

8th Grade Integrated Math



UNIT 1- Angle Relationships

ESSENTIAL QUESTION

How can angle relationships be used to solve mathematical problems?

BIG IDEAS

Students explore and understand concepts of angles and angle measurement.

Students investigate and informally prove the relationship between angles that are created when parallel lines are cut by a transversal.

Students examine the relationships between exterior and interior angles of a triangle and construct triangles given a variety of conditions.

GUIDING QUESTIONS

Content and Process

- What is the relationship between the number of degrees in an angle and a circle measuring 360 degrees? **8.G.1a, 8.G.1b**
- How can we classify angles that are created when two rays share a common endpoint based on the degree measurement? **8.G.1**
- How can an angle be measured and constructed using a protractor? **8.G.2**
- How can algebraic reasoning and the angle properties be used to solve for unknown angle measures in a variety of problems? **8.G.3, 8.G.4, 8.G.5**
- How can the properties of complementary, supplementary, adjacent and vertical angles be used to solve problems? **8.G.4**
- What is the relationship between angle sums and exterior angle sums of triangles? **8.G.5**
- How can angles be used to prove triangles are similar? **8.G.5**
- How can you use angle measures and side lengths to create multiple and unique triangles, or determine that no triangle is possible? **8.G.6**

Reflective

- How can I use the relationships between parallel lines cut by a transversal to find multiple missing angle measures in a diagram?
- How can I construct triangles using given angle measures and/or side lengths?
- How do I use algebra to create and solve equations to find unknown angle measures in a problem?

FOCUS STANDARDS

Standards of Mathematical Practice

MP.5 Use appropriate tools strategically.

MP.6 Attend to precision.

Content Standards

8.G.1. Recognize angles as geometric shapes that are formed wherever two rays share a common endpoint, and understand concepts of angle measurement:

- **8.G.1a.** An angle is measured with reference to a circle with its center at the common endpoint of the rays, by considering the fraction of the circular arc between the points where the two rays intersect the circle. An angle that turns through $\frac{1}{360}$ of a circle is called a “one-degree angle,” and can be used to measure angles.
- **8.G.1b.** An angle that turns through n one-degree angles is said to have an angle measure of n degrees.

8.G.2. Measure angles in whole-number degrees using a protractor. Draw angles of specified measure using a protractor and straight edge.

8.G.3. Recognize angle measure as additive. When an angle is decomposed into non-overlapping parts, the angle measure of the whole is the sum of the angle measures of the parts. Solve addition and subtraction problems to find unknown angles on a diagram in real world and mathematical problems, *e.g. by using an equation with a symbol for the unknown angle measure.*

8.G.4. Use facts about supplementary, complementary, vertical, and adjacent angles in a multi-step problem to write and use them to solve simple equations for an unknown angle in a figure.

8.G.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. *For example, arrange three copies of the same triangle so that the sum of the three angles appears to form a line, and give an argument in terms of transversals why this is so.*

8.G.6. Draw (freehand, with ruler and protractor, and with technology) geometric shapes with given conditions. Focus on drawing triangles from three measures of angles or sides, noticing when the conditions determine a unique triangle, more than one triangle, or no triangle.

SUPPORTING RESOURCES

BV Created Unit - Angle Relationships: [Key Learning Experience](#)

Angle Relationships (Key Learning Experiences)

i-Ready- Grade 4, Grade 7, Grade 8

4th Grade Unit 5, Lesson 30: Points, Lines, Rays, and Angles **8.G.1a, 8.G.1b**

4th Grade Unit 5, Lesson 31: Angles **8.G.1a, 8.G.1b, 8.G.2**

4th Grade Unit 5, Lesson 32: Add and Subtract with Angles **8.G.3**

7th Grade Unit 6, Lesson 28: Find Unknown Angle Measures **8.G.4**

7th Grade Unit 6, Lesson 29: Draw Plane Figures with Given Conditions **8.G.6**

8th Grade Unit 2, Lesson 6: Describe Angle Relationships **8.G.5**

8th Grade Unit 2, Lesson 7: Describe Angle Relationships in Triangles **8.G.5**

SOCIAL-EMOTIONAL SKILLS

RELATIONSHIP SKILLS

The ability to establish and maintain healthy and rewarding relationships with diverse individuals and groups. The ability to communicate clearly, listen well, cooperate with others, resist inappropriate social pressure, negotiate conflict constructively, and seek and offer help when needed.

