

Cedar Grove School District

Cedar Grove, NJ

2016 | **Grades**
7-8

Pre-Algebra

Approved by the Cedar Grove Board of Education

Superintendent of Schools

Mr. Michael J. Fetherman

Board of Education

Mr. Joseph Cicala, President

Mrs. Christine Dye, Vice-President

Mrs. Pam Burke

Mr. Frank Mandala

Mr. Peter Prvulovic

Mathematics- Grades 7-8: Pre-Algebra Course Description

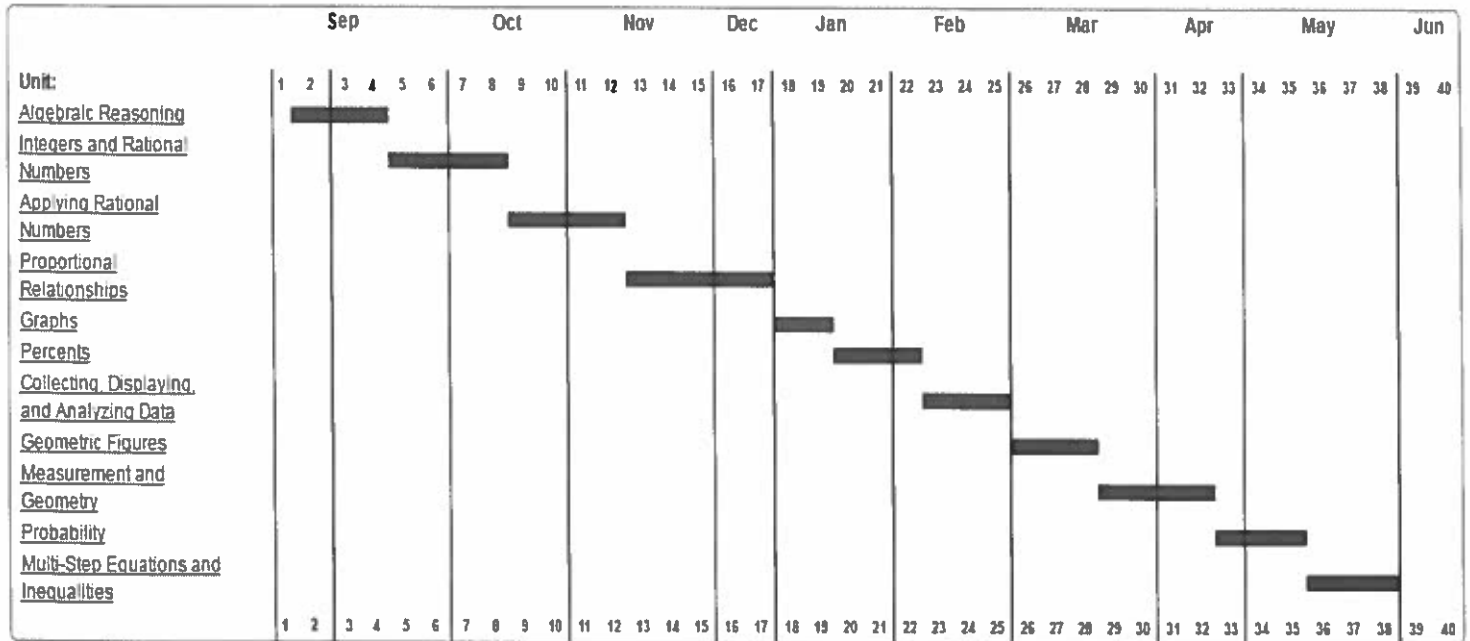
Pre-Algebra focuses on a broad range of mathematical tasks intended to prepare a student for *Algebra I*. The course promotes student communication, critical thinking, and problem solving through the refinement and extension of mathematical processes. The sequence will be adjusted to maximize preparedness for NJASK 7 and NJASK 8.

Pre-Algebra links math skills to basic algebra skills, and applications dealing with integers, order of operations, equation solving, and graphing linear equations and inequalities. Much attention is devoted to applying different problem-solving strategies in a variety of applications. Emphasis is placed on making connections between general math, algebra, geometry, probability, and real-life situations.

Pre-Algebra is intended for students in grades 7 and 8.

Mathematics- Grades 7-8: Pre-Algebra

Course Calendar





Unit Planner: Intro Unit Pre-Algebra

Wednesday, August 31, 2016, 3:15PM



Memorial Middle School > 2016-2017 > Middle School > Mathematics > Pre-Algebra (D) > Week 1

Travaglio, Maria

Stage 1: Desired Results

NJ Standards

NJ: 2016 SLS: Mathematics

NJ: Grade 7

The Number System

7.NS.A. Apply and extend previous understandings of operations with fractions to add, subtract, multiply, and divide rational numbers.

7.NS.A.1. Apply and extend previous understandings of addition and subtraction to add and subtract rational numbers; represent addition and subtraction on a horizontal or vertical number line diagram.

7.NS.A.1d. Apply properties of operations as strategies to add and subtract rational numbers.

7.NS.A.2. Apply and extend previous understandings of multiplication and division and of fractions to multiply and divide rational numbers.

7.NS.A.2c. Apply properties of operations as strategies to multiply and divide rational numbers.

7.NS.A.2d. Convert a rational number to a decimal using long division; know that the decimal form of a rational number terminates in 0s or eventually repeats.

7.NS.A.3. Solve real-world and mathematical problems involving the four operations with rational numbers.

Geometry

7.G.A. Draw construct, and describe geometrical figures and describe the relationships between them.

7.G.A.1. Solve problems involving scale drawings of geometric figures, including computing actual lengths and areas from a scale drawing and reproducing a scale drawing at a different scale.

7.G.A.2. Draw (with technology, with ruler and protractor as well as freehand) geometric shapes with given conditions. Focus on constructing triangles from three measures of angles or sides, noticing when the conditions determine a unique triangle, more than one triangle, or no triangle.

7.G.A.3. Describe the two-dimensional figures that result from slicing three-dimensional figures, as in plane sections of right rectangular prisms and right rectangular pyramids.

7.G.B. Solve real-life and mathematical problems involving angle measure, area, surface area, and volume.

7.G.B.4. Know the formulas for the area and circumference of a circle and use them to solve problems; give an informal derivation of the relationship between the circumference and area of a circle.

