Grade 8 Math Cover Sheet

Content Area: **Mathematics**
Course(s):
Time Period: **1st Marking Period**
Length: **Full Year**
Status: **Not Published**

Course Overview

This 8th-grade math course aligns with the 2023 New Jersey Student Learning Standards, focusing on key areas like the number system, expressions and equations, functions, geometry, statistics, and probability. Students will explore rational and irrational numbers, solve linear equations and inequalities, graph functions, understand transformations, and analyze data. Students will develop strong critical thinking and problem-solving skills through direct instruction, collaborative learning, and problem-based activities. Assessments will include quizzes, unit tests, projects, and performance-based tasks. The course will utilize textbooks, online resources, manipulatives, and technology to cater to diverse learning styles and differentiate instruction. By the end of the course, students will be well-prepared for higher-level math courses and real-world applications of mathematical concepts.

Course Name, Length, Date of Revision and Curriculum Writer

Grade 8 Math

Full Year

April 2024

Ms. Stephanie Izzo and Ms. Kathryn Jasper

Table of Contents

Unit 9: Volume and Similar Solids

Unit 1: Integers and Equations

Content Area: **Mathematics**
Course(s):
Time Period: **1st Marking Period**
Length: **180**
Status: **Published**

Summary of the Unit

In this unit students will review integer concepts as well as solve one-step, two-step, multi-step, and variables on both sides equations. Along the way, concepts of applying the properties of equality, identifying/combining like terms, and using the distributive property will be highlighted. Students will also model real world situations through the use of equations and solve for the unknown.

MATH.8.EE.C.7	Solve linear equations in one variable.
MATH.8.EE.C.7.a	Give examples of linear equations in one variable with one solution, infinitely many solutions, or no solutions. Show which of these possibilities is the case by successively transforming the given equation into simpler forms, until an equivalent equation of the form 𝑥 = 𝑎, 𝑎 = 𝑎, or 𝑎 = 𝑏 results (where 𝑎 and 𝑏 are different numbers).
MATH.8.EE.C.7.b	Solve linear equations with rational number coefficients, including equations whose solutions require expanding expressions using the distributive property and collecting like terms.

Enduring Understandings

Equations serve as powerful tools for expressing relationships, solving problems, and making sense of real-world scenarios. Through the study of equations, students develop the ability to analyze, represent, and manipulate mathematical expressions, fostering a deep understanding of the fundamental principles that underlie algebraic thinking. The skills acquired in solving equations not only provide a gateway to higher-level mathematics but also empower students to approach complex problem-solving with confidence and precision, laying a resilient foundation for lifelong mathematical reasoning.

Essential Questions

1. Why do we use equations to represent mathematical relationships?

2. How do one-step equations model simple real-world situations?

3. What strategies can be employed to solve two-step equations efficiently?

4. Why is it essential to check the solutions of an equation?

5. What role does the order of operations play in solving equations, and why is it crucial to follow these rules?

Summative Assessment and/or Summative Criteria

- Students will take a test to review concepts learned in Unit 1

- Students will complete an "Equations Around the Clock" Marking Period 1 Project

- Students will demonstrate mastery through various assessment criteria included the unit

Resources

- Big Ideas Grade 8 Textbook
- IXL
- NJ Student Learning Standards for Mathematics
- Additional Resources located under the "Resource" tab

Unit Plan

In this section you may fill in this table or delete it and paste your own.

THEN you will associate your standards by selecting the "standards" tab above, clicking "associate standards" and selecting your standards for this unit from the list.