- Communication
- Social engagement
- Relationship-building
- Teamwork

TECHNOLOGY SKILLS

Based on ISTE Standards for Students, these are discrete technology skills that unit designers will use to integrate digital tools in students' learning experiences. Intentionally broad and device and app agnostic, these skills build upon one another and provide students a strong foundation in technology use.

KEY LEARNING EXPERIENCES

BV Created Key Learning Experience - [Unit 3: Key Learning Experience](#)

Angle Relationships

Visualize - *Discovering Angle Relationships*

- Students will explore angles formed when two parallel lines are cut by a transversal and the relationship between those angles using patty paper. Students will make and informally prove conjectures they make about the angle relationships.

Play - *Naming and Defining Angle Relationships*

- Students will explore the names and definitions of angles formed when two parallel lines are cut by a transversal to formalize their learning from the Visualize activity. Students will play with different applets embedded in a Canvas module to help them name and define these angles.

Investigate - *Exterior and Interior Angles of a Triangle*

- Students will investigate exterior and interior angles of a triangle including the relationship between an exterior angle of a triangle and its remote interior angles. Students will also explore the sum of interior and exterior angles of a triangle.

8th Grade Integrated Math

UNIT 2- Linear Relationships: Slope, Linear Equations, and Inequalities



ESSENTIAL QUESTION

How can algebraic equations and inequalities be used to model, analyze, and solve real-world situations?

BIG IDEAS

- Students will solve equations and inequalities in one variable.
- Students will investigate and identify equations with a variety of solutions.
- Students will write equations and inequalities to model real world situations.
- Students can distinguish between proportional and non-proportional relationships.

GUIDING QUESTIONS

Content and Process

- How are properties used to solve one-step, two-step, and multi-step equations and inequalities, including those with rational coefficients? **8.EE.7, 8.EE.7b**
- What is the difference between the solution(s) of an equation and an inequality? **8.EE.7**
- What method can be used to prove a solution(s) to an equation or inequality is true? **8.EE.7**
- What does it mean if an equation has one, no, or infinite solutions? **8.EE.7a**
- How is the distributive property and collecting like terms used to solve linear equations and inequalities? **8.EE.7b**
- How can similar triangles be used to prove the slope is the same between any two points on a line? **8.EE.5**
- How do I find the slope between any two points? **8.EE.5**
- What are the differences between proportional and nonproportional linear relationships? **8.EE.4, 8.EE.5, 8.EE.6**

Reflective

- Using the equation $3(2x + 5) = ax + b$, how can you find a value for a and a value for b so that there are infinitely many, one, or no solution for the value of x that make the equation true?
- How would I tell a friend how to solve $\frac{1}{3}x - 5 + 171 = x$?
- How would I explain the differences between various forms of proportional and non-proportional relationships?

FOCUS STANDARDS

Standards of Mathematical Practice

MP.2 Reason abstractly and quantitatively.

MP.7 Look for and make use of structure.

Content Standards

8.EE.4. Graph proportional relationships, interpreting its unit rate as the slope (m) 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.5. 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 and extend to include the use of the slope formula

($m = \frac{y_2 - y_1}{x_2 - x_1}$ when given two coordinate points (x_1, y_1) and (x_2, y_2)). Generate the equation $y = mx$ for a line through the origin (proportional) and the equation $y = mx + b$ for a line with slope m intercepting the vertical axis at y -intercept b (not proportional when $b \neq 0$).

8.EE.6. Describe the relationship between the proportional relationship expressed in $y = mx$ and the non-proportional linear relationship $y = mx + b$ as a result of a vertical translation. *Note: be clear with students that all linear relationships have a constant rate of change (slope), but only the special case of proportional relationships (line that goes through the origin) continue to have a constant of proportionality.*

8.EE.7. Fluently (efficiently, accurately, and flexibly) solve one-step, two-step, and multi-step linear equations and inequalities in one variable, including situations with the same variable appearing on both sides of the equal sign.

