triangular and rectangular prisms.

Assessment: formative and summative assessments

MA.6.GM.A.1

MA.6.GM.A.2

MA.6.GM.A.3

MA.6.GM.A.4

UNIT: Statistics and Probability -- 6 Week(s)**Unit Description**

Students will make sense of problems and persevere in solving them.

Students will construct viable arguments and critique the reasoning of others.

Students will look for express regularity on repeated reasoning.

Enduring Understandings/Essential Learner Outcomes

Students will understand that...

Describing the nature of the attribute under investigations, including how it was measured and its units of measurement.

A well-written statistical question refers to a population of interest, a measurement of interest, and anticipates answers that vary.

Data can be displayed and numerically represented in a variety of ways to support an argument and some formats are more effective.

Understand that a set of data collected to answer a statistical question has a distribution which can be described by its center, spread, overall shape, and outlier.

Giving quantitative measures of center (median and/or mean) and variability (interquartile range and/or mean absolute deviation) as well as describing any overall pattern and any striking deviations from the overall pattern with reference to the context in which the data were gathered.

Relating the choice of measures of center and variability to the shape of the data distribution and the context in which the data were gathered.

Academic Vocabulary

average
quartiles
first quartile
range
interquartile range
statistical question
mean
third quartile
mean absolute deviation
measure of center
measure of variation
median
mode
outliers

TOPIC: Develop understanding of statistical variability -- 15 Day(s)**Description**

Students will understand that...

Describing the nature of the attribute under investigation, including how it was measured and its units of measurement.

A well-written statistical question refers to a population of interest, a measurement of interest, and anticipates answers that vary.

Data can be displayed and numerically represented in a variety of ways to support an argument and some formats are more effective.

Understand that a set of data collected to answer a statistical question has a distribution which can be described by its center, spread, overall shape, and outliers.

Giving quantitative measures of center (median and/or mean) and variability (interquartile range and/or mean absolute deviation) as well as describing any overall pattern and any striking deviations from the overall pattern with reference to the context in which the data were gathered.

Relating the choice of measures of center and variability to the shape of the data distribution and the context in which the data were gathered.

Academic Vocabulary (What terms will students need to know?)

average

first quartile

interquartile range

mean

mean absolute deviation

measure of center

measures of variation

median

mode

outliers

quartiles

range

statistical question

third quartile

Learning Targets

I will be able to recognize a statistical question.

I will be able to account for variability in statistical questions.

I will be able to use measures of center to describe the distribution of data.

I will be able to describe the distribution of data using spread.

I will be able to analyze the shape of a graph to describe the distribution of data.

I will recognize that a measure of center summarizes all values with a single number.

I will recognize that a measure of variation describes how the values vary with a single number.

Measures of center include mean and median.

Spread includes mean absolute deviation and inter-quartile range.

Examine mean, median and mode to determine measure of center.

Determine the measure of variation using range and mean absolute deviation.

Assessment: Formative and summative assessments

MA.6.DSP.A.1

MA.6.DSP.A.2

MA.6.DSP.A.3

MA.6.DSP.B.4

MA.6.DSP.B.5

TOPIC: Summarize and describe distribution -- 15 Day(s)

Description

Students will....

Analyze data form many different sources such as organized lists, box-plots, bar graphs, histogreams and dot plots.

Understand that responses to statistical questions may vary.

Understand tha data can be described by a single number.

Determine quantitative measures of center (median and/or mean).

Determine quantitative measures of variability (interquartile range and range).

Academic Vocabulary (What terms will students need to know?)

inter-quartile range (IQR)

maximum value

mean

measure of center

measure of spread

median

minimum value

mode

numerical data

outlier

range

skewed data

statistical questions

variability

Learning Targets

I will be able to display data on a number line.

I will be able to determine the number of observations in a set of data.

I will be able to determine how data was measured and its units of measure.

I will be able to use measures of center and variability to contextually describe the overall data.

I will be able to relate the choice of measures of center and variability to the context of the data gathered and the overall shape.

Displays include dot plots, histograms and box plots.

Determine number of observations using data displayed in histograms and line plots.

Describe the attributes of a data set by analyzing line plots, histograms and box plots.

Assessment: formative and summative assements.

MA.6.DSP.A.1

MA.6.DSP.A.2

MA.6.DSP.A.3

MA.6.DSP.B.4

MA.6.DSP.B.5