Topic/Selection Timeframe	General Objectives	Instructional Activities	Benchmarks/Assessments
Integer Operations (2 days)	Students will add, subtract, multiply and divide integers.	- Use visual strategies to represent rules of signed numbers - Use of hands-on manipulatives to create practice problems (i.e. cards, dice) - Incorporate real-life word problems using integers - Suggested activity: Integer "I Have, Who Has" game	- Daily homework check - Exit ticket (all operations)
Review & Assess (2-3 days)	Students will demonstrate mastery of topics and concepts presented.	Review using varied teacher created/chosen materials and tasks; some examples could include whiteboards, stations, online assessment tools, etc.	- Mastery of IXL integer topics - Integer Quiz
Solving One-Step Equations (1 day)	Students will write and solve one-step	- Define properties of equality and identify inverse operations - Use equations to model and	- Daily homework check - Exit ticket (one-step) 1.1 textbook mini

	equations.	solve real-life problems	assessment
		• Demonstrate how to check a solution • Suggested activity: Partner 1-Step Equation Connect 4	
Solving Two-Step Equations (2 days)	Students will write and solve two-step equations.	• Outline solving equation steps in order to isolate the variable • Use equations to model and solve real-life problems • Use of error analysis to identify/correct mistake and justify equation solving process • Suggested activity: interactive whiteboards	• Daily homework check • Digital textbook assignment • Exit ticket (two-step)
Review & Assess (2-3 days)	Students will demonstrate mastery of topics and concepts presented.	• Review using varied teacher created/chosen materials and tasks; some examples could include whiteboards, stations, online assessment tools, etc.	• 1.1-1.2 Quiz
Simplifying Algebraic Expressions (1 day)	Students will apply the distributive property and combine like terms.	• Define key vocabulary (i.e. term, coefficient, like/unlike terms, distributive property) • Use visuals such as shapes/colors to identify like terms and arrows for the distributive property • Classification and justification of like vs. unlike terms • Suggested activity: Quizizz game	• Daily homework check • Exit ticket (combining like terms & distributive property)
Solving Multi-Step Equations (2 days)	Students will write and solve multi- step equations.	• Expand solving equation steps to include the distributive property and combining like terms • Use equations to model and solve real-life problems • Suggested activity: ABC groups with 3 differentiated student tasks	• Daily homework check • Exit ticket (multi-step) • 1.2 textbook mini assessment
Solving Equations with Variables on Both Sides (2 days)	Students will write and solve equations with variables on both sides.	• Emphasize collecting variables to one side of the equation and constants to the other • Identify and differentiate between solution types: one solution, no solution, infinitely many • Use equations to model and solve real-life problems • Suggested activity: digital task cards	• Daily homework check • Exit ticket (variables on both sides) • 1.3 textbook mini assessment
Review & Assess	Students will demonstrate	• Review using varied teacher created/chosen materials and	• Mastery of IXL Equation topics

(2-3 days)	mastery of topics and concepts presented.	tasks; some examples could include whiteboards, stations, online assessment tools, etc.	• Chapter 1 Equation Test • Marking Period 1 "Equations Around the Clock" Project

Standards

- NJSLS.8.EE.C.7
- NJSLS.8.EE.C.7a
- NJSLS.8.EE.C.7b

Suggested Modifications for Special Education, ELL and Gifted Students

*Consistent with individual plans, when appropriate.

- Students will be allowed to submit assignments using additional time per IEP/504 modifications.

- Students will receive modified assessments and use of multiplication chart and/or calculator according to IEP/504 modifications.

- ELL students will be allowed to use an internet translator or language glossary in order to translate vocabulary and assignments properly.

- ELL students may be allowed to work with another student who is fluent in their native language.

Suggested Technological Innovations/Use

- Instructional technology should be used to present and assess lessons such as; SmartNotebook, PowerPoint, and interactive whiteboards.

- Teachers are encouraged to use electronic assessments/activities to determine mastery of concepts taught. Examples of this include: IXL, Quizizz, Desmos, Link-It, etc.

Cross Curricular/Career Readiness, Life Literacies and Key Skills Practice

- 9.1: All students will demonstrate the creative, critical thinking, collaboration, and problem-solving

skills needed to function successfully as both global citizens and workers in diverse ethnic and organizational cultures.

- 9.2: All students will be able to identify the importance of being knowledgeable about one's interests and talents, and being well informed about postsecondary and career options, career planning, and career requirements.

