



Township of Ocean Schools

Assistant Superintendent
Office of Teaching and Learning

SPARTAN MISSION:

Meeting the needs of all students with a proud tradition of academic excellence.

Curriculum Development Timeline

School: Township of Ocean Intermediate School

Course: Pre-Algebra, Grade 7

Department: Mathematics

Board Approval	Supervisor	Notes
October 2009	Janet Bluefield	Born Date/Alignment to NJCCCS
July 2012	Janet Bluefield	Revisions
July 2017	Nichole Kerney	Revisions/Alignment to NJSIS
August 2018	Nichole Kerney	Revisions

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Week	Marking Period 1	Week	Marking Period 3
1	Negative Numbers	21	Fractions, Decimals & Percentages
2	Negative Numbers	22	Fractions, Decimals & Percentages
3	Negative Numbers	23	Geometry
4	Negative Numbers	24	Geometry
5	Negative Numbers	25	Geometry
6	Negative Numbers	26	Geometry
7	Expressions, Equations & Inequalities	27	Statistics & Probability
8	Expressions, Equations & Inequalities	28	Statistics & Probability
9	Expressions, Equations & Inequalities	29	Statistics & Probability
10	Expressions, Equations & Inequalities	30	Linear Equations & Functions
Week	Marking Period 2	Week	Marking Period 4
11	Expressions, Equations & Inequalities	31	Linear Equations & Functions
12	Expressions, Equations & Inequalities	32	Linear Equations & Functions
13	Expressions, Equations & Inequalities	33	Linear Equations & Functions
14	Expressions, Equations & Inequalities	34	Linear Equations & Functions
15	Rates & Proportional Reasoning	35	Linear Equations & Functions
16	Rates & Proportional Reasoning	36	Linear Equations & Functions
17	Rates & Proportional Reasoning	37	Linear Equations & Functions
18	Rates & Proportional Reasoning	38	Linear Equations & Functions
19	Fractions, Decimals & Percentages	39	Transformations
20	Fractions, Decimals & Percentages	40	Transformations

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Time Frame	6 weeks
Topic	
Negative Numbers	
Essential Questions	
<ul style="list-style-type: none">A. How are integers and their opposites related?B. How do we use what we know about absolute value to add integers?C. How is subtracting integers related to adding integers?D. How do the signs of factors affect their products?E. How does dividing integers relate to multiplying integers?F. How are multiplying and dividing integers related to multiplying and dividing other rational numbers?G. How is absolute value used to find distance between two real numbers on the number line?H. How do compare and order rational numbers and irrational numbers?I. How is a number written using scientific notation?	
Enduring Understandings	
<ul style="list-style-type: none">A. An integer, n, and its opposite, $-n$, combine to make 0.B. When adding integers with the same sign, find the sum of the absolute values. When adding integers with different signs, find the difference of absolute values.C. When subtracting integers, such as $a - b$, you can use the additive inverse to write subtraction as an equivalent addition expressions. The distance between any two rational numbers p and q on a number line is the absolute value of their difference.D. When multiplying two integer numbers, the sign of the product depends on the sign of the factors: same sign factors have positive products and different sign factors have negative products.E. The rules for dividing integers numbers are the same as the rules for multiplying integer numbers: divisor and dividend have the same sign, the quotient is positive; if the dividend and divisor have different signs the quotient is negative.F. The same rules for multiplying and dividing integers apply to multiplying and dividing rational numbers.	

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- G. To find the distance between any two real numbers on a number line, find the difference between the two numbers and take the absolute value.
- H. In rational numbers, both numerator and denominator are whole numbers, where the denominator is not equal to zero. An irrational number is a number which cannot be expressed in a ratio of two integers. To compare irrational numbers, use rational approximations of each written as a decimal.
- I. Very large or small numbers can be written in a shorter way called scientific Notation with uses powers of 10.

Alignment to Standards

7.NS.1a-d, 7.NS.2a-d, 7.NS.3, 8.NS.1, 8.NS.2, CRP4, CRP6

Key Concepts and Skills

Students will perform addition, subtraction, multiplication and division with integers and then deepen knowledge of these operations with rational numbers. This concept is applied these to real-life situations and reason why the chosen operation is appropriate. (Formal knowledge of properties is not assessed.) They will be able to select and apply various computational methods including mental math, estimation, paper-and-pencil techniques, and the use of calculators when appropriate for the following key concepts.

