



# 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.*

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### Curriculum Development Timeline

**School:** Township of Ocean Intermediate School

**Course:** Mathematics, Grade 7

**Department:** Mathematics

| Board Approval | Supervisor      | Notes                         |
|----------------|-----------------|-------------------------------|
| January 2009   | Janet Bluefield | Born Date/Alignment to NJCCCS |
| July 2012      | Janet Bluefield | Revisions                     |
| August 2016    | Amanda Maltese  | Revisions                     |
| July 2017      | Nichole Kerney  | Revisions/Alignment to NJSL   |
| August 2018    | Nichole Kerney  | Revisions                     |

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

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|  |         |
|--|---------|
| Time Frame   | 8 weeks |
| <b>Topic</b>   |         |
| Negative Numbers   |         |
| <b>Essential Questions</b>   |         |
| <ul style="list-style-type: none"><li>A. How are integers and their opposites related?</li><li>B. How do we use what we know about absolute value to add integers?</li><li>C. How is subtracting integers related to adding integers?</li><li>D. How do the signs of factors affect their products?</li><li>E. How does dividing integers relate to multiplying integers?</li><li>F. How are multiplying and dividing integers related to multiplying and dividing other rational numbers?</li></ul>   |         |
| <b>Enduring Understandings</b>   |         |
| <ul style="list-style-type: none"><li>A. An integer, <math>\square</math>, and its opposite, <math>-\square</math>, combine to make 0.</li><li>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.</li><li>C. When subtracting integers, such as <math>\square - \square</math>, you can use the additive inverse to write subtraction as an equivalent addition expressions. The distance between any two rational numbers <math>\square</math> and <math>\square</math> on a number line is the absolute value of their difference.</li><li>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.</li><li>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.</li><li>F. The same rules for multiplying and dividing integers apply to multiplying and dividing rational numbers.</li></ul> |         |
| <b>Alignment to Standards</b>  |         |
| 7.NS.1a-d, 7.NS.2a-d, 7.NS.3, CRP4, CRP6   |         |

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### 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 negative numbers  
Missing numbers on the number line  
Understand subtraction as adding the opposite  
Subtracting negative numbers  
Adding negative numbers on the number line  
Number equations & number lines  
Interpret negative number addition and subtraction expressions  
Adding & subtracting negative numbers  
Addition & subtraction: find the missing value  
Adding & subtracting negative fractions  
Interpreting negative number statements  
Negative number addition and subtraction: word problems  
Absolute value to find distance  
Equivalent expressions with negative numbers  
Equivalent expressions with negative numbers and variables  
Substitution with negative numbers  
Ordering negative number expressions  
One-step equations with negatives (add & subtract)  
Signs of expressions  
Multiplying negative numbers  
Dividing negative numbers  
One-step equations with negatives (multiply & divide)  
Multiplying & dividing negative numbers word problems  
Negative signs in fractions  
Negative signs in fractions (with variables)  
Multiplying positive and negative fractions  
Dividing positive and negative fractions  
Dividing mixed numbers with negatives  
Order of operations with negative numbers  
Equivalent expressions with negative numbers (multiplication and division)

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### 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

### 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)

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- NCTM Illuminations ([illuminations.nctm.org](http://illuminations.nctm.org))
- Khan Academy ([khanacademy.org](http://khanacademy.org))
- Interactive Websites: Kahoot, Quizizz, Quizlet
- Google Classroom

|  |         |
|--|---------|
| Time Frame   | 9 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> <p>J. How is solving inequalities similar to and different from solving equations?</p> <p>K. How is solving a two-step inequality similar to and different from solving a two-step equation?</p> |         |
| Enduring Understandings  |         |
| <p>A. Algebra expressions can be used to represent problems with unknown or variable values. Variables can be substituted for variable to evaluate the expression.</p> <p>B. Expressions can be condensed and expanded.</p> <p>C. The greatest common factor can be used to factor an expression to create an equivalent expression.</p> <p>D. Rewriting expressions can clarify relationships among quantities or variables.</p> <p>E. Write an equation with more than one operations to represent a situation; known as a two-step equation</p> <p>F. The properties of equality can be applied the same way when solving two-step</p>  |         |

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- 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. 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.
- H. 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.

### 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, CRP2, CRP8

### 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

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Two-step inequality word problems

### 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.)
- 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

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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)
- Khan Academy (khanacademy.org)
- Interactive Websites: Kahoot, Quizizz, Quizlet
- Google Classroom

Time Frame

5 weeks

### Topic

Rates and Proportional Reasoning

### Essential Questions

- 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?

### Enduring Understandings

- 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  $\frac{x}{y}$  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,  $L$ , to the

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corresponding length,  $\square$ , in the drawing. The ratio is the constant of proportionality,  $\square$ , that relates the actual figure to the scale drawing. You can use a proportion or use an equation of the form  $\square = \square \square$  to solve problems using scale drawings.