Unit 2: Transformations

Content Area: **Mathematics**
Course(s):
Time Period: **1st Marking Period**
Length: **180**
Status: **Published**

Summary of the Unit

In this unit, students will focus on translating figures on a coordinate plane by determining new ordered pairs. Students will also determine if transformations are similar or congruent. By the end of this unit, students will be able to identify new ordered pairs for translations, rotations of 90/180/270 degrees, reflections over the x and y axis, and dilations with a given scale factor. They will also be able to interpret what type of transformation happens by applying transformation rules and observing ordered pairs. Finally, they will be able to complete multiple transformations to a given figure.

MATH.8.G.A.1	Verify experimentally the properties of rotations, reflections, and translations:
MATH.8.G.A.2	Understand that a two-dimensional figure is congruent to another if the second can be obtained from the first by a sequence of rotations, reflections, and translations; given two congruent figures, describe a sequence that exhibits the congruence between them.

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

Enduring Understandings

Transformations are powerful mathematical tools that describe how geometric figures change in size, position, or orientation. Through the study of transformations, students develop a deep understanding of the relationships between original figures (pre-images) and their transformed counterparts (images), recognizing how these changes are governed by specific rules and properties. These transformations not only allow for precise geometric descriptions but also find extensive applications across various fields, emphasizing the importance of mathematical concepts in practical problem-solving and real-world scenarios.

Essential Questions

- Does a figure change dimensions when transformed?
- How do translations affect the position of a shape or object on a coordinate plane?
- What is the relationship between the pre-image and the image under a transformation?
- How can transformations be applied to real-world situations or problems?
- How can you determine the coordinates of an image after a given transformation?
- What happens to the vertices and sides of a shape under different transformations?
- What are the practical applications of transformations in daily life?
- What is the difference between similar transformations versus congruent transformations?

Summative Assessment and/or Summative Criteria

- Students will take assessments to review concepts learned in Unit 2.

  Students will demonstate mastery through various assessment criteria included in the unit.

  Students will demonstrate mastery on the end of unit performance task

Resources

- Big Ideas Grade 8 Textbook
- IXL
- NJ Student Learning Standards for Mathematics
- Additional resources located under the Resource Tab

Unit Plan

Topic/Selection Timeframe	General Objectives	Instructional Activities	Benchmarks/Assessments
Translations (1 day)	Students will translate figures on the coordinate plane.	• Create a foldable flip book of definitions, rules, and examples • Use hands on manipulatives to move figures on the coordinate plane • Given sets of ordered pairs, identify new ordered pairs using given translation rules • Practice graphing original and translated images	• Daily homework check • 2.1 textbook mini assessment • Exit ticket
Reflections (1 day)	Students will reflect figures over the x and y axis.	• Create a foldable flip book of definitions, rules, and examples • Use coordinate planes to visualize the types of transformations that are occurring. • Use hands on manipulatives to move figures on the coordinate plane • Given sets of ordered pairs, identify new ordered pairs using given reflection rules • Practice graphing original and reflected images	• Daily homework check • 2.2 textbook mini assessment • Exit ticket
Rotation (1 day)	Students will rotate figures 90, 180 and 270 degrees	• Create a foldable flip book of definitions, rules, and examples • Use coordinate planes to visualize the types of transformations that	• Daily homework check • 2.3 textbook mini assessment • Exit ticket

		are occurring.	
		• Use hands on manipulatives to move figures on the coordinate plane	
		• Given sets of ordered pairs, identify new ordered pairs using given rotation rules	
		• Practice graphing original and rotated images	
Dilation (1 day)	Students will dilate images by multiplying by the given scale factor	• Create a foldable flip book of definitions, rules, and examples	• Daily homework check
		• Use coordinate planes to visualize the types of transformations that are occurring.	• 2.5 textbook mini assessment
			• Exit ticket
		• Use hands on manipulatives to move figures on the coordinate plane	
		• Given sets of ordered pairs, identify new ordered pairs using given dilation rules	
		• Practice graphing original and dilated images	
Review and Assess (2-3 days)	Students will demonstrate mastery of topics and concepts presented	Chapter review using varied teacher created/chosen materials and tasks	-Chapter Quiz
Similar and Congruent Transformations (1 day)	Students will identify the transformation that occurs and whether they are similar or congruent	• Discuss/take notes on similar vs. congruent	• Daily homework check
		• Identify types of transformations that are similar (dilation) vs congruent (translation, reflection, rotation)	• Exit ticket
		• Observe figures on a	