Skills

Adding, subtracting, multiplying, and dividing negative numbers (whole numbers, fractions, decimals, mixed numbers)

Missing numbers on the number line

Understand subtraction as adding the opposite

Adding negative numbers on the number line

Number equations & number lines

Interpret negative number addition and subtraction expressions

Addition & subtraction: find the missing value

Interpreting negative number statements

Negative number addition and subtraction: word problems

Absolute value to find distance

Equivalent expressions with negative numbers, negative numbers and variables

Substitution with negative numbers

Ordering negative number expressions

One-step equations with negatives (add, subtract, multiply and divide)

Signs of expressions

Order of operations with negative numbers

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Equivalent expressions with negative numbers (multiplication and division)
Multiplying the same number multiple times can be expressed as an exponent - know how to simplify.

Approximating with powers of 10 **(8th Grade)**

Scientific notation **(8th Grade)**

Multiplying & dividing in scientific notation **(8th Grade)**

Adding & subtracting in scientific notation **(8th Grade)**

Scientific notation word problems **(8th Grade)**

Learning Activities

- Integer Chips and Algebra Tiles
- Number line manipulatives
- Integer Bingo
- Discuss and explore where integers and opposites are applied in the real-world
- Math “Trails”
- Punchline worksheets
- Interactive Websites: Kahoot, Quizizz, Quizlet

Assessments

- Completing online and paper exercise questions
- Teacher observations
- Quiz on addition and subtraction of integer numbers
- Quiz on multiplying and dividing of rational numbers
- Test on Negative Numbers: All operations

21st Century Skills

Creativity		Critical Thinking	x	Collaboration	x	Communication	x
Life & Career Skills	x	Information Technology		Media Literacy			

Interdisciplinary Connections

Science: sea level, altitude, temperature
Business: finances and profits

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Technology Integration

8.1 Educational Technology- All students will use digital tools to access, manage, evaluate, and synthesize information in order to solve problems individually and collaboratively and to create and communicate knowledge.

- Calculators/Desmos
- Smart Notebook
- Smart Response Interactive Response System
- National Library of Virtual Manipulatives Numbers and Operations (nlvm.usu.edu)
- NCTM Illuminations (illuminations.nctm.org)
- Khan Academy (khanacademy.org)
- Interactive Websites: Kahoot, Quizizz, Quizlet
- Google Classroom

Time Frame	8 weeks
Topic	
Expressions, Equations, & Inequalities	
Essential Questions	
<p>A. How can algebraic expression be used to represent and solve problems?</p> <p>B. How do you write equivalent expressions?</p> <p>C. How are properties of operations used to simplify expressions?</p> <p>D. How does the value of an expression change when it is expanded?</p> <p>E. How does the Distributive Property relate to factoring expressions?</p> <p>F. How can writing equivalent expressions show how quantities are related?</p> <p>G. How does an equation show the relationship between variables and other quantities in a situation?</p> <p>H. How is solving a two-step equation similar to solving a one-step equation?</p> <p>I. How does the Distributive Property help you solve equations?</p>	

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- J. How is solving inequalities similar to and different from solving equations?
- K. How is solving a two-step inequality similar to and different from solving a two-step equation?
- L. How is an equation with the variable on both sides solved?
- M. How many solutions can a linear equation have?

Enduring Understandings

- A. Algebra expressions can be used to represent problems with unknown or variable values. Variables can be substituted for variable to evaluate the expression.
- B. Expressions can be condensed and expanded.
- C. The greatest common factor can be used to factor an expression to create an equivalent expression.
- D. Rewriting expressions can clarify relationships among quantities or variables.
- E. Write an equation with more than one operations to represent a situation; known as a two-step equation.
- F. The properties of equality can be applied the same way when solving two-step equations as when solving one-step equations. The inverse relationship between operations determines the property of equality to “undo” the operations in the equation.
- G. Move all the terms containing the variable to one, and only one, side when encountering equations with the variable on both sides.
- H. When solving equations written in the form $p(x + q) = r$, use the distributive property to multiply the two terms in the parentheses by the term outside the parentheses.
- I. Solving inequalities with addition and subtraction is the same as solving equations with addition and subtraction. Solving inequalities with multiplication and division is the same as solving equations with multiplication and division when the values are positive. When multiplying or dividing by negative values, the inequality symbol is reversed.
- J. Like two step equations, solving two-step inequalities involve carrying out two different operations-addition and subtraction, and multiplication or division. Unlike two-step equations, which have a single solution, two-step inequalities have multiple solutions.
- K. Linear equations in one variable may have no solution, one solution, or infinitely many solutions.

