

Sixth Grade

**Arithmetic Operations
of Fractions and Decimals**

Mathematics

Grade Level:

Sixth

Strand:

**Numbers and
Numerical Operations**

ESSENTIAL UNDERSTANDINGS:

The following understandings are aligned with the New Jersey Core Curriculum Content Standards as indicated in the left-hand column.

NJCCS

- The learner will extend the understanding and utilization of arithmetic and algebraic concepts as they apply to the completion of numerical operations.
- The learner will understand and apply standard algebraic and numerical operations using estimation, pencil and paper, mental math, and a calculator.
- The learner will extend the understanding of the number system by constructing meanings for fractions and decimals.
- The learner will understand how to develop and apply methods for solving problems involving proportions and percents.

ESSENTIAL QUESTIONS:

1. What is the relationship between fractions, decimals, and percentages?
2. Can all numbers be graphed on a number line?
3. Are all real numbers rational?

STUDENT ACHIEVEMENT STANDARDS:

CPI

- The learner will be able to use arithmetic operations for fractions and decimals.
- The learner will be able to estimate sums and differences of fractions.
- The learner will be able to estimate products and quotients for fractions and decimals.

APPLICABLE ASSESSMENT:

Demonstration of knowledge of stated achievement standards
Teacher observation
Completed assignments
Tests

RECOMMENDED ACTIVITIES:

SUGGESTED TIME RANGE:

6 – 8 weeks

VOCABULARY:

prime number
composite number
commutative property
associative property
distributive property

exponents
power
base
repeating decimals
reciprocals

Measurement

Mathematics
Grade Level:
Sixth
Strand:
Geometry and Measurement

ESSENTIAL UNDERSTANDINGS:

The following understandings are aligned with the New Jersey Core Curriculum Content Standards as indicated in the left-hand column.

NJCCS

- The learner will understand and use measurement to describe and analyze familiarity with common measurement.
- The learner will understand the proper use of numbers in various forms of measurement.
- The learner will understand how to use the concept of estimation to predict appropriate measurement.
- The learner will understand how changing a quantity will affect the change in measurement.

ESSENTIAL QUESTIONS:

1. When is estimation appropriate in everyday life?
2. What information would be utilized to determine the appropriate unit of measurement?

STUDENT ACHIEVEMENT STANDARDS:

CPI

- The learner will be able to develop, apply, and explain a variety of different estimation strategies, in problem situations, involving quantities and measurement.
- The learner will be able to determine whether a given estimate is an overestimate or an underestimate.
- The learner will be able to understand money notations, count and compute money, and recognize the decimal nature of United States currency.
- The learner will be able to identify, derive, and compare properties

of numbers.

- The learner will be able to use estimated and actual measurements to describe and compare phenomena.
- The learner will be able to read and interpret various scales, including those based on number lines and maps.
- The learner will be able to determine the degree of accuracy needed in a given situation and choose units accordingly.
- The learner will be able to develop formulas and procedures for solving problems related to measurement.
- The learner will be able to convert measurement units from one form to another, and carry out calculations that involve various units of measurement.
- The learner will be able to understand and apply measurement in their lives and in other subject areas.
- The learner will be able to understand and explain the impact of the change of an object's linear dimensions on its perimeter.
- The learner will be able to apply their knowledge of measurement to the construction of a variety of two- and three-dimensional figures.

SUGGESTED METHOD OF INSTRUCTION:

Small group instruction
Whole group instruction
Individual instruction
Hands-on instruction

CORE ACTIVITIES:

- The teacher will demonstrate the concepts being taught.
- The students will utilize mathematical concepts to complete assigned tasks.
- The students and teachers will use appropriate manipulatives to learn and reinforce concepts being taught.

INSTRUCTIONAL RESOURCES:

Student Resources:

Middle School Math, Prentice Hall
Computer
Manipulatives

Technology Integrations:

Computer
Calculator

Geometry

Mathematics
Grade Level:
Sixth
Strand:
Geometry and Measurement

ESSENTIAL UNDERSTANDINGS:

The following understandings are aligned with the New Jersey Core Curriculum Content Standards as indicated in the left-hand column.

NJCCS

- The learner will understand and use geometric concepts such as area, volume, and perimeter as they relate to measurement in all life situations.
- The learner will understand how to utilize the estimation concept to perform a logical prediction of measurement.
- The learner will understand the proper use of numbers to solve measurement and geometric computation.
- The learner will understand geometric terms.
- The learner will understand and apply the concepts of congruence and symmetry (line and rotational.)