		graph to identify type of transformations • Observe ordered pairs of two images to identify the type of transformation	
Composed Transformations (1 day)	Students will complete multiple transformations of an image	• Work on using an original set of ordered pairs and complete multiple transformations using the new ordered pairs each time. Discuss to students using more than one prime mark for multiple transformations • Practice graphing multiple images on a coordinate plane that reflect composed transformations	• Daily homework check • Exit ticket
Review and Assess (2-3)	Students will demonstrate mastery of topics and concepts presented	Chapter review using varied teacher created/chosen materials and tasks	-End of Unit Test -Master of IXL topics -Marking Period project- Transformation cupcake project

Standards

MATH.8.G.A.1	Verify experimentally the properties of rotations, reflections, and translations:
MATH.8.G.A.2	Understand that a two-dimensional figure is congruent to another if the second can be obtained from the first by a sequence of rotations, reflections, and translations; given two congruent figures, describe a sequence that exhibits the congruence between them.
MATH.8.G.A.3	Describe the effect of dilations, translations, rotations, and reflections on two-dimensional figures using coordinates.

Suggested Modifications for Special Education, ELL and Gifted Students

*Consistent with individual plans, when appropriate.

- Students will be allowed to submit assignments using additional time per IEP/504 modifications.
- Students will receive modified assessments and use of multiplication chart and/or calculator according to IEP/504 modifications.
- ELL students will be allowed to use an internet translator or language glossary in order to translate vocabulary and assignments properly.
- ELL students may be allowed to work with another student who is fluent in their native language.

Suggested Technological Innovations/Use

- Instructional technology should be used to present and assess lessons such as: SMART Notebook, Powerpoint, and interactive whiteboards.
- Teachers are encouraged to use electronic assessments/activities to determine mastery of concepts taught. Examples of this include: IXL, Quizizz, Desmos, Linkit, etc.

Cross Curricular/Career Readiness, Life Literacies and Key Skills Practice

- 9.1: All students will demonstrate the creative, critical thinking, collaboration, and problem-solving skills needed to function successfully as both global citizens and workers in diverse ethnic and organizational cultures.
- 9.2: All students will be able to identify the importance of being knowledgeable about one's interests and talents, and being well informed about postsecondary and career options, career planning, and career requirements.

Unit 3: Angles and Triangles

Content Area: **Mathematics**
Course(s):
Time Period: **2nd Marking Period**
Length: **180**
Status: **Published**

Summary of the Unit

In this unit students will learn about different angle relationships, including ones that are formed with parallel lines and transversals. Students will also learn to calculate the interior angle sum of polygons and explore similar triangles to solve real-life problems.

MATH.8.G.A.5	Use informal arguments to establish facts about the angle sum and exterior angle of triangles, about the angles created when parallel lines are cut by a transversal, and the angle-angle criterion for similarity of triangles.

Enduring Understandings

Angles are fundamental in geometry, playing a crucial role in describing/understanding shapes and the properties of geometric figures. Through the study of angles, students develop an appreciation for the principles of geometry, including the connection of angles with symmetry, parallel lines, and polygons. The ability to measure, classify, and manipulate angles equips students with essential tools for problem-solving and critical thinking, laying a foundation for more advanced mathematical concepts and practical applications in fields such as engineering, architecture, and physics.

Essential Questions

1. What is the significance of angles in understanding the properties of geometric shapes?

2. How do we classify angles, and what criteria determine their classifications?

3. How does the measurement of angles contribute to our ability to describe and compare different geometric figures?

4. How do angles play a role in defining and identifying parallel lines, and what impact do they have on the properties of parallel lines?

5. How do angles contribute to our understanding of congruence, and what role do they play in proving that two figures are congruent?