Alignment to Standards

7.EE.1, 7.EE.2, 7.EE.3, 7.EE.4a-b, 7.NS.1a-d, 7.NS.2a-d, 7.NS.3, 8.EE.7a-b, CRP2, CRP8

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Key Concepts and Skills

Students will begin the unit by generating equivalent expressions by way of factoring and distributive property. Students build on this knowledge to solve two-step and multi-step equations and apply this to real world situations. Knowledge is then applied to solving two-step and multi-step inequalities in practical applications. Problems include fractions, mixed numbers and decimals. Use of manipulatives, calculators, and computers will enhance understanding and provide a means for students with different learning styles to master concepts.

Skills

Combining like terms with negative coefficients
Combining like terms with negative coefficients & distribution
Combining like terms with rational coefficients
Distributive property with variables (negative numbers)
Equivalent expressions: negative numbers & distribution
Interpreting linear expressions
Two-step equations
Two-step equations with decimals and fractions
Find the mistake: two-step equations
Interpret two-step equation word problems
Two-step equations word problems
One-step inequalities
Two-step inequalities
Two-step inequality word problems
Equations with variables on both sides (**8th Grade**)
Equations with variables on both sides: decimals & fractions (**8th Grade**)
Equations with parentheses (**8th Grade**)
Equations with parentheses: decimals & fractions (**8th Grade**)
Number of solutions to equations (**8th Grade**)

Learning Activities

- Algebra Tiles and Communicators
- Using a scale and weights to model solving algebraic equations
- Math Trail
- Interactive Websites: Kahoot, Quizizz, Quizlet
- Discussion of real-life activities that must be done in a certain order (cooking, construction, etc.)

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- Punchline worksheets

Assessments

- Completing online and paper exercise questions
- Teacher observations
- Quiz on writing and evaluating variable expressions
- Quiz on variables and one-step equations
- Quiz on two-step equations
- Test on variables and solving equations
- Quiz on solving and graphing one-step inequalities
- Test on expressions, equations and inequalities

21st Century Skills

Creativity	x	Critical Thinking	x	Collaboration	x	Communication	x
Life & Career Skills	x	Information Technology		Media Literacy			

Interdisciplinary Connections

Science: balancing
Computer science: algorithms in coding

Technology Integration

8.1 Educational Technology- All students will use digital tools to access, manage, evaluate, and synthesize information in order to solve problems individually and collaboratively and to create and communicate knowledge.

- Calculators/Desmos
- Smart Notebook
- Smart Response Interactive Response System
- Geometer's Sketchpad/GeoGebra
- National Library of Virtual Manipulatives Numbers and Operations (nlvm.usu.edu)
- NCTM Illuminations (illuminations.nctm.org)
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Time Frame	4 weeks
Topic	
Rates and Proportional Reasoning	
Essential Questions	
<ul style="list-style-type: none">A. How are ratios, rates, and unit rates used to solve problems?B. Why is it useful to write a ratio of fractions as a unit rate?C. How are proportional quantities described by equivalent ratios?D. How can you represent a proportional relationship with an equation?E. What does the graph of a proportional relationship look like?F. How do scale drawings and actual measurements represent proportional relationships?G. How do proportional relationships differ from other relationships?	
Enduring Understandings	
<ul style="list-style-type: none">A. Use equivalent ratios and rates including unit rates, to compare ratios and to solve problems.B. Use knowledge about equivalent ratios and operations with fractions to write a ratio of fractions as a unit rate.C. The quantities x and y have proportional relationship if all the ratios y/x for related pairs of x and y are equivalent.D. Two proportional quantities x and y are related by a constant multiple or “constant of proportionality”, k, and are represented by the equation $y = kx$.E. The graph of a proportional relationship is a straight line through the origin.F. The scale factor of a scale drawing is the ratio of an actual length, y, to the corresponding length, x, in the drawing. The ratio is of the constant of proportionality, k, that relates the actual figure to the scale drawing. You can use a proportion or use an equation of the form $y = kx$ to solve problems using scale drawings.G. If two quantities are proportional, then they have a constant ratio and pass through the origin, $(0,0)$. If the ratio is not constant, the two quantities are said to be non-proportional. Make tables to look at the relationship between the variables to determine proportionality.	
Alignment to Standards	

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7.RP.1, 7.RP.2a-d, 7.RP.3, 7.G.A.1, 7.EE.2, 7.EE.3, 7.EE.4a, CRP6, CRP8

Key Concepts and Skills

Students will analyze proportional relationships using rational numbers in the same and different units. They will distinguish these from other types of relationships. This knowledge is applied real-world problems such as scale drawings. Connects to algebraic concepts are made when equations are generated from proportional relationships. They will select and apply various computational methods including mental math, estimation, paper-and-pencil techniques, and the use of calculators.