- **8.EE.7a.** Give examples of linear equations in one variable with one solution ($x = a$), infinitely many solutions ($a = a$), or no solutions ($a = b$). 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.7b.** Solve linear equations and inequalities with rational number coefficients, including equations/inequalities whose solutions require expanding and/or factoring expressions using the distributive property and collecting like terms.

SUPPORTING RESOURCES

BV Created KLE - [Unit 2: Key Learning Experience](#)

How Many Solutions Are There? (Key Learning Experiences)

i-Ready- Grade 8

Unit 3, Lesson 8: Graph Proportional Relationships and Define Slope **8.EE.4, 8.EE.5**

Unit 3, Lesson 9: Derive and Graph Linear Equations of the Form $y=mx+b$ **8.EE.5**

Unit 3, Lesson 10: Solve Linear Equations in One Variable **8.EE.7b**

Unit 3, Lesson 11: Determine the Number of Solutions to One-Variable Equations **8.EE.7a**

SOCIAL-EMOTIONAL SKILLS

SELF-AWARENESS

The ability to accurately recognize one's own emotions, thoughts, and values and how they influence behavior. The ability to accurately assess one's strengths and limitations, with a well-grounded sense of confidence, optimism, and a "growth mindset."

- Identifying emotions
- Accurate self-perception
- Recognizing strengths
- Self-confidence
- Self-efficacy

TECHNOLOGY SKILLS

Based on ISTE Standards for Students, these are discrete technology skills that unit designers will use to integrate digital tools in students' learning experiences. Intentionally broad and device and app agnostic, these skills build upon one another and provide students a strong foundation in technology use.

KEY LEARNING EXPERIENCES

BV Created Unit: [Unit 2: Key Learning Experience](#)

How Many Solutions Are There?

Visualize - *Balancing Scales*

- Students balance scales by placing numbers in blocks. Students discover that not all scales can be balanced while other scales have one unique way or multiple ways to be balanced.

Play - *Solution Sort*

- Students explore equations and make connections between the structure of an equation and its number of solutions (one, infinite, or none).

Investigate - *What's My Number?*

- Students will further their understanding of what makes a solution to an equation. They will work with equations that have one solution, infinite solutions, and no solutions by guessing, "What's my number?" At the same time, students will get more practice with solving equations formally.

8th Grade Integrated Math



UNIT 3- Functions: Linear and Nonlinear Relationships

ESSENTIAL QUESTION

How can functions be used to describe real-world situations, model predictions, and solve problems?

BIG IDEAS

Students will discover the meaning of a function and investigate how it can be presented in various forms, including graphs, tables, equations and visual patterns.

Students will construct and analyze functions that model linear relationships and distinguish how they are different from non-linear functions.

GUIDING QUESTIONS

Content and Process

- When is the relationship between two quantities considered a function? **8.F.1**
- How can linear functions be represented and compared in various forms? **8.F.2, 8.F.3**
- What are examples of linear and nonlinear functions? **8.F.3**
- How do you determine and interpret the rate of change and initial value in order to construct various forms of linear functions? **8.F.4**
- What can you infer about a situation given a sketch of a graph? **8.F.5**
- How can proportional relationships in different forms (graphs, equations, tables) be compared? **8.EE.4**

Reflective

- How can I translate among representations of functions and describe how aspects of functions are reflected in different representations?
- How would I explain to a friend how to derive an equation for a line?

FOCUS STANDARDS

Standards of Mathematical Practice

MP.2 Reason abstractly and quantitatively.

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

Content Standards

8.F.1. Explain 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. (*Function notation is not required in Grade 8.*)

8.F.2. Compare properties of two linear functions represented in a variety of ways (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, the greater y -intercept, or the point of intersection.*

8.F.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. *For example, the function $A = s^2$ giving the area of a square as a function of its side length is not linear because its graph contains the points $(1,1)$, $(2,4)$ and $(3,9)$, which are not on a straight line.*

8.F.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.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.