ESSENTIAL QUESTIONS:

1. If a dimension of a prism is changed, how does it affect perimeter, area, and volume?

STUDENT ACHIEVEMENT STANDARDS:

The learner will be able to ...

CPI

- The learner will be able to identify and classify polygons, prisms, pyramids, and angles.
- The learner will be able to measure and draw angles.
- The learner will be able to complete translations, turns, rotations, and flips.
- The learner will be able to classify geometric terms.
- The learner will be able to identify and determine perimeter, area, and volume.

SUGGESTED METHOD OF INSTRUCTION:

Small groups instruction
Whole group instruction
Individual instruction
Hands-on

CORE ACTIVITIES:

- The teacher will model the concepts being taught.
- The students will utilize mathematical concepts to complete assigned tasks.
- The students and teachers will use appropriate manipulatives to learn and reinforce concepts being taught.

INSTRUCTIONAL RESOURCES:**Student Resources:**

Middle School Math, Prentice Hall
Computer
Manipulatives

Technology Integrations:

Computer - Draw angles

Literature/Cross Curricular Connections:

Science
Art
Physical Education

APPLICABLE ASSESSMENT:

Demonstration of knowledge of stated achievement standards
Teacher observation
Completed assignments
Tests

RECOMMENDED ACTIVITIES:

SUGGESTED TIME RANGE:

6–8 weeks

VOCABULARY:

perpendicular lines
parallel lines
skew lines
obtuse, acute, and right triangles

regular and irregular polygons
straight angle
chord

Procedures

Mathematics
Grade Level:
Sixth
Strand:
Patterns and Algebra

ESSENTIAL UNDERSTANDINGS:

The following understandings are aligned with the New Jersey Core Curriculum Content Standards as indicated in the left-hand column.

NJCCS

- The learner will recognize, describe and create patterns involving whole numbers and rational numbers.
- The learner will generate formulas from given function tables.
- The learner will use and create graphs to make predictions and interpret events.
- The learner will solve linear equations.
- The learner will understand and apply properties of operations and numbers.

ESSENTIAL QUESTIONS:

1. Which graph is best to use with the given information?
2. How do graphs influence ones interpretation of given data?

STUDENT ACHIEVEMENT STANDARDS:

CPI

- The learner will be able to recognize and describe recursive patterns including Pascal's and Fibonacci.
- The learner will be able to recognize and create patterns involving whole numbers and rational numbers.
- The learner will be able to recognize formulas given function tables.
- The learner will apply and use properties of operations and numbers.
- The learner will solve linear equations.

SUGGESTED METHOD OF INSTRUCTION:

Small groups instruction
Whole group instruction
Individual instruction
Hands-on instruction

CORE ACTIVITIES:

- The teacher will model the concepts being taught.
- The students will utilize mathematical concepts to complete assigned tasks.
- The students and teachers will use appropriate manipulatives to learn and reinforce concepts being taught.

INSTRUCTIONAL RESOURCES:**Student Resources:**

Middle School Math, Prentice Hall
Computer
Manipulatives

Technology Integrations:

Computer
Calculator

Literature/Cross Curricular Connections:

Science
Art
Physical Education

APPLICABLE ASSESSMENT:

Demonstration of knowledge of stated achievement standards
Teacher observation
Completed assignments
Tests

RECOMMENDED ACTIVITIES:

SUGGESTED TIME RANGE:

weeks

VOCABULARY:

Fibonacci
Pascal
distributive property
variable

multiplicative inverse
identity property of one
identity property of zero
spread sheet

Data Analysis and Probability

Mathematics

Grade Level:

Sixth

Strand:

**Data Analysis/Probability
Discrete Mathematics**

ESSENTIAL UNDERSTANDINGS:

The following understandings are aligned with the New Jersey Core Curriculum Content Standards as indicated in the left-hand column.

NJCCS

- The learner will develop and understand concepts and techniques of data analysis and probability.
- The learner will solve problems, analyze and draw conclusions given data.

ESSENTIAL QUESTIONS:

1. Given data, how do charts and graphs influence one's decisions?
2. How can understanding probability influence game play?

STUDENT ACHIEVEMENT STANDARDS:

CPI

- The learner will be able to collect, generate, and interpret bar graphs, line graph, circle graphs, tables, histograms and scatter plots.
- The learner will be able to determine probability, intuitive, experimental and theoretical methods.
- The learner will be able to use vertex edge graphs to find the shortest route.
- The learner will be able to solve problems involving Venn Diagrams.
- The learner will be able to use the fundamental counting principle and explore the concept of permutation.