Skills

Rates with fractions
Constant of proportionality from graphs
Constant of proportionality from equations
Constant of proportionality from tables
Compare constants of proportionality
Interpret constants of proportionality
Identify proportional relationships
Proportional relationships
Identify proportional relationships from graphs
Interpreting graphs of proportional relationships
Solving proportions
Writing proportions
Proportion word problems
Writing proportional equations
Explore scale copies
Corresponding sides and points
Identify scale copies
Identify scale factor in scale drawings
Scale copies
Scale drawings
Constructing scale drawings

Learning Activities

- Math Trail
- Geometer's Sketchpad (similar figures, scale, etc.)
- Create Scale Drawings
- Interactive Websites: Kahoot, Quizizz, Quizlet

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Assessments							
<ul style="list-style-type: none"> • Completing exercise questions • Teacher observations • Quiz or Project on ratios, rates, and proportions • Test or Project on ratios, rates, and proportions 							
21st Century Skills							
Creativity	x	Critical Thinking	x	Collaboration	x	Communication	x
Life & Career Skills	x	Information Technology	x	Media Literacy			
Interdisciplinary Connections							
Science: real-life applications of ratios Business: rates in running a business							
Technology Integration							
8.1 Educational Technology- All students will use digital tools to access, manage, evaluate, and synthesize information in order to solve problems individually and collaboratively and to create and communicate knowledge. <ul style="list-style-type: none"> • Calculators/Desmos • Smart Notebook • Smart Response Interactive Response System • Geometer's Sketchpad/GeoGebra • National Library of Virtual Manipulatives Numbers and Operations (nlvm.usu.edu) • NCTM Illuminations (illuminations.nctm.org) • Khan Academy (khanacademy.org) • Interactive Websites: Kahoot, Quizizz, Quizlet • Google Classroom 							
Time Frame	4 weeks						
Topic							

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Fractions, Decimals & Percentages

Essential Questions

- A. How are rational numbers written as decimals?
- B. How do percents show the relationship between quantities?
- C. How are percent problems such as finding tax, gratuity, and commission related to proportional reasoning?
- D. How is finding percent error similar to finding percent change?
- E. What is and how do you calculate percent markup and percent markdown?
- F. How does simple interest show proportional reasoning and relate to the percent equation?

Enduring Understandings

- A. All rational numbers can be expressed as a fraction.
- A. A percent is one way to represent the relationship between two quantities, generally that of a part to the whole.
- B. Percent problems such as finding tax, gratuity, and commission represent a kind of proportional relationship that can be used to solve percent problems. The percent equation shows how a percent relates to proportional quantities where the percent is a constant of proportionality and the equation is of the form $y = mx$ (or $part = percent \times whole$)
- C. Percent change and error problems are types of percent problems that can be solved using the percent equation in this form: $amount\ of\ change = percent\ change \times original\ amount$. Percent change describes how much a quantity has increased or decreased relative to its original amount. Percent error describes the accuracy of a measured or estimated value compared to an actual value; it is written as a positive percent.
- D. Markup (or Markdown) is the amount of increase (or decrease) from the original cost of an item to its selling (sale) price. Solve such problems using the percent equation in this form: $markup\ (discount) = percent\ markup\ (percent\ discount) \times original\ value$
- E. Simple interest represents a proportional relationship between the yearly interest and the principal, or initial amount. The ratio of yearly interest to principal is the interest rate. Solve simple interest problems using this equation: $simple\ interest\ amount = principal\ (initial\ amount) \times interest\ rate \times time$

Alignment to Standards

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7.RP.A.3, 7.EE.2, 7.EE.3, 7.EE.4a, CRP11

Key Concepts and Skills

Recognizing that a fraction, decimal and percent of rational numbers are equivalent representations, students will apply their knowledge of ratios and proportions to real world situations including commission, gratuity, tax, markup, discount (markdown), percent increase and decrease, and simple interest. They will select and apply various computational methods including mental math, estimation, paper-and-pencil techniques, and the use of calculators.