7.G.B.5. Use facts about supplementary, complementary, vertical, and adjacent angles in a multi-step problem to write and solve simple equations for an unknown angle in a figure.

7.G.B.6. Solve real-world and mathematical problems involving area, volume and surface area of two- and three-dimensional objects composed of triangles, quadrilaterals, polygons, cubes, and right prisms.

NJ: Grade 8

The Number System

8.NS.A. Know that there are numbers that are not rational, and approximate them by rational numbers.

8.NS.A.1. Understand informally that every number has a decimal expansion; the rational numbers are those with decimal expansions that terminate in 0s or eventually repeat. Know that other numbers are called irrational.

Geometry

8.G.A. Understand congruence and similarity using physical models, transparencies, or geometry software.

8.G.A.1a. Lines are transformed to lines, and line segments to line segments of the same length.

8.G.A.1b. Angles are transformed to angles of the same measure.

Mathematical Practice

MP. The Standards for Mathematical Practice describe varieties of expertise that mathematics educators at all levels should seek to develop in their students.

MP.1. Make sense of problems and persevere in solving them.

MP.2. Reason abstractly and quantitatively.

MP.3. Construct viable arguments and critique the reasoning of others.

MP.4. Model with mathematics.

MP.5. Use appropriate tools strategically.

MP.6. Attend to precision.

MP.7. Look for and make use of structure.

MP.8. Look for and express regularity in repeated reasoning.

Copyright © State of New Jersey, 1996 - 2016.

Enduring Understandings

- A quantity can be represented numerically in various ways. Problem solving depends upon choosing wise ways.
- Computational fluency includes understanding the meaning and the appropriate use of numerical operations.
- Geometric properties can be used to construct geometric figures.
- Everyday objects have a variety of attributes each of which can be measured in many ways.
- Algebraic representation can be used to generalize patterns and relationships.
- The message conveyed by the data depends on how the data is collected, represented, and summarized.

Essential Questions

1. How can we compare and contrast numbers?
2. What makes a computational strategy both effective and efficient?
3. How can spatial relationships be describe by careful use of geometric language?
4. How can measurements be used to solve problems?
5. How can change be represented mathematically?
6. How can the collection, organization, interpretation, and display of data be used to answer questions?

Content

A. Estimation

Skills

A1. Use Place Value and Rounding

<p>B. Decimals</p> <p>C. Fractions</p> <p>D. Data Analysis</p> <p>E. Geometry and Measurement</p>	<p>B1. Review Comparing and Ordering Decimals B2. Apply Decimal Operations</p> <p>C1. Review Fractions, Mixed Numbers, and Improper Fractions C2. Apply Fraction Operations</p> <p>D1. Review Reading Graphs D2. Use Venn Diagrams and Logical Reasoning</p> <p>E1. Identify Basic Geometric Figures E2. Compare and Convert Units of Measurement E3. Find Area and Volume E4. Use a Protractor and Compass</p>
---	---

Stage 2: Assessment Evidence

Assessments

Summative: Written Test
Pre-Course Test

Stage 3: Learning Plan

Learning Activities

Included but not limited to:

- Guided Practice
- Lecture and Demonstration
- "Speed Round"

Resources

Pre-Algebra
Larson, Boswell, Kanold, Stiff
Holt McDougal
2012


Supplementary Materials:

Pre-Algebra
Larson, Boswell, Kanold, Stiff
McDougal Littell, 2008

*Measuring Up to the New Jersey Core Curriculum
Content Standards*
Peoples Publishing Group

New Jersey Ask8 Coach, Mathematics, Grade 8
Triumph Learning, LLC

Websites:

 <http://illuminations.nctm.org/>
www.exchange.smarttech.com
www.ixl.com
www.aaastudy.com
www.classzone.com

Calculators:

Texas Instruments
TI-34-II (or equivalent)

Online state test preparation:

www.ixl.com

Manipulatives:

White boards

Dice

Graph paper

Cylinders, spheres, prisms

Pattern blocks

Rulers

Tangrams

Protractors

Compasses



Unit Planner: Unit 1: Integers, Equations, and Inequalities Pre-Algebra

Wednesday, August 31, 2016, 3:15PM



Memorial Middle School > 2016-2017 > Middle School > Mathematics > Pre-Algebra (D) > Week 2 - Week 10

Travaglio, Maria

Stage 1: Desired Results

NJ Standards

NJ: 2016 SLS: Mathematics

NJ: Grade 7

The Number System

7.NS.A. Apply and extend previous understandings of operations with fractions to add, subtract, multiply, and divide rational numbers.

7.NS.A.1. Apply and extend previous understandings of addition and subtraction to add and subtract rational numbers; represent addition and subtraction on a horizontal or vertical number line diagram.

7.NS.A.1a. Describe situations in which opposite quantities combine to make 0.

7.NS.A.1b. Understand $p + q$ as the number located a distance $|q|$ from p , in the positive or negative direction depending on whether q is positive or negative. Show that a number and its opposite have a sum of 0 (are additive inverses). Interpret sums of rational numbers by describing real-world contexts.

7.NS.A.1c. Understand subtraction of rational numbers as adding the additive inverse, $p - q = p + (-q)$. Show that the distance between two rational numbers on the number line is the absolute value of their difference, and apply this principle in real-world contexts.

7.NS.A.1d. Apply properties of operations as strategies to add and subtract rational numbers.

7.NS.A.2a. Understand that multiplication is extended from fractions to rational numbers by requiring that operations continue to satisfy the properties of operations, particularly the distributive property, leading to products such as $(-1)(-1) = 1$ and the rules for multiplying signed numbers. Interpret products of rational numbers by describing real-world contexts.

7.NS.A.2b. Understand that integers can be divided, provided that the divisor is not zero, and every quotient of integers (with non-zero divisor) is a rational number. If p and q are integers, then $-(p/q) = (-p)/q = p/(-q)$. Interpret quotients of rational numbers by describing real-world contexts.

7.NS.A.2c. Apply properties of operations as strategies to multiply and divide rational numbers.

Expressions & Equations

7.EE.A. Use properties of operations to generate equivalent expressions.

7.EE.A.1. Apply properties of operations as strategies to add, subtract, factor, and expand linear expressions with rational coefficients.