6. How can angles be applied in real-world contexts, such as architecture, engineering, or art?

7. How do angles contribute to solving real-world problems involving distance, height, and angles of elevation?

8. In what ways can angles be used to analyze and describe the properties of polygons, including their interior and exterior angles?

9. How do angles contribute to our understanding of the relationships between various types of polygons, and what patterns emerge when studying angles in different shapes?

Summative Assessment and/or Summative Criteria

- Students will take a test to review concepts learned in Unit 3

- Students will demonstrate mastery through various assessment criteria included the unit

Resources

- Big Ideas Grade 8 Textbook
- IXL
- NJ Student Learning Standards for Mathematics
- Additional Resources located under the "Resource" tab

Unit Plan

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Topic/Selection Timeframe	General Objectives	Instructional Activities	Benchmarks/Assessments
Parallel Lines and Transversals (2-3 days)	Students will find missing angle measures created by the intersections of lines.	- Desmos exploration of angle relationships and pairs - Use of student-created, color-coded diagram labeling the types of angles formed by parallel lines - Calculate angle measures in application problems of parallel lines (progress questions to include creating and solving algebraic equations) - Suggested activity: Angle cut & paste Card Sort	- Daily homework check - Exit ticket 3.1 textbook mini assessment
Angles of Triangles (2 days)	Students will understand properties of	Define/model Interior Angle Sum Theorem and Exterior Angle	- Daily homework check - Exit ticket

		Theorems	• 3.2 textbook mini assessment
	interior and exterior angles of triangles.	• Create and solve algebraic equations to solve for unknown angle measures • Suggested activity: Triangle Theorems Pixel Art	
Review & Assess (2-3 days)	Students will demonstrate mastery of topics and concepts presented.	• Review using varied teacher created/chosen materials and tasks; some examples could include whiteboards, stations, online assessment tools, etc.	• 3.1-3.2 Quiz
Angles of Polygons (1 day)	Students will find interior angle measures of polygons.	• Explore connection between a shape's side lengths and number of triangles created to arrive at Polygon Interior Angle Sum Theorem • Use angle sum to create algebraic equations to solve for unknown angle measures • Suggested activity: digital task cards	• Daily homework check • Exit ticket • 3.3 textbook mini assessment
Similar and Congruent Figures (1 day)	Students will apply properties of similar/congruent figures to solve for unknown angle and side lengths.	• Define similar and congruent figures • Color code diagrams to label corresponding sides and angles • Create and solve algebraic equations to calculate unknown side lengths and angle measures • Suggested activity: Quizizz game	• Daily homework check • Exit ticket • Digital textbook assignment
Review & Assess (2-3 days)	Students will demonstrate mastery of topics and concepts presented.	• Review using varied teacher created/chosen materials and tasks; some examples could include whiteboards, stations, online assessment tools, etc.	• Mastery of IXL Angle topics • Chapter 3 Test

Standards

• NJSLS.8.G.A.5

Suggested Modifications for Special Education, ELL and Gifted Students

*Consistent with individual plans, when appropriate.

- Students will be allowed to submit assignments using additional time per IEP/504 modifications.

- Students will receive modified assessments and use of multiplication chart and/or calculator according to IEP/504 modifications.

- ELL students will be allowed to use an internet translator or language glossary in order to translate vocabulary and assignments properly.

- ELL students may be allowed to work with another student who is fluent in their native language.

Suggested Technological Innovations/Use

- Instructional technology should be used to present and assess lessons such as; SmartNotebook, PowerPoint, and interactive whiteboards.

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Cross Curricular/Career Readiness, Life Literacies and Key Skills Practice

- 9.1: All students will demonstrate the creative, critical thinking, collaboration, and problem-solving skills needed to function successfully as both global citizens and workers in diverse ethnic and organizational cultures.
- 9.2: All students will be able to identify the importance of being knowledgeable about one's interests and talents, and being well informed about postsecondary and career options, career planning, and career requirements.