Skills

Rewrite decimals as fractions
Rewriting decimals as fractions challenge
Converting fractions to decimals
Comparing rational numbers
Adding & subtracting rational numbers
Equivalent representations of percent problems
Percent problems
Tax and tip word problems
Discount, markup, and commission word problems
Rational number word problems

Learning Activities

- "Punchline" Worksheets
- Real world applications of shopping (better buy)
- Working with a Budget (including coupons and tax)
- Fractions, Decimals, Percents Math Trail
- Interactive Websites: Kahoot, Quizizz, Quizlet

Assessments

- Quiz on fraction, decimal, and percent equivalents
- Quiz on finding the missing part, base, or percent in a proportion
- Quiz on sales tax, discount, markup, percent of change, and simple interest
- Test or Project on percents and percent applications
- Mid-year Benchmark

21st Century Skills

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Creativity		Critical Thinking	x	Collaboration	x	Communication	x
Life & Career Skills	x	Information Technology		Media Literacy	x		
Interdisciplinary Connections							
Business/Consumer Science: discounts, markups, and tipping							
Technology Integration							
<p>8.1 Educational Technology- All students will use digital tools to access, manage, evaluate, and synthesize information in order to solve problems individually and collaboratively and to create and communicate knowledge.</p> <ul style="list-style-type: none"> ● Calculators/Desmos ● Smart Notebook ● Smart Response Interactive Response System ● Geometer's Sketchpad/GeoGebra ● National Library of Virtual Manipulatives Numbers and Operations (nlvm.usu.edu) ● NCTM Illuminations (illuminations.nctm.org) ● Khan Academy (khanacademy.org) ● Interactive Websites: Kahoot, Quizizz, Quizlet ● Google Classroom 							

Time Frame	6 weeks
Topic	
Geometry	
Essential Questions	
A. How does the circumference of a circle relate to the length of its diameter?	

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- B. How are angles formed by intersecting lines related?
- C. How can a triangle that meets given conditions be drawn?
- D. How can you find the area of a circle?
- E. How do the faces of three-dimensional figures determine the two dimensional shapes created by slicing the figure?
- F. How is finding the area of a composite two-dimensional figure similar to finding the surface area of three-dimensional figures?
- G. How does the formula for volume of a prism help you understand what volume of a prism means?
- H. How is the Pythagorean Theorem applied to solve problems?
- I. How is the measure of a missing angle in a triangle found?
- J. How are measurements of angles created when parallel lines are cut by a transversal determined?

Enduring Understandings

- A. Circumference is the distance around a circle. The ratio of the circumference of a circle to its diameter is π , or 3.14 or $\frac{22}{7}$. The circumference is calculated using the formulas:
 $C = \pi d$ or $C = 2\pi r$.
- B. Angles that form a straight line and up add up to 180° are supplementary. Shared lines are adjacent. Angles opposite each other are called vertical. Angles that add up to 90° are called complementary.
- C. Given conditions may include properties of geometric figures and relationships between parts of the figures. Analyze given conditions of side lengths and angle measures to determine one unique triangle, more than one unique triangle, or no triangle can be drawn. Triangles can be drawn freehand, with a ruler & protractor, or with technology.
- D. Area of a circle is determined using the formula $A = \pi r^2$ where r is the radius of the circle.
- E. A cross section is the two-dimensional shape exposed when a three dimensional figure is sliced vertically or horizontally. The shape and dimensions of a cross section are the same as the faces that are parallel to the direction of the slice.
- F. The area of a two-dimensional composite figure is the sum of the areas of all the shapes that compose it. The surface area of a three-dimensional composite figure is the sum of the area of all its faces.
- G. The equation $V = Bh$, uses the area of the base, B , of a three dimensional figure to then multiply by the height to find volume, the amount of space inside a three-dimensional object.
- H. The Pythagorean Theorem states that for any right triangle, the sum of the squares of the lengths of the legs equals the square of the length of the hypotenuse (triangle side

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opposite the right angle).

- I. The measure of a missing angle in a triangle is determined by using the other two angles and the fact and that the sum of all angles is 180° .
- J. Using corresponding angles the measurements of angles created when parallel lines are cut by a transversal are determined.

Alignment to Standards

7.G.2, 7.G.3, 7.G.4, 7.G.5, 7.G.6, 7.NS.A.3, 7.EE.B.3, 7.EE.B.4a, 8.G.5, 8.G.9, CRP2, CRP8, CRP11

Key Concepts and Skills

Students will be able to understand that geometric shapes that construction of a shape is dependent on side and angle measurements. Students will draw, construct, and describe two dimensional and three-dimensional geometrical figures and describe the relationships between them. They will examine cross sections of three-dimensional objects. These are applied to real-world problems by way of numerical and algebraic expressions and equations. Lastly, problems involving area, surface area, and volume of Circles (area & circumference), Volume of rectangular prisms, cylinders & cones, and Surface area of prisms are calculated. Students will develop a strong spatial sense using a wide variety of activities organized around physical models, mapping, and measuring. They will discover geometric relationships, and use mathematical procedures such as drawing, sorting, classifying, finding patterns, and solving geometric problems.