7.EE.A.2. Understand that rewriting an expression in different forms in a problem context can shed light on the problem and how the quantities in it are related.

7.EE.B. Solve real-life and mathematical problems using numerical and algebraic expressions and equations.

7.EE.B.3. Solve multi-step real-life and mathematical problems posed with positive and negative rational numbers in any form (whole numbers, fractions, and decimals), using tools strategically. Apply properties of operations to calculate with numbers in any form; convert between forms as appropriate; and assess the reasonableness of answers using mental computation and estimation strategies.

7.EE.B.4. Use variables to represent quantities in a real-world or mathematical problem, and construct simple equations and inequalities to solve problems by reasoning about the quantities.

7.EE.B.4a. Solve word problems leading to equations of the form $px + q = r$ and $p(x + q) = r$, where p , q , and r are specific rational numbers. Solve equations of these forms fluently. Compare an algebraic solution to an arithmetic solution, identifying the sequence of the operations used in each approach.

7.EE.B.4b. Solve word problems leading to inequalities of the form $px + q > r$ or $px + q < r$, where p , q , and r are specific rational numbers. Graph the solution set of the inequality and interpret it in the context of the problem.

NJ: Grade 8

Expressions & Equations

8.EE.C. Analyze and solve linear equations and pairs of simultaneous linear equations.

8.EE.C.7. Solve linear equations in one variable.

8.EE.C.7b. Solve linear equations with rational number coefficients, including equations whose solutions require expanding expressions using the distributive property and collecting like terms.

Mathematical Practice

MP.The Standards for Mathematical Practice describe varieties of expertise that mathematics educators at all levels should seek to develop in their students.

MP.1. Make sense of problems and persevere in solving them.

MP.2. Reason abstractly and quantitatively.

MP.3. Construct viable arguments and critique the reasoning of others.

MP.4. Model with mathematics.

MP.5. Use appropriate tools strategically.

MP.6. Attend to precision.

MP.7. Look for and make use of structure.

MP.8. Look for and express regularity in repeated reasoning.

Copyright © State of New Jersey, 1996 - 2016.

Enduring Understandings

- A quantity can be represented numerically in various ways. Problem solving depends upon choosing wise ways.
- Numeric fluency includes both the understanding

Essential Questions

1. How can substitution be used to evaluate or simplify algebraic expressions?
2. What are the parts of the order of operations?
3. What are the rules for adding, subtracting, multiplying and dividing integers?
4. How can perimeter and area of regular and irregular

<p>of and the ability to appropriately use numbers.</p> <ul style="list-style-type: none"> • Computational fluency includes understanding the meaning and the appropriate use of numerical operations. • Coordinate geometry can be used to represent and verify geometric/algebraic relationships. • The symbolic language of algebra is used to communicate and generalize the patterns in mathematics. • Patterns and relationships can be represented graphically, numerically, symbolically, or verbally. • Problems can be solved algebraically and arithmetically. • Literal equations and formulas can be rewritten and solved. 	<p>figures be represented in terms of a variable?</p> <ol style="list-style-type: none"> 5. How can we best represent and verify geometric/algebraic relationships? 6. How can we solve a problem both algebraically and arithmetically? 7. How can multi-step equations, including equations with variables on both sides, be solved using the distributive property and/or combining like terms? 8. How can equations be written, solved to represent everyday situations? 9. How can we rewrite equations and formulas? 10. How are inequalities graphed on the number line?
<p>Content</p> <p>A. Variable expressions</p> <p>B. Integers</p> <p>C. Coordinate plane</p> <p>D. Distributive Property</p> <p>E. One-step equations</p> <p>F. Positive and negative decimals</p> <p>G. Multi-step equations.</p> <p>H. Inequalities.</p>	<p>Skills</p> <p>A1. Evaluate and write variable expressions. A2. Use powers and exponents. A3. Use order of operations to evaluate expressions.</p> <p>B1. Compare and order integers. B2. Add, subtract, multiply and divide integers.</p> <p>C1. Identify and plot points in a coordinate plane.</p> <p>D1. Use properties of addition and multiplication. D2. Use the Distributive property. D3. Simplify variable expressions.</p> <p>E1. Solve equations with variables using addition and subtraction. E2. Solve equations using multiplication and division.</p> <p>F1. Add, subtract, multiply and divide positive and negative decimals.</p> <p>F2. Solve equations involving decimals.</p> <p>G1. Solve two-step equations. G2. Solve equations using the Distributive Property. G3. Solve equations with variables on both sides. G4. Solve problems arithmetically and algebraically. G5. Solve extended response questions using multi-step equations.</p> <p>H1. Solve inequalities using addition and subtraction. H2. Solve inequalities using multiplication and division. H3. Solve multi-step inequalities. H4. Solve extended response questions using inequalities.</p>

Stage 2: Assessment Evidence

Assessments

Formative: Other written assessments

Classwork Homework Quizzes Projects

Summative: Written Test

Chapter Test

Formative: Other Visual Assessments

Class Participation Teacher Observation

Stage 3: Learning Plan

Learning Activities

Included but not limited to:

- Lecture and demonstration
- Guided practice
- Technology infusion
- Integer Game: "Zip, Zilch, Zero"
- "Jeopardy" review game
- "Tic Tac Math" equation bingo
- "Battleship" review game
- "Speed Round"
- Plotting points
- Homework review
- State test preparation

Resources

Textbook: *Pre-Algebra*
Larson, Boswell, Kanold, Stiff
Holt McDougal, 2012


Supplementary Materials:

Pre-Algebra
Larson, Boswell, Kanold, Stiff
McDougal Littell, 2008

*Measuring Up to the New Jersey Core Curriculum
Content Standards*
Peoples Publishing Group

New Jersey Ask8 Coach, Mathematics, Grade 8
Triumph Learning, LLC

Websites:

 <http://illuminations.nctm.org/>
www.exchange.smarttech.com
www.ixl.com
www.aaastudy.com
www.classzone.com

Calculators:

Texas Instruments
TI-34-II (or equivalent)

Online state test preparation:

www.ixl.com

Manipulatives:

White boards
Dice
Graph paper
Cylinders, spheres, prisms
Pattern blocks
Rulers
Tangrams

	Protractors Compasses Puzzles
--	-------------------------------------



Unit Planner: Unit 2: Rational Numbers and Proportions Pre-Algebra

Wednesday, August 31, 2016, 3:15PM



Memorial Middle School > 2016-2017 > Middle School > Mathematics > Pre-Algebra (D) > Week 11 - Week 23

Travaglio, Maria

Stage 1: Desired Results

NJ Standards

NJ: 2016 SLS: Mathematics

NJ: Grade 7

Ratios & Proportional Relationships

7.RP.A. Analyze proportional relationships and use them to solve real-world and mathematical problems.