Unit 4: Real Numbers, Cuberoots, Radicals and the Pythagorean Theorem

Content Area: **Mathematics**
Course(s):
Time Period: **2nd Marking Period**
Length: **180**
Status: **Published**

Summary of the Unit

Students will learn the different between rational and irrational numbers in the real number system. By doing this, they will first focus with working with square roots and cube roots. Once this is completed, they will then move into learning about the Pythagorean Theorem. While working with Pythagorean Theorem, they will find the missing sides of a triangle, set up and solve word problems, and find the distance between two points on a coordinate plane. They will then work on the converse of the Pythagorean Theorem. Once these concepts are completed, they will then move into converting fractions and decimals. Finally, they will then work with irrational numbers, which leads into estimating square roots and simplifying radicals.

MATH.8.G.B.6	Explain a proof of the Pythagorean Theorem and its converse.
MATH.8.G.B.7	Apply the Pythagorean Theorem to determine unknown side lengths in right triangles in real-world and mathematical problems in two and three dimensions.
MATH.8.G.B.8	Apply the Pythagorean Theorem to find the distance between two points in a coordinate system.
MATH.8.EE.A.2	Use square root and cube root symbols to represent solutions to equations of the form $x^2 = p$ and $x^3 = p$, where p is a positive rational number.
MATH.8.EE.A.2.a	Evaluate square roots of small perfect squares and cube roots of small perfect cubes. Know that $\sqrt{2}$ is irrational.
MATH.8.EE.A.2.b	Simplify numerical radicals, limiting to square roots (i.e., nonperfect squares).
MATH.8.NS.A.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.
MATH.8.NS.A.2	Use rational approximations of irrational numbers to compare the size of irrational numbers, locate them approximately on a number line diagram, and estimate the value of expressions (e.g., π^2).

Enduring Understandings

Through Unit 4, students will gain understanding of the Real Number system and the difference between a rational and irrational number. Students will understand how the Pythagorean Theorem only applies to right triangles. By estimating and simplifying radicals, students will be able to understand approximate estimations for non-perfect squares and where they can be located on a number line.

Essential Questions

- What strategies can be employed to estimate square roots without using a calculator?

- How does the converse of the Pythagorean Theorem help identify whether a triangle is right-angled or not?
- How can the Pythagorean Theorem be used to find the missing side length in a right triangle and the distance between two points?
- Can you use rational approximations to model irrational numbers accurately?
- What is the connection between square roots and exponents?

Summative Assessment and/or Summative Criteria

- Students will take a test to review concepts learned in Unit 4

-Students will demonstrate mastery through various assessment criteria included in the unit

Resources

-Big Ideas Grade 8 Textbook

-IXL

-NJ Student Learning Standards for Mathematics

-Additional Resources located under the "Resource" tab

Unit Plan

Topic/Selection Timeframe	General Objectives	Instructional Activities	Benchmarks/Assessments
Finding Square Roots (1 day)	Students will find square roots and evaluate expressions with square roots	- Define square root and discuss two possible solutions - Create a list of perfect squares - Evaluate expressions involving square roots by applying order of operations and computation skills - Ball toss activity- have students toss a	-Daily homework check -9.1 textbook mini assessment -Exit ticket

		ball around to review perfect squares from 1-400	
Finding Cube Roots (1 day)	Students will find cube roots	• Practice evaluating cube roots • Review tricks for evaluating cube roots: Ends in 2, try a number that ends in 8 Ends in 8, try a number that ends in 2 Ends in 3, try a number that ends in 7 Ends in 7, try a number that ends in 3 Ends in any other number, try that number in the ones place	-Daily homework check -9.3 textbook mini assessment -Exit ticket
The Pythagorean Theorem (4 days)	Students will identify missing sides of a right triangle by applying the Pythagorean Theorem Formula	• Identify the Pythagorean Theorem $a^2 + b^2 = c^2$ and discuss the parts (legs and hypotenuse) • Practice problems calculating missing sides • Evaluate word problems by setting up pictures to demonstrate and solve real life situations • Calculating distance on a coordinate plane by creating right triangles and finding the hypotenuse	-Daily homework check -9.2 textbook mini assessment -Exit ticket
The Converse of the Pythagorean Theorem (1 day)	Students will justify if 3 sides make a right triangle.	• Key Idea: Identify what the converse of the Pythagorean Theorem means • Discuss how to identify the hypotenuse • Make a list of Pythagorean triples • Practice problems involving 3 measurements and setting up Pythagorean Theorem to identify if both sides are equal	-Daily homework check -9.6 textbook mini assessment -Exit ticket