8.EE.4. Graph proportional relationships, interpreting its unit rate as the slope (m) 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.*

SUPPORTING RESOURCES

Mindset Mathematics - Grade 8

The Ins and Outs of Functions Pg. 117-148 (Key Learning Experiences)

i-Ready- Grade 8

Unit 4, Lesson 15: Understand Functions **8.F.1, 8.F.3**

Unit 4, Lesson 16: Use Functions to Model Linear Relationships **8.F.4**

Unit 4, Lesson 17: Compare Different Representations of Functions **8.F.2**

Unit 4, Lesson 18: Analyze Functional Relationships Qualitatively **8.F.5**

SOCIAL-EMOTIONAL SKILLS

RELATIONSHIP SKILLS

The ability to establish and maintain healthy and rewarding relationships with diverse individuals and groups. The ability to communicate clearly, listen well, cooperate with others, resist inappropriate social pressure, negotiate conflict constructively, and seek and offer help when needed.

- Communication
- Social engagement
- Relationship-building
- Teamwork

TECHNOLOGY SKILLS

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KEY LEARNING EXPERIENCES

Mindset Mathematics-Grade 8

Big Idea 5: The Ins and Outs of Functions

Visualize - *Growing Functions*

- Students visualize and extend linear patterns, which each represent functions, and make connections between written descriptions, coordinate graphs, tables of values, visual patterns, and algebraic expressions. Students explore the meaning of domain within these functions.

Play - *Getting Warmer!*

- Students explore a visual representation of the relationship between Celsius and Fahrenheit, using it to predict temperature conversions not shown and to generalize a linear function.

Investigate - *The Functions of Near Squares*

- Students explore ways to represent and generalize the relationship between the areas of squares and those of near squares, starting with an intriguing pattern in the multiplication table.

8th Grade Integrated Math

UNIT 4- Integer Exponents: Scientific Notation



ESSENTIAL QUESTION

How can scientific notation help us solve problems about our world?

BIG IDEAS

Students use scientific notation to represent very large and small quantities and solve problems.

GUIDING QUESTIONS

Content and Process

- How can very large and very small quantities be represented with standard notation? **8.EE.2**
- How can numbers written in scientific notation be compared? **8.EE.2**
- How is standard form converted to scientific notation and scientific notation converted to standard form? **8.EE.3**

Reflective

- How do you choose an appropriate unit for measurements using scientific notation?
- What quantities in the real world are best represented with scientific notation?

FOCUS STANDARDS

Standards of Mathematical Practice

MP.2 Reason abstractly and quantitatively.

MP.5 Use appropriate tools strategically.

Content Standards

8.EE.2. Use numbers expressed in the form of a single digit times an integer power of 10 to estimate very large or very small quantities, and to express how many times as much one is than the other. For example, estimate the population of the United States as 3×10^8 and the population of the world as 7×10^9 , and determine that the world population is more than 20 times larger.

8.EE.3. Read and write 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.

SUPPORTING RESOURCES

Unit 5, Lesson 21: Express Numbers using Integer Powers of 10 **8.EE.2**

Unit 5, Lesson 22: Work with Scientific Notation **8.EE.3**

SOCIAL-EMOTIONAL SKILLS

Self-Management

The ability to successfully regulate one's emotions, thoughts, and behaviors in different situations — effectively managing stress, controlling impulses, and motivating oneself. The ability to set and work toward personal and academic goals.

- Impulse control
- Stress management
- Self-discipline
- Self-motivation
- Goal-setting
- Organizational Skills

TECHNOLOGY SKILLS

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KEY LEARNING EXPERIENCES

N/A

8th Grade Integrated Math

UNIT 5- Real Numbers: Rational Numbers, Irrational Numbers, and the Pythagorean Theorem



ESSENTIAL QUESTION

BIG IDEAS

How can the Pythagorean Theorem be used to solve problems?

Students will build a visual understanding of irrational numbers.

Students will investigate and apply the Pythagorean Theorem to solve real-world and mathematical problems.