7.RP.A.1. Compute unit rates associated with ratios of fractions, including ratios of lengths, areas and other quantities measured in like or different units.

7.RP.A.2a. Decide whether two quantities are in a proportional relationship, e.g., by testing for equivalent ratios in a table or graphing on a coordinate plane and observing whether the graph is a straight line through the origin.

7.RP.A.2b. Identify the constant of proportionality (unit rate) in tables, graphs, equations, diagrams, and verbal descriptions of proportional relationships.

7.RP.A.2c. Represent proportional relationships by equations.

7.RP.A.2d. Explain what a point (x, y) on the graph of a proportional relationship means in terms of the situation, with special attention to the points $(0, 0)$ and $(1, r)$ where r is the unit rate.

7.RP.A.3. Use proportional relationships to solve multistep ratio and percent problems.

The Number System

7.NS.A. Apply and extend previous understandings of operations with fractions to add, subtract, multiply, and divide rational numbers.

7.NS.A.1c. Understand subtraction of rational numbers as adding the additive inverse, $p - q = p + (-q)$. Show that the distance between two rational numbers on the number line is the absolute value of their difference, and apply this principle in real-world contexts.

7.NS.A.1d. Apply properties of operations as strategies to add and subtract rational numbers.

7.NS.A.2. Apply and extend previous understandings of multiplication and division and of fractions to multiply and divide rational numbers.

7.NS.A.2a. Understand that multiplication is extended from fractions to rational numbers by requiring that operations continue to satisfy the properties of operations, particularly the distributive property, leading to products such as $(-1)(-1) = 1$ and the rules for multiplying signed numbers. Interpret products of rational numbers by describing real-world contexts.

7.NS.A.2c. Apply properties of operations as strategies to multiply and divide rational numbers.

7.NS.A.2d. Convert a rational number to a decimal using long division; know that the decimal form of a rational number terminates in 0s or eventually repeats.

7.NS.A.3. Solve real-world and mathematical problems involving the four operations with rational numbers.

Expressions & Equations

7.EE.B. Solve real-life and mathematical problems using numerical and algebraic expressions and equations.

7.EE.B.3. Solve multi-step real-life and mathematical problems posed with positive and negative rational numbers in any form (whole numbers, fractions, and decimals), using tools strategically. Apply properties of operations to calculate with numbers in any form; convert between forms as appropriate; and assess the reasonableness of answers using mental computation and estimation strategies.

7.EE.B.4. Use variables to represent quantities in a real-world or mathematical problem, and construct simple equations and inequalities to solve problems by reasoning about the quantities.

Geometry

7.G.A. Draw construct, and describe geometrical figures and describe the relationships between them.

7.G.A.1. Solve problems involving scale drawings of geometric figures, including computing actual lengths and areas from a scale drawing and reproducing a scale drawing at a different scale.

Statistics & Probability

7.SP.C. Investigate chance processes and develop, use, and evaluate probability models.

7.SP.C.5. Understand that the probability of a chance event is a number between 0 and 1 that expresses the likelihood of the event occurring. Larger numbers indicate greater likelihood. A probability near 0 indicates an unlikely event, a probability around $\frac{1}{2}$ indicates an event that is neither unlikely nor likely, and a probability near 1 indicates a likely event.

7.SP.C.6. Approximate the probability of a chance event by collecting data on the chance process that produces it and observing its long-run relative frequency, and predict the approximate relative frequency given the probability.

7.SP.C.7. Develop a probability model and use it to find probabilities of events. Compare probabilities from a model to observed frequencies; if the agreement is not good, explain possible sources of the discrepancy.

7.SP.C.7a. Develop a uniform probability model by assigning equal probability to all outcomes, and use the model to determine probabilities of events.

7.SP.C.7b. Develop a probability model (which may not be uniform) by observing frequencies in data generated from a chance process.

7.SP.C.8. Find probabilities of compound events using organized lists, tables, tree diagrams, and simulation.

7.SP.C.8a. Understand that, just as with simple events, the probability of a compound event is the fraction of outcomes in the sample space for which the compound event occurs.

7.SP.C.8b. Represent sample spaces for compound events using methods such as organized lists, tables and tree diagrams. For an event described in everyday language (e.g., "rolling double sixes"), identify the outcomes in the sample space which compose the event.

7.SP.C.8c. Design and use a simulation to generate frequencies for compound events.

NJ: Grade 8

The Number System

8.NS.A. Know that there are numbers that are not rational, and approximate them by rational numbers.

8.NS.A.1. Understand informally that every number has a decimal expansion; the rational numbers are those with decimal expansions that terminate in 0s or eventually repeat. Know that other numbers are called irrational.

8.NS.A.2. Use rational approximations of irrational numbers to compare the size of irrational numbers, locate them approximately on a number line diagram, and estimate the value of expressions

Expressions & Equations

8.EE.A. Work with radicals and integer exponents.

8.EE.A.1. Know and apply the properties of integer exponents to generate equivalent numerical expressions.

8.EE.A.3. Use numbers expressed in the form of a single digit times a whole-number power of 10 to estimate very large or very small quantities, and to express how many times as much one is than the other.

8.EE.A.4. Perform operations with numbers expressed in scientific notation, including problems where both decimal and scientific notation are used. Use scientific notation and choose units of appropriate size for measurements of very large or very small quantities (e.g., use millimeters per year for seafloor spreading). Interpret scientific notation that has been generated by technology.

Mathematical Practice

MP.The Standards for Mathematical Practice describe varieties of expertise that mathematics educators at all levels should seek to develop in their students.

MP.1. Make sense of problems and persevere in solving them.

MP.2. Reason abstractly and quantitatively.

MP.3. Construct viable arguments and critique the reasoning of others.