Review and Assess (2-3 days)	Students will demonstrate mastery of topics and concepts presented	Chapter review using varied teacher created/chosen materials and tasks	-Chapter Assessment
Rational Numbers (2 days)	Students will understand what a rational number is and convert fractions and decimals	• Vocabulary- rational number • Convert fractions to decimals • Convert decimals to fractions • Suggested Activity- drag and drop filling in chart with equivalent fractions and decimals	-Daily homework check -9.4 textbook mini assessment -Exit ticket
Irrational Numbers (2 days)	Students will determine if numbers are rational or irrational	• Create a Venn Diagram to organize types of numbers • Classify perfect squares and non-perfect squares as rational or irrational • Suggested Activity- card sorting using various numbers and identifying as rational or irrational	-Daily homework check -9.5 textbook mini assessment -Exit ticket
Estimating Square Roots (2 days)	Students will estimate square roots to the nearest tenths place	• Use a number line to estimate the location of square roots and what two integers it falls between • Use guess and check method with multiplication to approximate to the nearest tenths place. • Suggested Activity: Estimating Square roots chart to identify the estimated value and match the appropriate graph	-Daily homework check -Exit ticket (sorting non-perfect square roots on a number line)
Simplifying radicals (2 days)	Students will be able to simplify non-perfect squares	• Create factor trees to break down non-perfect squares • Observe all prime numbers and determine which have a pair and which do not	-Daily homework check -Exit ticket

Review and Assess (2-3 days)	Students will demonstrate mastery of topics and concepts presented	Chapter review using varied teacher created/chosen materials and tasks	-End of Unit Test -Mastery of IXL topics

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Standards

MATH.8.G.B.6	Explain a proof of the Pythagorean Theorem and its converse.
MATH.8.G.B.7	Apply the Pythagorean Theorem to determine unknown side lengths in right triangles in real-world and mathematical problems in two and three dimensions.
MATH.8.G.B.8	Apply the Pythagorean Theorem to find the distance between two points in a coordinate system.
MATH.8.EE.A.2	Use square root and cube root symbols to represent solutions to equations of the form ð𝑥²Â² = ð𝑝 and ð𝑥³Â³ = ð𝑝, where ð𝑝 is a positive rational number.
MATH.8.EE.A.2.a	Evaluate square roots of small perfect squares and cube roots of small perfect cubes. Know that √2 is irrational.
MATH.8.EE.A.2.b	Simplify numerical radicals, limiting to square roots (i.e., nonperfect squares).
MATH.8.NS.A.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.
MATH.8.NS.A.2	Use rational approximations of irrational numbers to compare the size of irrational numbers, locate them approximately on a number line diagram, and estimate the value of expressions (e.g., ð𝜋‹Â²).

Suggested Modifications for Special Education, ELL and Gifted Students

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- Students will be allowed to submit assignments using additional time per IEP/504 modifications.
- Students will receive modified assessments and use of multiplication chart and/or calculator according to IEP/504 modifications.
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Unit 5: Exponents and Scientific Notation

Content Area: **Mathematics**
Course(s):
Time Period: **3rd Marking Period**
Length: **180**
Status: **Published**

Summary of the Unit

In this unit students will evaluate exponential expressions as well as operate with/compare numbers in scientific notation.

MATH.8.EE.A		Work with radicals and integer exponents
MATH.8.EE.A.1		Know and apply the properties of integer exponents to generate equivalent numerical expressions.
MATH.8.EE.A.3		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.
MATH.8.EE.A.4		Perform operations with numbers expressed in scientific notation, including problems where both decimal and scientific notation are used. Use scientific notation and choose units of appropriate size for measurements of very large or very small quantities (e.g., use millimeters per year for seafloor spreading). Interpret scientific notation that has been generated by technology.