SUGGESTED METHOD OF INSTRUCTION:

Small group instruction
Whole group instruction
Individual instruction
Hands-on instruction

CORE ACTIVITIES:

- The teacher will model the concepts being taught.
- The students will utilize mathematical concepts to complete assigned tasks.
- The students and teachers will use appropriate manipulatives to learn and reinforce concepts being taught.

INSTRUCTIONAL RESOURCES:**Student Resources:**

Middle School Math, Prentice Hall
Computer
Manipulatives

Technology Integrations:

Computer
Calculator

Literature/Cross Curricular Connections:

Science
Art
Physical Education

APPLICABLE ASSESSMENT:

Demonstration of knowledge of stated achievement standards
Teacher observation
Completed assignments
Tests

RECOMMENDED ACTIVITIES:

SUGGESTED TIME RANGE:

weeks

VOCABULARY:

Venn Diagram

histogram

complementary events

permutation

Pascal's triangle

fundamental counting principle

vertex

edge

graph

Seventh Grade

**Arithmetic Operations of Fractions,
Decimals, Integers, and
Rational Numbers**

Mathematics
Grade Level:
Seventh
Strand:
Numbers and Numerical Operations

ESSENTIAL UNDERSTANDINGS:

The following understandings are aligned with the New Jersey Core Curriculum Content Standards as indicated in the left-hand column.

NJCCS

- The learner will extend his/her understanding and utilization of arithmetic and algebraic concepts as they apply to numerical operations.
- The learner will understand and apply standard algebraic and numerical operations using estimation.
- The learner will extend his/her understanding of the number system by constructing the meaning of integers, fractions, decimals, and rational numbers.
- The learner will understand develop, apply and explain methods for solving problems involving proportions and percents.

ESSENTIAL QUESTIONS:

1. What is the relationship between decimals, fractions and percentages?
2. Are all real numbers rational?
3. Can all numbers be graphed on a number line?

STUDENT ACHIEVEMENT STANDARDS:

NJCCS

- The learner will be able to use arithmetic operations with fractions, decimals, integers and rational numbers.
- The learner will be able to estimate sums and differences of whole numbers and fractions.
- The learner will be able to estimate products and quotients of fractions and decimals.

- The learner will be able to find equivalent fractions, decimals, and percents.
- The learner will be able develop, apply and explain procedures for computation and estimation with whole numbers, fractions, decimals, and integers.
- The learner will be able to investigate the relationships among fractions, decimals, and percents, and use them appropriately.
- The learner will be able to solve problems involving proportions and percents.
- The learner will be able to apply and understand the standard algebraic order of operations.

SUGGESTED METHOD OF INSTRUCTION:

- Large group instruction
- Small Groups instruction
- Individual Instruction
- Manipulatives

CORE ACTIVITIES:

- The teacher will model the concepts being taught.
- The students will utilize mathematical concepts to complete assigned tasks.
- The student and teacher will use appropriate manipulatives to learn and reinforce concepts being taught.

INSTRUCTIONAL RESOURCES:

Student Resources:

Middle School Math, Prentice Hall
Manipulatives

Technology Integrations:

Calculators

Literature/Cross Curricular Connections:

Science/Social Studies
Physical Education

APPLICABLE ASSESSMENT:

Demonstration of knowledge of stated achievement standards
Teacher observation
Completed assignments
Tests

RECOMMENDED ACTIVITIES:

- Balance a checkbook to introduce integers, review adding and subtraction with decimals, and reading a chart.

SUGGESTED TIME RANGE:

12-16 weeks

VOCABULARY:

reciprocal
distributive property
inverse operation
integers

Pascal's Triangle
Fibonacci sequence
arithmetic sequence
geometric sequence

Measurement

Mathematics
Grade Level:
Seventh
Strand:
Geometry and Measurement

ESSENTIAL UNDERSTANDINGS:

The following understandings are aligned with the New Jersey Core Curriculum Content Standards as indicated in the left-hand column.

NJCCS

- The learner will understand the comparison between standard and non-standard measurement.
- The learner will understand the proper use of numbers in various forms of measurement.
- The learner will understand how to utilize estimation concepts to predict appropriate measurements.
- The learner will understand how changing a quantity will affect a change in measurement.

ESSENTIAL QUESTIONS:

1. How will changing the dimensions of a 3D figure affect the area, perimeter and volume?
2. How can you construct a figure with the same surface area, but having different volume?
3. When is estimation appropriate in everyday life?
4. What information would be utilized to determine the appropriate unit of measurement?