MP.4. Model with mathematics.

MP.5. Use appropriate tools strategically.

MP.6. Attend to precision.

MP.7. Look for and make use of structure.

MP.8. Look for and express regularity in repeated reasoning.

Copyright © State of New Jersey, 1996 - 2016.

Enduring Understandings

- One representation may sometimes be more helpful than another, and used together, multiple representations give a fuller understanding of a problem.
- A quantity can be represented numerically in various ways. Problem solving depends upon choosing wise ways.

Essential Questions

1. How can GCF and LCM be applied to solve real-life problems?
2. How can powers with the same base be multiplied or divided, or a power be raised to a power using the rules of exponents?
3. How can writing a number in scientific notation be beneficial?
4. How can using proportions help solve problems involving rates and ratios?

- Everyday objects have a variety of attributes, each of which can be measured in many ways.
- Measurements can be used to describe, compare, and make sense of phenomena.
- The symbolic language of algebra is used to communicate and generalize the patterns in mathematics.
- Experimental results tend to approach theoretical probabilities after a large number of trials.
- Percents are applied to everyday situations.

5. How can proportions be used to show relationships among models and/or similar and congruent figures?
6. How can theoretical and experimental probability help in making predictions or drawing conclusions?
7. How can percents be applied to real-life situations?

Content

A. Greatest common factors and least common multiples

B. Rules of exponents and scientific notation

C. Equivalence of fractions as decimals and visa-versa

D. Operations with fractions and mixed numbers

E. Equations and inequalities with rational numbers

F. Rates and ratios

G. Proportions

H. Theoretical and experimental probabilities

I. Equivalent fractions, decimals and percents

J. Proportions and the percent formula to solve percent problems

K. Percent of change

Skills

- A1. Write the prime factorization of a number.
- A2. Find the GCF of two or more whole numbers.
- A3. Write equivalent fractions.
- A4. Find the LCM of two numbers.
- A5. Rewriting variable expressions with a common denominator.

- B1. Multiply and divide powers using the product of powers property and quotient of powers property.
- B2. Simplify fractions using the product of powers property and quotient of powers property.
- B3. Work with negative and zero exponents.
- B4. Writing numbers using powers of 10.
- B5. Write numbers using scientific notation.
- B6. Perform operations with numbers written in scientific notation.

- C1. Identifying rational numbers.
- C2. Write fractions as decimals and decimals as fractions.
- C3. Use inductive and deductive reasoning.

- D1. Add and subtract like fractions.
- D2. Add and subtract unlike fractions.
- D3. Subtract rational numbers.
- D4. Multiply fractions and mixed numbers.
- D5. Divide fractions and mixed numbers.
- D6. Convert temperatures between degrees Celsius and Fahrenheit.

- E1. Use multiplicative inverses to solve equations.
- E2. Use the LCD to solve equations and inequalities.

- F1. Find ratios.
- F2. Find unit rates.
- F3. Convert rates from one system of measurement to another.

G1. Write and solve proportions.
 G2. Identify direct variations and inverse variations.
 G3. Solve proportions using cross-products.
 G4. Identify similar and congruent figures.
 G5. Find unknown side lengths of similar figures.
 G6. Use proportions with scale drawings.

H1. Find probabilities.
 H2. Determine whether a game is fair.
 H3. Use counting principle to find probabilities.
 H4. Use the addition principle to find the number of possible ways any of two or more events can occur.

I1. Use fractions to find percent.
 I2. Use decimals to solve percent problems.

J1. Use proportions to solve percent problems.
 J2. Use equations to solve percent problems.
 J3. Find mark-up, discount, sales tax.
 J4. Calculate interest earned and account balances.
 J5. Find and interest rate.

K1. Find percent of change in a quantity.

Stage 2: Assessment Evidence

Assessments

Formative: Other Visual Assessments
 Class Participation Teacher Observation
Formative: Other written assessments
 Classwork Homework Quizzes Projects
Summative: Written Test
 Chapter Tests

Stage 3: Learning Plan

Learning Activities

Included but not limited to:

- Lecture and demonstration
- Guided practice
- Homework review
- State test preparation
- "Jeopardy" review game
- "Speed Round"
- "Now and Then" percent activity
- Create a scale drawing

Resources

Textbook: *Pre-Algebra*
 Larson, Boswell, Kanold, Stiff
 Holt McDougal, 2012

Supplementary Materials:
Pre-Algebra
 Larson, Boswell, Kanold, Stiff
 McDougal Littell, 2008


- "SKUNK" probability game
- Dice probability activity

*Measuring Up to the New Jersey Core Curriculum
Content Standards*
Peoples Publishing Group

New Jersey Ask8 Coach, Mathematics, Grade 8
Triumph Learning, LLC

Mathematics Teaching in the Middle School
National Council of Teachers of Mathematics Journal

Websites:

 <http://illuminations.nctm.org/>
www.exchange.smarttech.com
www.ixl.com
www.aaastudy.com
www.classzone.com

Calculators:

Texas Instruments
TI-34-II (or equivalent)

Online State test preparation:

www.ixl.com

Manipulatives:

White boards
Dice
Graph paper
Cylinders, spheres, prisms
Pattern blocks
Rulers
Tangrams
Protractors
Compasses
Puzzles



Unit Planner: Unit 3: Functions, Geometry, and Measurement Pre-Algebra

Wednesday, August 31, 2016, 3:16PM



Memorial Middle School > 2016-2017 > Middle School > Mathematics > Pre-Algebra (D) > Week 24 - Week 31

Travaglio, Maria

Stage 1: Desired Results

NJ Standards

NJ: 2016 SLS: Mathematics

NJ: Grade 7

Geometry

7.G.A. Draw construct, and describe geometrical figures and describe the relationships between them.

7.G.A.2. Draw (with technology, with ruler and protractor as well as freehand) geometric shapes with given conditions. Focus on constructing triangles from three measures of angles or sides, noticing when the conditions determine a unique triangle, more than one triangle, or no triangle.

7.G.A.3. Describe the two-dimensional figures that result from slicing three-dimensional figures, as in plane sections of right rectangular prisms and right rectangular pyramids.

7.G.B. Solve real-life and mathematical problems involving angle measure, area, surface area, and volume.