Skills

Radius and diameter
Circumference of a circle
Area of a circle
Circumference of parts of circles
Area of parts of circles
Circumference and rotations
Area and circumference of circles challenge
Shaded areas
Name angles
Identifying supplementary, complementary, and vertical angles
Complementary and supplementary angles (visual)
Complementary and supplementary angles (no visual)
Vertical angles
Finding missing angles

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Create equations to solve for missing angles
Unknown angle problems (with algebra)
Triangle side length rules
Cross sections of 3D objects (basic)
Volume and surface area word problems
Angle relationships with parallel lines **(8th Grade)**
Equation practice with angle addition **(8th Grade)**
Equation practice with angles **(8th Grade)**
Finding angle measures between intersecting lines **(8th Grade)**
Find angles in triangles **(8th Grade)**
Find angles in isosceles triangles **(8th Grade)**
Finding angle measures using triangles **(8th Grade)**
Use Pythagorean theorem to find right triangle side lengths **(8th Grade)**
Use Pythagorean theorem to find isosceles triangle side lengths **(8th Grade)**
Right triangle side lengths **(8th Grade)**

Learning Activities

- Geometer's Sketchpad activities
- *Discovering Pi* activity
- "Punchline" worksheets
- Interactive websites: Quizzizz, Kahoot, Quizlet
- Math Trail

Assessments

- Completing exercise questions
- Teacher observations
- Quiz on units of measurement
- Quiz on perimeter and area of regular and irregular figures
- Test on measurement, perimeter, and area
- Quiz on surface area
- Quiz on volume
- Test on surface area and volume
- Project utilizing real-world application of surface area and volume

21st Century Skills

Creativity	x	Critical Thinking	x	Collaboration	x	Communication	x
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Life & Career Skills	x	Information Technology	Media Literacy	
Interdisciplinary Connections				
Art: symmetry, cross sections, geometry in sculptures, etc. Social Studies: history of pi				
Technology Integration				
8.1 Educational Technology- All students will use digital tools to access, manage, evaluate, and synthesize information in order to solve problems individually and collaboratively and to create and communicate knowledge.				
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Time Frame	4 weeks
Topic	
Statistics & Probability	
Essential Questions	
<p>A. How can you determine a representative sample of a population? B. How can inferences be drawn about a population from data gathered from samples? C. How can data displays be used to compare populations? D. What is probability? E. How can the probability of an event help make predictions? F. How is experimental probability similar to and different from theoretical probability? G. How can a model be used to find the probability of an event?</p>	

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- H. How can all the possible outcomes or sample space of a compound event be represented?
- I. How can a model help you find the probability of a compound event?
- J. How can you use simulations to determine the probability of events?

Enduring Understandings

- A. When you ask a statistical question about population, it is often more efficient to gather data from a sample of the population. A representative sample of a population has the same characteristics as the population. Generating a random sample is one reliable way to produce a representative sample.
- B. Analyze numerical data from a random sample to draw inferences about the population. Measures of center, like mean and median, and measures of variability, like range, can be used to analyze the data in a sample.
- C. Data displays such as box plot and dot plots make informal comparative inferences about two populations. You can compare the shapes of data displays or draw comparative inferences about two populations using median and interquartile range (IQR).
- D. Probability is the likelihood an event will occur and is a value from 0 to 1. It can be written as a ratio, fraction or percent.
- E. Theoretical probability of an event, $P(event)$, can be determined if you know all the possible outcomes and they are equally likely.
- F. Relative frequency, or experimental probability is based on the actual results of an experiment, while theoretical probability is based on the calculated results from the knowledge of the possible outcomes. Theoretical probability may be close but are rarely exactly the same.
- G. A probability model can help you evaluate a chance process and its outcomes. The model consists of sample space of an action, events within the sample space, and probabilities associated with each event.
- H. An organized list, table, or tree diagram can be used to represent the sample space of a compound event.
- I. The probability of a compound event can be represented by a ratio of the number of favorable outcomes to the total number of possible equally likely outcomes which can be determined from an organized list, table, or tree diagram.
- J. A simulation is a model of a real-world situation that can be used to predict results or outcomes when actual event is difficult to perform or record. Model using a tool such as a spinner, number cube, coin, or random number generator for which outcomes have the same probabilities as the actual event.

Alignment to Standards

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7.SP.1, 7.SP.2, 7.SP.3, 7.SP.4, 7.SP.5, 7.SP.6, 7.SP.7a-b, 7.SP.8a-c, CRP2, CRP4, CRP8

Key Concepts and Skills

For the statistics portion, students will demonstrate formal statistical methods such as measures of center and measures of variability to gain information about a population. Students use the data from a random sample to draw inferences. Data displays such as dot plots and box plots help students to visualize the data to make informal inferences. By exploring a variety of high interest real world examples, students will develop a sense of the application of statistics. Students develop a probability model and use it to find the appropriate probabilities of events. Additionally, probability of compound events using lists, tables, tree diagrams, and simulation are also discussed. Lastly, students will approximate probability by collecting data.