GUIDING QUESTIONS

Content and Process

- What is the difference between rational and irrational numbers? **8.NS.1**
- How does a number line help approximate and compare irrational numbers? **8.NS.2**
- How does understanding inverse operations help solve equations containing square or cube numbers? **8.EE.1**
- How can the square root of a number be classified as rational or irrational? **8.EE.1**
- What is the relationship between the area and the side length of a square? **8.G.7, 8.G.8**
- How is the converse of the Pythagorean Theorem used to show a triangle is right? **8.G.7**
- How does applying the Pythagorean Theorem help find unknown lengths in right triangles and problems in two and three dimensions? **8.G.8**
- How can the Pythagorean Theorem be used to find the distance between two points in a coordinate system? **8.G.9**

Reflective

- How can I find the area of any square by sub-dividing it or surrounding it with a larger square?
- What strategies did you use to find the area and side length of a square with an irrational length?
- How would you estimate the value of a square root, such as $\sqrt{60}$?
- How could you find the length of any line segment on a grid?

FOCUS STANDARDS

Standards of Mathematical Practice

MP.5 Use appropriate tools strategically.

MP.7 Look for and make use of structure.

Content Standards

8.NS.1. Know that numbers that are not rational are called irrational. Understand informally that every number has a decimal expansion; for rational numbers show that the decimal expansion repeats eventually, and convert a decimal expansion which repeats eventually into a rational number.

8.NS.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 (e.g. π^2). For example, for the approximation of $\sqrt{68}$, show that $\sqrt{68}$ is between 8 and 9 and closer to 8.

8.EE.1. 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 whole number perfect squares with solutions between 0 and 15 and cube roots of whole number perfect cubes with solutions between 0 and 5. Know that $\sqrt{2}$ is irrational.

8.G.7. Explain a proof of the Pythagorean Theorem and its converse.

8.G.8. Apply the Pythagorean Theorem to determine unknown side lengths in right triangles in real-world and mathematical problems in two and three dimensions. For example: Finding the slant height of pyramids and cones.

8.G.9. Apply the Pythagorean Theorem to find the distance between two points in a coordinate system.

SUPPORTING RESOURCES

Mindset Mathematics - Grade 8

Completing the Real Number System Pg. 177-199 (Key Learning Experiences)

Discovering Pythagoras Pg. 201-219 (Key Learning Experiences)

i-Ready- Grade 8

Unit 6, Lesson 23: Find Square Roots and Cube Roots to Solve Problems **8.EE.1**

Unit 6, Lesson 24: Express Rational Numbers as Fractions and Decimals **8.NS.1**

Unit 6, Lesson 25: Find Rational Approximations of Irrational Numbers **8.NS.1, 8.NS.2, 8.EE.1**

Unit 6, Lesson 26: Understand the Pythagorean Theorem and Its Converse **8.G.7**

Unit 6, Lesson 27: Apply the Pythagorean Theorem **8.G.8, 8.G.9**

SOCIAL-EMOTIONAL SKILLS

Social Awareness

The ability to take the perspective of and empathize with others, including those from diverse backgrounds and cultures. The ability to understand social and ethical norms for behavior and to recognize family, school, and community resources and supports.

- Perspective-taking
- Empathy
- Appreciating diversity
- Respect for others

TECHNOLOGY SKILLS

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KEY LEARNING EXPERIENCES

Required Key Learning Experiences

Mindset Mathematics-Grade 8

Big Idea 7: Completing the Real Number System

Visualize - *Square Sides*

- Students build a visual understanding of square roots by finding the area and side lengths of squares positioned in different ways on a grid.

Big Idea 8: Discovering Pythagoras

Visualize - *Unpacking Pythagoras*

- Students unpack the relationship between the side lengths of a right triangle and the squares that can be made by those sides, ultimately naming this the Pythagorean Theorem.

Play - *Pythagorean Triples*

- Students play with patterns in Pythagorean triples - right triangles with whole-number side lengths.

Investigate - *Approximating Square Roots*

- Students use paper folding to explore the relationship between right triangles and square roots, and then to create a number line that includes the square roots of 1 through 16 to compare their lengths.

Optional Key Learning Experiences

Mindset Mathematics-Grade 8

Big Idea 7: Completing the Real Number System

Play - *Between 4 x 4 and 5 x 5*

- Students play with creating squares with irrational side lengths, building on their understanding of square roots as the side lengths of squares with a given area.