7.G.B.4. Know the formulas for the area and circumference of a circle and use them to solve problems; give an informal derivation of the relationship between the circumference and area of a circle.

7.G.B.5. Use facts about supplementary, complementary, vertical, and adjacent angles in a multi-step problem to write and solve simple equations for an unknown angle in a figure.

7.G.B.6. Solve real-world and mathematical problems involving area, volume and surface area of two- and three-dimensional objects composed of triangles, quadrilaterals, polygons, cubes, and right prisms.

NJ: Grade 8

Expressions & Equations

8.EE.A. Work with radicals and integer exponents.

8.EE.A.1. Know and apply the properties of integer exponents to generate equivalent numerical expressions.

8.EE.A.2. Use square root and cube root symbols to represent solutions to equations of the form $x^2 = p$ and $x^3 = p$, where p is a positive rational number. Evaluate square roots of small perfect squares and cube roots of small

perfect cubes. Know that  is irrational.

8.EE.B. Understand the connections between proportional relationships, lines, and linear equations.

8.EE.B.5. Graph proportional relationships, interpreting the unit rate as the slope of the graph. Compare two different proportional relationships represented in different ways. For example, compare a distance-time graph to a distance-time equation to determine which of two moving objects has greater speed.

8.EE.B.6. Use similar triangles to explain why the slope m is the same between any two distinct points on a non-vertical line in the coordinate plane; derive the equation $y = mx$ for a line through the origin and the equation $y = mx + b$ for a line intercepting the vertical axis at b .

8.EE.C. Analyze and solve linear equations and pairs of simultaneous linear equations.

8.EE.C.7. Solve linear equations in one variable.

8.EE.C.7a. Give examples of linear equations in one variable with one solution, infinitely many solutions, or no solutions. Show which of these possibilities is the case by successively transforming the given equation into simpler forms, until an equivalent equation of the form $x = a$, $a = a$, or $a = b$ results (where a and b are different

numbers).

8.EE.C.8. Analyze and solve pairs of simultaneous linear equations.

8.EE.C.8a. Understand that solutions to a system of two linear equations in two variables correspond to points of intersection of their graphs, because points of intersection satisfy both equations simultaneously.

8.EE.C.8b. Solve systems of two linear equations in two variables algebraically, and estimate solutions by graphing the equations. Solve simple cases by inspection. For example, $3x + 2y = 5$ and $3x + 2y = 6$ have no solution because $3x + 2y$ cannot simultaneously be 5 and 6.

8.EE.C.8c. Solve real-world and mathematical problems leading to two linear equations in two variables. For example, given coordinates for two pairs of points, determine whether the line through the first pair of points intersects the line through the second pair.

Functions

8.F.A. Define, evaluate, and compare functions.

8.F.A.1. Understand that a function is a rule that assigns to each input exactly one output. The graph of a function is the set of ordered pairs consisting of an input and the corresponding output.

8.F.A.2. Compare properties (e.g., rate of change, intercepts, domain and range) of two functions each represented in a different way (algebraically, graphically, numerically in tables, or by verbal descriptions). For example, given a linear function represented by a table of values and a linear function represented by an algebraic expression, determine which function has the greater rate of change.

8.F.A.3. Interpret the equation $y = mx + b$ as defining a linear function, whose graph is a straight line; give examples of functions that are not linear.

8.F.B. Use functions to model relationships between quantities.

8.F.B.4. Construct a function to model a linear relationship between two quantities. Determine the rate of change and initial value of the function from a description of a relationship or from two (x, y) values, including reading these from a table or from a graph. Interpret the rate of change and initial value of a linear function in terms of the situation it models, and in terms of its graph or a table of values.

8.F.B.5. Describe qualitatively the functional relationship between two quantities by analyzing a graph (e.g., where the function is increasing or decreasing, linear or nonlinear). Sketch a graph that exhibits the qualitative features of a function that has been described verbally.

Geometry

8.G.A. Understand congruence and similarity using physical models, transparencies, or geometry software.

8.G.A.1. Verify experimentally the properties of rotations, reflections, and translations:

8.G.A.1a. Lines are transformed to lines, and line segments to line segments of the same length.

8.G.A.1b. Angles are transformed to angles of the same measure.

8.G.A.1c. Parallel lines are transformed to parallel lines.

8.G.A.2. Understand that a two-dimensional figure is congruent to another if the second can be obtained from the first by a sequence of rotations, reflections, and translations; given two congruent figures, describe a sequence that exhibits the congruence between them.

8.G.A.3. Describe the effect of dilations, translations, rotations, and reflections on two-dimensional figures using coordinates.

8.G.A.4. Understand that a two-dimensional figure is similar to another if the second can be obtained from the first by a sequence of rotations, reflections, translations, and dilations; given two similar two-dimensional figures, describe a sequence that exhibits the similarity between them.

8.G.A.5. Use informal arguments to establish facts about the angle sum and exterior angle of triangles, about the

angles created when parallel lines are cut by a transversal, and the angle-angle criterion for similarity of triangles.

8.G.B. Understand and apply the Pythagorean Theorem.

8.G.B.6. Explain a proof of the Pythagorean Theorem and its converse.

8.G.B.7. Apply the Pythagorean Theorem to determine unknown side lengths in right triangles in real-world and mathematical problems in two and three dimensions.

8.G.B.8. Apply the Pythagorean Theorem to find the distance between two points in a coordinate system.

8.G.C. Solve real-world and mathematical problems involving volume of cylinders, cones, and spheres.

8.G.C.9. Know the formulas for the volumes of cones, cylinders, and spheres and use them to solve real-world and mathematical problems.

Statistics & Probability

8.SP.A. Investigate patterns of association in bivariate data.

8.SP.A.1. Construct and interpret scatter plots for bivariate measurement data to investigate patterns of association between two quantities. Describe patterns such as clustering, outliers, positive or negative association, linear association, and nonlinear association.

8.SP.A.2. Know that straight lines are widely used to model relationships between two quantitative variables. For scatter plots that suggest a linear association, informally fit a straight line, and informally assess the model fit (e.g., line of best fit) by judging the closeness of the data points to the line.

8.SP.A.3. Use the equation of a linear model to solve problems in the context of bivariate measurement data, interpreting the slope and intercept.