Skills

Valid claims
Making inferences from random samples
Comparing distributions
Simple probability
Experimental probability
Comparing probabilities
Making predictions with probability
Probability models
Sample spaces for compound events
Probabilities of compound events
The counting principle

Learning Activities

- *Is the Game Fair?* dice game
- "Punchline" worksheets
- Interactive websites: Quizzizz, Kahoot, Quizlet
- Math Trail

Assessments

- Completing exercise questions
- Teacher observations
- Quiz on experimental and theoretical probability
- Test on probability

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<ul style="list-style-type: none"> ● Quiz or Project on measures of central tendency and sampling ● Test or Project on measures of central tendency and graphing and interpreting data 							
21st Century Skills							
Creativity	x	Critical Thinking	x	Collaboration	x	Communication	x
Life & Career Skills	x	Information Technology	x	Media Literacy			
Interdisciplinary Connections							
Business/Consumer Science: analyze data to determine profits Science: law of large numbers							
Technology Integration							
8.1 Educational Technology- All students will use digital tools to access, manage, evaluate, and synthesize information in order to solve problems individually and collaboratively and to create and communicate knowledge. <ul style="list-style-type: none"> ● Calculators/Desmos ● Smart Notebook ● Smart Response Interactive Response System ● Geometer's Sketchpad/GeoGebra ● National Library of Virtual Manipulatives Numbers and Operations (nlvm.usu.edu) ● NCTM Illuminations (illuminations.nctm.org) ● Khan Academy (khanacademy.org) ● Interactive Websites: Kahoot, Quizizz, Quizlet ● Google Classroom 							

Time Frame	8 weeks
Topic	
Linear Functions & Equations	
Essential Questions	

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- A. What makes a relation a function?
- B. How are solutions to two-variable equations determined?
- C. What are the ways a linear equation graphed?
- D. What is the slope of the line and how is it determined?
- E. How is a linear equation written?
- F. How is an equation represented as a function?

Enduring Understandings

- A. A relation is a function if for each input there is exactly one output. Use mapping diagrams and graphs to determine whether a relation is a function.
- B. Substitute (x,y) into the equation to determine if a true statement is generated.
- C. Use the x - and y -intercepts to graph a linear equation or use the y -intercept and the slope.
- D. The slope of a line is the ratio of the line's vertical change, called the rise, to its horizontal change, called the run. Using two ordered pairs, the slope is determined by dividing the difference of y -coordinates by the difference of the x -coordinates of the ordered pairs.
- E. Write a linear equation using the slope-intercept form: $y = mx + b$ where m represents the slope and b represents the y -intercept.
- F. Solve the equation for y , then replace y with function notation $f(x)$, which is read " f of x " and represents the value of the function of f at x .

Alignment to Standards

8.EE.5-6, 8.F.1, 8.F.2, 8.F.3, 8.F.4, 8.F.5, CRP2, CRP8

Key Concepts and Skills

Students will model real-life data with equations and graphs and will be able to interpret what is shown. Students will compare graphs and analyze the corresponding tables to understand why the graphs appear as they do. Students will be able to make predictions about graphs based on the equations and tables that correspond with them.

Skills (all 8th Grade)

Solutions to 2-variable equations
Complete solutions to 2-variable equations
Intercepts from a graph
Intercepts from an equation
Slope from graph

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Slope from two points
Slope from equation
Slope-intercept intro
Graph from slope-intercept form
Slope-intercept equation from graph
Slope-intercept from two points
Evaluate functions
Evaluate functions from their graph
Function rules from equations
Linear equations word problems: graphs
Linear equations word problems
Linear models word problems
Compare linear functions
Comparing linear functions word problem
Graphing linear functions word problems
Writing linear functions word problems
Recognize functions from tables
Recognize functions from graphs
Linear & nonlinear functions
Interpreting graphs of functions

Learning Activities

- Variables and patterns activities
- Graphing equations using a graphing calculator
- Calculator activities

Assessments

- Completing exercise questions
- Quiz on graphing patterns in the coordinate plane
- Quiz on constructing and graphing input-output tables
- Quiz on the interpreting slopes and intercepts
- Test on graphing functions