### Alignment to Standards

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

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### Learning Activities

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

### Assessments

- Completing exercise questions
- Teacher observations
- Quiz on ratios, rates, and proportions
- Test on ratios, rates, and proportions
- Mid-year Benchmark

### 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.

- Calculators/Desmos
- Smart Notebook
- Smart Response Interactive Response System
- Geometer's Sketchpad/GeoGebra
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- Interactive Websites: Kahoot, Quizizz, Quizlet
- Google Classroom

|  |         |
|--|---------|
| Time Frame   | 4 weeks |
| <b>Topic</b>   |         |
| Fractions, Decimals & Percentages  |         |
| <b>Essential Questions</b>   |         |
| <p>A. How are rational numbers written as decimals?</p> <p>B. How do percents show the relationship between quantities?</p> <p>C. How are percent problems such as finding tax, gratuity, and commission related to proportional reasoning?</p> <p>D. How is finding percent error similar to finding percent change?</p> <p>E. What is and how do you calculate percent markup and percent markdown?</p> <p>F. How does simple interest show proportional reasoning and relate to the percent equation?</p>   |         |
| <b>Enduring Understandings</b>   |         |
| <p>A. All rational numbers can be expressed as a fraction.</p> <p>B. A percent is one way to represent the relationship between two quantities, generally that of a part to the whole.</p> <p>C. 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 <math>\square = \square\square</math> (or <math>\square\square\square\square = \square\square\square\square\square\square \times \square\square\square\square</math>)</p> <p>D. Percent change and error problems are types of percent problems that can be solved using the percent equation in this form:<br/><math>\square\square\square\square\square\square \square\square \square\square\square\square\square\square =</math><br/><math>\square\square\square\square\square\square \square\square\square\square\square\square \times \square\square\square\square\square\square\square\square \square\square\square\square\square\square</math>. 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.</p> <p>E. Markup (or Markdown) is the amount of increase (or decrease) from the original cost</p> |         |

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of an item to its selling (sale) price. Solve such problems using the percent equation in this form:

$$\square\square\square\square\square\square (\square\square\square\square\square\square\square\square) =$$

$$\square\square\square\square\square\square\square\square\square\square\square\square (\square\square\square\square\square\square\square\square\square\square\square\square) \times$$

$$\square\square\square\square\square\square\square\square\square\square$$

- F. 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:

$$\square\square\square\square\square\square\square\square\square\square\square\square\square\square\square\square =$$

$$\square\square\square\square\square\square\square\square\square\square\square\square (\square\square\square\square\square\square\square\square\square\square\square\square) \times \square\square\square\square\square\square\square\square\square\square\square\square \times \square\square\square\square$$

### Alignment to Standards

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)

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- 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

### 21st Century Skills

|                      |   |                        |   |                |   |               |   |
|----------------------|---|------------------------|---|----------------|---|---------------|---|
| 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

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  | 8 weeks |
| Topic   |         |
| Geometry  |         |
| Essential Questions   |         |
| <p>A. How does the circumference of a circle relate to the length of its diameter?</p> <p>B. How are angles formed by intersecting lines related?</p> <p>C. How can a triangle that meets given conditions be drawn?</p> <p>D. How can you find the area of a circle?</p> <p>E. How do the faces of three-dimensional figures determine the two dimensional shapes created by slicing the figure?</p> <p>F. How is finding the area of a composite two-dimensional figure similar to finding the surface area of three-dimensional figures?</p> <p>G. How does the formula for volume of a prism help you understand what volume of a prism means?</p>  |         |
| Enduring Understandings   |         |
| <p>A. Circumference is the distance around a circle. The ratio of the circumference of a circle to its diameter is <math>\pi</math>, or 3.14 or <math>\frac{22}{7}</math>. The circumference is calculated using the formulas:<br/><math>C = \pi d</math> <math>C = 2\pi r</math>.</p> <p>B. Angles that form a straight line and angles that add up to <math>180^\circ</math> are supplementary. Shared lines are adjacent. Angles opposite each other are called vertical. Angles that add up to <math>90^\circ</math> are called complementary.</p> <p>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 &amp; protractor, or with technology.</p> <p>D. Area of a circle is determined using the formula <math>A = \pi r^2</math> where <math>r</math> is the radius of the circle.</p> <p>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.</p> <p>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</p> |         |

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sum of the area of all its faces.

- G. The equation  $V = B \cdot h$ , 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..

### 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, 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  
Create equations to solve for missing angles  
Unknown angle problems (with algebra)

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# Township of Ocean Schools

Assistant Superintendent  
Office of Teaching and Learning

## **SPARTAN MISSION:**

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Triangle side length rules  
Cross sections of 3D objects (basic)  
Volume and surface area word problems

### 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 |
| 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,

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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)
- Khan Academy (khanacademy.org)
- Interactive Websites: Kahoot, Quizizz, Quizlet
- Google Classroom

|  |         |
|--|---------|
| Time Frame   | 6 weeks |
| <b>Topic</b>   |         |
| Statistics & Probability   |         |
| <b>Essential Questions</b>   |         |
| A. How can you determine a representative sample of a population?<br>B. How can inferences be drawn about a population from data gathered from samples?<br>C. How can data displays be used to compare populations?<br>D. What is probability?<br>E. How can the probability of an event help make predictions?<br>F. How is experimental probability similar to and different from theoretical probability?<br>G. How can a model be used to find the probability of an event?<br>H. How can all the possible outcomes or sample space of a compound event be represented?<br>I. How can a model help you find the probability of a compound event?<br>J. How can you use simulations to determine the probability of events? |         |
| <b>Enduring Understandings</b>   |         |
| 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.   |         |

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- 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,  $\frac{1}{6}$  ( $\frac{1}{6}$ ), 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

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 helps 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

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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
- Quiz or Project on measures of central tendency and sampling
- Test or Project on measures of central tendency and graphing and interpreting data
- Benchmark

### **21st Century Skills**

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

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### 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.

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- Interactive Websites: Kahoot, Quizizz, Quizlet
- Google Classroom

### 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
- 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

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- 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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