8.SP.A.4. Understand that patterns of association can also be seen in bivariate categorical data by displaying frequencies and relative frequencies in a two-way table. Construct and interpret a two-way table summarizing data on two categorical variables collected from the same subjects. Use relative frequencies calculated for rows or columns to describe possible association between the two variables.

Mathematical Practice

MP.The Standards for Mathematical Practice describe varieties of expertise that mathematics educators at all levels should seek to develop in their students.

MP.1. Make sense of problems and persevere in solving them.

MP.2. Reason abstractly and quantitatively.

MP.3. Construct viable arguments and critique the reasoning of others.

MP.4. Model with mathematics.

MP.5. Use appropriate tools strategically.

MP.6. Attend to precision.

MP.7. Look for and make use of structure.

MP.8. Look for and express regularity in repeated reasoning.

Copyright © State of New Jersey, 1996 - 2016.

Enduring Understandings

- Numeric fluency includes both the understanding of and the ability to appropriately use numbers.
- Geometric relationships provide a means to make a sense of a variety of phenomena.
- Measurements can be used to describe, compare, and make sense of phenomena.
- Coordinate geometry can be used to represent and verify geometric/algebraic relationships.

Essential Questions

1. How can functions be identified from information in a table, sets of ordered pairs, equations, graphs, or mapping?
2. How can function rules be determined based on a table?
3. What is the difference of dependent and independent variables in a function?
4. How can a linear function be graphed?
5. How can the slope and equation of a function be determined?
6. How is the Pythagorean Theorem used in everyday life?
7. How are the properties of plane figures alike and different?
8. How does the surface area of a figure differ from its volume?

Content

- A. Relations and functions
- B. Linear equations in two variables
- C. Square roots and the Pythagorean Theorem
- D. Rational and irrational numbers
- E. Angle measures and side lengths of triangles and quadrilaterals
- F. Areas of parallelograms, trapezoids, and circles
- G. Surface area and volume of prisms, cylinders, pyramids and cones

Skills

- A1. Use graphs to represent relations and functions.
- A2. Understand that functions can be linear and nonlinear.
- B1. Use x- and y-intercepts to graph linear equations.
- B2. Find slopes of lines.
- B3. Use slope to analyze real world graphs.
- B4. Identify the slopes of parallel and perpendicular lines.
- B5. Use slope-intercept form to graph linear equations.
- B6. Analyze and graph a direct variation equation.
- B7. Use the equation of a linear model to solve problems in the context of bivariate measurement data.
- B8. Use slope-intercept form to write linear equations.
- B9. Identify discrete and continuous functions.
- B10. Interpret scatter plots.
- B11. Use function notation to write linear functions.
- B12. Compare two different proportional relationships and compare two different functional relationships.
- B13. Graph and solve systems of linear equations graphically and algebraically.
- B14. Graph linear inequalities in two variables.
- C1. Find and approximate square roots of numbers.
- C2. Simplify radical expressions.
- C3. Use the product and quotient properties of square

- roots and the distributive property to perform operations on square roots.
- C4. Apply the Pythagorean Theorem to find missing side lengths.
- C5. Determine the sum of the measures of the angles of a triangle.
- D1. Compare and order real numbers.
- D2. Use rational approximations to approximate and compare irrational numbers.
- D3. Use the distance and midpoint formulas.
- E1. Solve problems involving special right triangles.
- E2. Use the tangent ratio to find side lengths of right triangles.
- E3. Use the sine and cosine to find triangle side lengths.
- E4. Classify polygons and quadrilaterals.
- F1. Use formulas to find area of various geometric shapes.
- F2. Find circumference and area of circles.
- G1. Find surface area of prisms and cylinders.
- G2. Find surface areas of pyramids and cones.
- G3. Describe the two-dimensional figures that result from slicing three-dimensional figures.
- G4. Find volume of prisms and cylinders.
- G5. Find the volume of pyramids and cones.
- G6. Convert areas and volumes within or between systems of measurement.
- G7. Determine the effect of changes in dimensions on perimeter, area, and volume.

Stage 2: Assessment Evidence

Assessments

Formative: Other Visual Assessments
 Class Participation Teacher Observation
Formative: Other written assessments
 Classwork Homework Quizzes Projects
Summative: Written Test
 Chapter Test

Stage 3: Learning Plan

Learning Activities

Included but not limited to:

- Lecture and demonstration

Resources

Textbook: *Pre-Algebra*
 Larson, Boswell, Kanold, Stiff
 Holt McDougal, 2012

- Guided practice
- Technology infusion
- Homework review
- State test preparation
- Whiteboard graphing
- "Speed Round"
- Investigating slope (pg. 419)
- Modeling a linear system (pg. 453)
- Drawing triangles (pgs. 536 A and B)

Supplementary Materials:

Pre-Algebra

Larson, Boswell, Kanold, Stiff
McDougal Littell, 2008


*Measuring Up to the New Jersey Core Curriculum
Content Standards*

Peoples Publishing Group

New Jersey Ask8 Coach, Mathematics, Grade 8

Triumph Learning, LLC

Websites:

 <http://illuminations.nctm.org/>
www.exchange.smarttech.com
www.ixl.com
www.aaastudy.com
www.classzone.com

Calculators:

Texas Instruments
TI-34-II (or equivalent)

Online state test preparation:

www.ixl.com

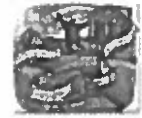
Manipulatives:

White boards
Dice
Graph paper
Cylinders, spheres, prisms
Pattern blocks
Rulers
Tangrams
Protractors
Compasses



Unit Planner: Unit 4: Data Analysis and Transformations Pre-Algebra

Wednesday, August 31, 2016, 3:16PM



Memorial Middle School > 2016-2017 > Middle School > Mathematics > Pre-Algebra (D) > Week 32 - Week 40

Travaglio, Maria

Stage 1: Desired Results

NJ Standards

NJ: 2016 SLS: Mathematics

NJ: Grade 7

Statistics & Probability

7.SP.A. Use random sampling to draw inferences about a population.

7.SP.A.1. Understand that statistics can be used to gain information about a population by examining a sample of the population; generalizations about a population from a sample are valid only if the sample is representative of that population. Understand that random sampling tends to produce representative samples and support valid inferences.