STUDENT ACHIEVEMENT STANDARDS:

NJCCS

- The learner will be able to develop informal ways of approximating the surface area and volume of familiar objects and discuss whether the approximations make sense.
- The learner will be able to express mathematically and explain the impact of change of an object's linear dimensions on an object's

surface area.

- The learner will be able to develop, apply and explain a variety of different estimation strategies in given situations involving quantities and measurement.
- The learner will be able to determine whether a given estimate is an overestimation or underestimation.
- The learner will be able to understand money notations, count and compute money and recognize the decimal nature of U.S. currency.
- The learner will be able to identify, derive and compare properties of numbers.
- The learner will be able to use estimated and actual measurements to describe and compare phenomena.
- The learner will be able to read and interpret various scales including those based on number lines and maps.
- The learner will be able to determine the degree of accuracy needed in a given situation and choose units accordingly.
- The learner will be able to develop formulas and procedures for solving problems related to geometry.
- The learner will be able to convert measurement units from one form to another and carry out calculations that involve various units of measurements.
- The learner will be able to understand and apply measurement in his or her own life and in other subject areas.
- The learner will be able to understand and explain the impact of change of an object's linear dimension on its perimeter and area.
- The learner will be able to apply his/her knowledge of measurement to the construction of various two and three-dimensional figures.

SUGGESTED METHOD OF INSTRUCTION:

Small group instruction
Whole group instruction
Individual instruction
Hands- on

CORE ACTIVITIES:

- The teacher will model the concepts being taught.
- The students will utilize mathematical concepts to complete assigned tasks.
- The student and teacher will use appropriate manipulatives to learn and reinforce concepts being taught.

INSTRUCTIONAL RESOURCES:**Student Resources:**

Middle School Math, Prentice Hall
Computer
Manipulatives

Technology Integrations:

Computer

Literature/Cross Curricular Connections:

Science
Art
Physical Education

APPLICABLE ASSESSMENT:

Demonstration of knowledge of stated achievement standards
Teacher observation
Completed assignments
Tests

RECOMMENDED ACTIVITIES:

SUGGESTED TIME RANGE:

6-8 weeks

VOCABULARY:

linear growth
exponential growth

Pythagorean Theorem

Geometry

Mathematics
Grade Level:
Seventh
Strand:
Geometry and Measurement

ESSENTIAL UNDERSTANDINGS:

The following understandings are aligned with the New Jersey Core Curriculum Content Standards as indicated in the left-hand column.

NJCCS

- The learner will understand and use geometric concepts such as area, volume, and perimeter as they relate to measurement in daily life.
- The learner will understand how to utilize the estimation concept to perform a logical prediction of measurement.
- The learner will understand the proper use of numbers to solve measurement and geometric computation.
- The learner will understand geometric terms.

ESSENTIAL QUESTIONS:

1. How will changing the dimensions of a prism or pyramid affect the area, perimeter and volume?

STUDENT ACHIEVEMENT STANDARDS:

NJCCS

- The learner will be able to identify and classify polygons, prisms, pyramids, cylinders, cones, and angles.
- The learner will be able to understand and apply the concepts of symmetry, similarity and congruence.
- The learner will be able to complete transformations.
- The learner will be able to classify geometric terms.
- The learner will be able to identify and determine perimeter, area, and volume of a regular or 3-D figure using formulas.
- The learner will be able to explore patterns produced by processes of geometric change relating iteration, approximation and fractals.
- The learner will be able to construct segment and angle bisectors.

- The learner will be able to find surface area of 3-D figures.
- The learner will be able to understand and apply Pythagorean Theorem.

SUGGESTED METHOD OF INSTRUCTION:

- Small group instruction
- Whole group instruction
- Individual instruction
- Hands- on

CORE ACTIVITIES:

- The teacher will model the concepts being taught.
- The students will utilize mathematical concepts to complete assigned tasks.
- The student and teacher will use appropriate manipulatives to learn and reinforce concepts being taught.

INSTRUCTIONAL RESOURCES:

Student Resources:

Middle School Math, Prentice Hall
Computer
Manipulatives

Technology Integrations:

Computer - Draw and construct angles
- Reflect, rotate, and dilate geometrical figures

Literature/Cross Curricular Connections:

Science
Art
Physical Education

APPLICABLE ASSESSMENT:

Demonstration of knowledge of stated achievement standards
Teacher observation
Completed assignments
Tests

RECOMMENDED ACTIVITIES:

SUGGESTED TIME RANGE:

6 – 8 weeks

VOCABULARY:

skew lines
obtuse, acute, and right triangles
perpendicular lines

corresponding, vertical and linear angles
Pythagorean Theorem