Investigate - *The Hypotenuse Hypothesis*

- Students use what they have learned about the meaning of square root to develop methods for finding the length of the hypotenuse of a right triangle on a grid.

8th Grade Integrated Math

UNIT 6: 3D GEOMETRY



ESSENTIAL QUESTION

How can understanding volume and surface area of three dimensional objects help solve real-world and mathematical problems?

BIG IDEAS

Students will investigate and generalize formulas for the volume and surface area of geometric shapes.

Students will apply formulas for the volume and surface area of geometric shapes to solve real-world problems.

GUIDING QUESTIONS

Content and Process

- How is the arc length in a circle measured? **8.G.10**
- How is the area of a sector in a circle calculated? **8.G.10**
- How can arc length and area of sectors be applied to solve real-world and mathematical problems? **8.G.12**
- How can formulas be used to find the surface area and volume of pyramids, cones, and spheres? **8.G.10**
- How is the relationship between 1) the volume of cylinders and cones, 2) the volume of cylinders and spheres, 3) the volume of prisms and pyramids represented in the corresponding formulas? **8.G.10, 8.G.11a**
- How is the formula for finding the surface area of pyramids and cones generalized? **8.G.11b**
- How can surface area and volume of three dimensional objects be applied to solve real-world and mathematical problems? **8.G.12**

Reflective

- What relationships between the volumes of cylinders, cones, and spheres do you think will be the most useful to you in the world? Explain.
- What is the relationship between surface area and volume of 3 dimensional geometric shapes?
- What strategy would you tell a friend about to help her find the surface area of any sized pyramid or a cone?

FOCUS STANDARDS

Standards of Mathematical Practice

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

MP.6 Attend to precision.

Content Standards

8.G.10 Use the formulas or informal reasoning to find the arc length, areas of sectors, surface areas and volumes of pyramids, cones, and spheres. *For example, given a circle with a 60° central angle, students identify the arc length as $\frac{1}{6}$ of the total circumference ($\frac{1}{6} = \frac{60}{360}$).*

8.G.11 Investigate the relationship between the formulas of three dimensional geometric shapes;

- **8.G.11a.** Generalize the volume formula for pyramids and cones ($V = \frac{1}{3}Bh$).
- **8.G.11b.** Generalize surface area formula of pyramids and cones ($SA = B + \frac{1}{2}Pl$).

8.G.12. Solve real-world and mathematical problems involving arc length, area of two-dimensional shapes including sectors, volume and surface area of three-dimensional objects including pyramids, cones and spheres.

SUPPORTING RESOURCES

Unit 6, Lesson 28: Solve Problems with Volumes of Cylinders, Cones, and Spheres **8.G.10, 8.G.12**

NEW iREADY LESSON-One-Day Activity: Solve Problems with Volumes of Pyramids and Cones **8.G.10, 8.G.11a, 8.G.12**

NEW iREADY LESSON-Solve Problems with Surface Area of Pyramids, Cones, and Sphere **8.G.10, 8.G.11b, 8.G.12**

NEW iREADY LESSON-Solve Problems with Arc Lengths and Areas of Sectors **8.G.10, 8.G.12**

Supplemental Activities-OPTIONAL You can use the following **BV** created lessons or the new one day lessons from iReady

BV Created Lesson- [Arc Length and Area of Sectors](#) **8.G.10, 8.G.12**

BV Created Lesson- [Volume of Pyramids](#) **8.G.10, 8.G.11a 8.G.12**

BV Created Lesson- [Surface Area of Spheres](#) **8.G.10, 8.G.12**

Mindset Mathematics - Grade 8

Exploring the Geometry of Ice Cream Pg. 221-238 (Key Learning Experiences)

SOCIAL-EMOTIONAL SKILLS

RELATIONSHIP SKILLS

The ability to establish and maintain healthy and rewarding relationships with diverse individuals and groups. The ability to communicate clearly, listen well, cooperate with others, resist inappropriate social pressure, negotiate conflict constructively, and seek and offer help when needed.