7.SP.A.2. Use data from a random sample to draw inferences about a population with an unknown characteristic of interest. Generate multiple samples (or simulated samples) of the same size to gauge the variation in estimates or predictions.

7.SP.B. Draw informal comparative inferences about two populations.

7.SP.B.3. Informally assess the degree of visual overlap of two numerical data distributions with similar variabilities, measuring the difference between the centers by expressing it as a multiple of a measure of variability.

7.SP.B.4. Use measures of center and measures of variability for numerical data from random samples to draw informal comparative inferences about two populations.

NJ: Grade 8

Geometry

8.G.A. Understand congruence and similarity using physical models, transparencies, or geometry software.

8.G.A.1. Verify experimentally the properties of rotations, reflections, and translations:

8.G.A.1a. Lines are transformed to lines, and line segments to line segments of the same length.

8.G.A.1b. Angles are transformed to angles of the same measure.

8.G.A.1c. Parallel lines are transformed to parallel lines.

8.G.A.2. Understand that a two-dimensional figure is congruent to another if the second can be obtained from the first by a sequence of rotations, reflections, and translations; given two congruent figures, describe a sequence that exhibits the congruence between them.

8.G.A.3. Describe the effect of dilations, translations, rotations, and reflections on two-dimensional figures using coordinates.

8.G.A.4. Understand that a two-dimensional figure is similar to another if the second can be obtained from the first by a sequence of rotations, reflections, translations, and dilations; given two similar two-dimensional figures, describe a sequence that exhibits the similarity between them.

8.G.A.5. Use informal arguments to establish facts about the angle sum and exterior angle of triangles, about the

angles created when parallel lines are cut by a transversal, and the angle-angle criterion for similarity of triangles.

Statistics & Probability

8.SP.A. Investigate patterns of association in bivariate data.

8.SP.A.1. Construct and interpret scatter plots for bivariate measurement data to investigate patterns of association between two quantities. Describe patterns such as clustering, outliers, positive or negative association, linear association, and nonlinear association.

Mathematical Practice

MP.The Standards for Mathematical Practice describe varieties of expertise that mathematics educators at all levels should seek to develop in their students.

MP.1. Make sense of problems and persevere in solving them.

MP.2. Reason abstractly and quantitatively.

MP.3. Construct viable arguments and critique the reasoning of others.

MP.4. Model with mathematics.

MP.5. Use appropriate tools strategically.

MP.6. Attend to precision.

MP.7. Look for and make use of structure.

MP.8. Look for and express regularity in repeated reasoning.

Copyright © State of New Jersey, 1996 - 2016.

Enduring Understandings

- A quantity can be represented numerically in various ways. Problem solving depends upon choosing wise ways.
- Geometric relationships provide a means to make sense of a variety of phenomena.
- Geometric properties can be used to construct geometric figures.
- Shape and area can be conserved during mathematical transformations.
- The message conveyed by the data depends on how the data is collected, represented, and summarized.
- Experimental results tend to approach theoretical probabilities after a large number of trials.

Essential Questions

1. How can we compare and contrast numbers?
2. How do geometric relationships help to solve problems and/or make sense of phenomena?
3. How can spatial relationships be described by careful use of geometric language?
4. What situations can be analyzed using transformations and symmetries?
5. How can the collection, organization, interpretation, and display of data be used to answer questions?
6. How can experimental and theoretical probabilities be used to make predictions or draw conclusions?

Content

- A. Data displays
- B. Surveys and survey results
- C. Probabilities of events
- D. Special pairs of angles, and find their measures
- E. Measures of interior and exterior angles of polygons
- F. Translate, reflect, rotate and dilate geometric figures

Skills

- A1. Make and interpret stem-and-leaf plots.
- A2. Use circle graphs to describe data sets.
- A3. Make and interpret frequency tables and histograms.
- A4. Describe how changes in data values affect the mean, median, and mode.
- A5. Make and interpret box-and-whisker plots.
- A6. Choose appropriate displays for data sets.
- A7. Assess the degree of visual overlap of two data distributions.

- B1. Identify populations and sampling methods.
- B2. Make conclusions about populations, using surveys.
- B3. Construct and interpret a two-way table summarizing data on two variables collected from the same subjects.
- B4. Use measures of central tendency and dispersion from uniform random samples to draw informal comparative inferences about two populations.

- C1. Use permutations to count possibilities.
- C2. Use combinations to count possibilities.
- C3. Find the probability that event A or event B occurs.
- C4. Find the probability that event A and event B occur.

- D1. Classify special pairs of angles.
- D2. Identify angles when a transversal intersects lines.

- E1. Find the measure of interior and exterior angles.

- F1. Translate figures in a coordinate plane.
- F2. Reflect figures and identify lines of symmetry.
- F3. Rotate figures and identify rotational symmetry.
- F4. Dilate figures in a coordinate plane.

Stage 2: Assessment Evidence

Assessments

- Formative: Other Visual Assessments**
Class Participation Teacher Observation
- Formative: Other written assessments**
Classwork Homework Quizzes Projects
- Summative: Written Test**
Chapter Test

Stage 3: Learning Plan

Learning Activities

Included but not limited to:

- Lecture and demonstration
- Guided practice
- Technology infusion
- Homework review
- State test preparation
- "SKUNK" probability game
- Graphing functions lab
- Create a tessellation
- Create a survey, choose sample space, and create a graph using Microsoft Excel
- "ASK"etball review game

Resources

Textbook:

Pre-Algebra
Larson, Boswell, Kanold, Stiff
Holt McDougal, 2012


Supplementary Materials:

Pre-Algebra
Larson, Boswell, Kanold, Stiff
McDougal Littell, 2008

Measuring Up to the New Jersey Core Curriculum Content Standards
Peoples Publishing Group

New Jersey Ask8 Coach, Mathematics, Grade 8
Triumph Learning, LLC

Websites:

 <http://illuminations.nctm.org/>
www.exchange.smarttech.com
www.ixl.com
www.aaastudy.com
www.classzone.com

Calculators:

Texas Instruments
TI-34-II (or equivalent)

Online state test preparation:

www.ixl.com

Manipulatives:

White boards
Dice
Graph paper
Cylinders, spheres, prisms
Pattern blocks
Rulers
Tangrams
Protractors
Compasses