21st Century Skills

Creativity	x	Critical Thinking	x	Collaboration	x	Communication	x
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Life & Career Skills	x	Information Technology	x	Media Literacy		
Interdisciplinary Connections						
Science: linear functions in real-world Computer Science: algorithms with coding						
Technology Integration						
8.1 Educational Technology- All students will use digital tools to access, manage, evaluate, and synthesize information in order to solve problems individually and collaboratively and to create and communicate knowledge.						
<ul style="list-style-type: none"> ● Calculators/Desmos ● Smart Notebook ● Smart Response Interactive Response System ● Geometer's Sketchpad/GeoGebra ● Khan Academy (http://www.khanacademy.org/) ● NCTM Illuminations website (http://illuminations.nctm.org/) ● National Library of Virtual Manipulatives (http://nlvm.usu.edu/) ● SMART Notebook ● Kahoot, Quizizz, Quizlet 						

Time Frame	2 weeks
Topic	
Transformations	
Essential Questions	
<p>A. How is congruency or similarity between two dimensional figures determined?</p> <p>B. What is the effect of dilations, translations, rotations, and reflections on two-dimensional figures using coordinates?</p>	
Enduring Understandings	

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- A. A two-dimensional figure is congruent or similar to another if the second can be obtained from the first by a sequence of rotations, reflections, and translations.
- B. Each coordinate of the ordered pair is affected depending on the type of transformation. For example, for a reflection across the x-axis, each x-value stays the same and each y-value becomes opposite of what it was. $(x, y) \rightarrow (x, -y)$

Alignment to Standards

8.G.1.a-c, 8.G.2, 8.G.3, CRP4, CRP8

Key Concepts and Skills

Students will understand congruence and similarity using physical models, transparencies, or geometry software.

Skills (all 8th Grade)

- Identify transformations
- Translate points and shapes
- Determine translations
- Rotate points (basic)
- Determine rotations (basic)
- Reflect points and shapes
- Determine reflections
- Find measures using rigid transformations
- Rigid transformations: preserved properties
- Mapping shapes
- Dilate points
- Dilations: scale factor
- Dilate triangles
- Dilations and properties
- Congruence & transformations
- Similarity & transformations

Learning Activities

Computer program animations of transformations

Assessments

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- Completing exercise questions
- Quiz on congruence and similarity
- Test on graphing functions
- Benchmark

21st Century Skills

Creativity	x	Critical Thinking	x	Collaboration	x	Communication	x
Life & Career Skills	x	Information Technology	x	Media Literacy			

Interdisciplinary Connections

Art: symmetry, geometry in sculptures, etc.
Science: dilations in nature

Technology Integration

8.1 Educational Technology- All students will use digital tools to access, manage, evaluate, and synthesize information in order to solve problems individually and collaboratively and to create and communicate knowledge.

- Calculators/Desmos
- Smart Notebook
- Smart Response Interactive Response System
- Geometer's Sketchpad/GeoGebra
- Khan Academy (<http://www.khanacademy.org/>)
- NCTM Illuminations website (<http://illuminations.nctm.org/>)
- National Library of Virtual Manipulatives (<http://nlvm.usu.edu/>)
- SMART Notebook
- Quizizz, Kahoot, Desmos, Quizlet

Modifications (ELL, Special Education, Gifted and Talented, and 504 Plans)

ELL:

- Work toward longer passages as skills in English increase
- Use visuals
- Introduce key vocabulary before lesson

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- Teacher models reading aloud daily
- Provide peer tutoring
- Use of Bilingual Dictionary
- Guided notes and/or scaffold outline for written assignments
- Provide students with English Learner leveled readers.

Supports for Students With IEPs:

- Allow extra time to complete assignments or tests
- Guided notes and/or scaffold outline for written assignments
- Work in a small group
- Allow answers to be given orally or dictated
- Use large print books, Braille, or books on CD (digital text)
- Follow all IEP modifications

Gifted and Talented:

- Create an enhanced set of introductory activities (e.g. advance organizers, concept maps, concept puzzles)
- Provide options, alternatives and choices to differentiate and broaden the curriculum
- Organize and offer flexible small group learning activities
- Provide whole group enrichment explorations
- Teach cognitive and methodological skills
- Use center, stations, or contracts
- Organize integrated problem-solving simulations
- Propose interest-based extension activities
- Expose students to beyond level texts.

Supports for Students With 504 Plans:

- Follow all the 504 plan modifications
- Text to speech/audio recorded selections
- Amplification system as needed
- Leveled texts according to ability
- Fine motor skill stations embedded in rotation as needed
- Modified or constrained spelling word lists
- Provide anchor charts with high frequency words and phonemic patterns

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