- Communication
- Social engagement
- Relationship-building

- Teamwork

TECHNOLOGY SKILLS

Based on ISTE Standards for Students, these are discrete technology skills that unit designers will use to integrate digital tools in students' learning experiences. Intentionally broad and device and app agnostic, these skills build upon one another and provide students a strong foundation in technology use.

KEY LEARNING EXPERIENCES

Required Key Learning Experience

Mindset Mathematics-Grade 8

Big Idea 9: Exploring the Geometry of Ice Cream

Visualize ONLY - *Building Intuition about Volume*

- Students use fillable relational solids to explore and build conjectures about the relationships between their volumes.

Optional Key Learning Experience ***Mindset Mathematics-Grade 8***

Play - *Comparing Cylinders*

- Students use the nets of cylinders and what they know about prisms to develop methods for finding the volume of cylinders.

Note: Finding the volume of a cylinder is a 7th grade KS standard. However, this can be used as a quick review to help students see the relationships between the volume of cylinders, cones, and spheres used in the Investigate activity. The volume of cones and spheres is an 8th grade standard.

Investigate - *Scooping Up Volume*

- Students investigate ways of finding the volume of spheres and cones, building on their earlier conjectures, as they design ice cream cones with the same volume as cylindrical cups.

8th Grade Integrated Math

UNIT 7- Statistics: Two Variable Data and Fitting a Linear Model



ESSENTIAL QUESTION

How does investigating patterns in data help us solve problems?

BIG IDEAS

Students will investigate patterns of association in bivariate data.

Students will use linear models to solve problems.

GUIDING QUESTIONS

Content and Process

- What kind of patterns of associations can be found in bivariate data represented as a scatter plot?
8.SP.1
- How is a straight line used to model relationships between two quantities? **8.SP.2**
- How is a linear equation used to make predictions about bivariate data and solve problems? **8.SP.3**
- How can the slope and y-intercept be interpreted in the context of a real world problem? **8.SP.3**

Reflective

- Why is a scatter plot a good representation of bivariate data?
- How do outliers and/or clustering influence data analysis?
- How do scatter plots and lines of best fit enable you to make predictions about data?
- What types of patterns did you notice when investigating a variety of scatter plots of data?

FOCUS STANDARDS

Standards of Mathematical Practice

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

MP.4 Model with mathematics.

Content Standards

8.SP.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.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 by judging the closeness of the data points to the line.

8.SP.3. Use the equation of a linear model to solve problems in the context of bivariate measurement data, interpreting the slope and intercept. *For example, in a linear model for a biology experiment, interpret a slope of 1.5 cm/hr as meaning that an additional hour of sunlight each day is associated with an additional 1.5 cm in mature plant height.*

SUPPORTING RESOURCES

Mindset Mathematics - Grade 8

Finding Patterns in the Clouds Pg. 149-175 (Key Learning Experiences)

i-Ready- Grade 8

Unit 7, Lesson 29: Analyze Scatter Plots and Fit a Linear Model to Data **8.SP.1, 8.SP.2**

Unit 7, Lesson 30: Write and Analyze an Equation for Fitting a Linear Model to Data **8.SP.3**

SOCIAL-EMOTIONAL SKILLS

Social Awareness

The ability to take the perspective of and empathize with others, including those from diverse backgrounds and cultures. The ability to understand social and ethical norms for behavior and to recognize family, school, and community resources and supports.

- Perspective-taking
- Empathy
- Appreciating diversity
- Respect for others

TECHNOLOGY SKILLS

Based on ISTE Standards for Students, these are discrete technology skills that unit designers will use to integrate digital tools in students' learning experiences. Intentionally broad and device and app agnostic, these skills build upon one another and provide students a strong foundation in technology use.

KEY LEARNING EXPERIENCES

Mindset Mathematics-Grade 8

Big Idea 6: Finding Patterns in the Clouds

Visualize - *What's Going On in This Graph?*

- Students explore complex data displays, building habits of inquiry and interpretation for bivariate data.

Play - *What's the Story Here?*

- Students play with the stories that graphs tell by examining two types of graphs, one that is incomplete and one that is deceptive.

Investigate - *Creating Data Visualizations*

- Students investigate real, publicly available data and explore creative ways to display the patterns they find.