Enduring Understandings

Exponents and scientific notation are essential mathematical tools that empower students to efficiently represent, manipulate, and comprehend numerical expressions, particularly those involving very large or very small numbers. Through the study of exponents, students develop an understanding of powers which allows them to simplify complex expressions. Scientific notation emerges as a powerful method for expressing numbers concisely, utilizing powers of 10 to convey magnitude effectively. This unit equips students with not only the computational skills to perform operations involving exponents and scientific notation but also the conceptual understanding to apply these tools in real-world scenarios.

Essential Questions

1. Why do we use exponents, and how do they simplify repeated multiplication?

2. How does scientific notation relate to the concept of powers of 10, and how can we convert between standard form and scientific notation?

3. What is the purpose of scientific notation, and how does it provide a more efficient way to express very large or very small numbers?

4. How can we use exponents and scientific notation to analyze and compare the magnitudes of different quantities?

Summative Assessment and/or Summative Criteria

- Students will take a test to review concepts learned in Unit 5

- Students will demonstrate mastery through various assessment criteria included the unit

Resources

- Big Ideas Grade 8 Textbook
- IXL
- NJ Student Learning Standards for Mathematics
- Additional Resources located under the "Resource" tab

Unit Plan

In this section you may fill in this table or delete it and paste your own.

THEN you will associate your standards by selecting the "standards" tab above, clicking "associate standards" and selecting your standards for this unit from the list.

Topic/Selection Timeframe	General Objectives	Instructional Activities	Benchmarks/Assessments
Exponents (1 day)	Students will use exponents to write and evaluate expressions.	• Define keywords: power, base, exponent. • Demonstrate both writing and evaluating exponential expressions. • Suggested activity: class GimKit game.	• Daily homework check • Exit ticket • 8.1 textbook mini assessment
Zero and Negative Exponents (2 days)	Students will understand the concepts of zero and negative exponents.	• Use of a foldable for exponent rules and examples of each. • Define/practice zero exponent rule using both variable and constant bases; differentiate between -5^0 and $(-5)^0$. • Define/practice negative exponent rule using both variable and constant bases; emphasis on obtaining a positive exponent using the inverse. • Suggested activity: digital task cards.	• Daily homework check • Exit ticket • 8.4 textbook mini assessment

Topic	Objective	Instruction/Activities	Assessment
Product of Powers Property (1 day)	Students will generate equivalent expressions involving products of powers.	• Exploration expanding powers to arrive at properties: ○ $2^4 * 2^2 = (2*2*2*2)(2*2) = 2^6$ ○ $(7^3)^2 = (7*7*7)(7*7*7) = 7^6$ ○ $(2x)^3 = (2x)(2x)(2x) = 2^3x^3$ • Use of a foldable for exponent rules and examples of each. • Suggested activity: 8.2 digital textbook Big Ideas Assignment.	• Daily homework check • Exit ticket • 8.2 textbook mini assessment
Quotient of Powers Property (1 day)	Students will generate equivalent expressions involving quotients of powers.	• Exploration expanding powers to arrive at quotient property: ○ $(-4)^5 \div (-4)^2 = \cancel{(-4)}\cancel{(-4)}(-4)(-4)(-4) / \cancel{(-4)}\cancel{(-4)} = (-4)^3$ • Use of a foldable for exponent rules and examples of each. • Introduce nemonic device "MADS" to assist with multiplication and division properties. • Suggested activity: 8.3 digital textbook Big Ideas Assignment.	• Daily homework check • Exit ticket • 8.3 textbook mini assessment
Review & Assess (2-3 days)	Students will demonstrate mastery of topics and concepts presented.	• Review using varied teacher created/chosen materials and tasks; some examples could include whiteboards, stations, online assessment tools, etc.	• 8.1-8.4 Quiz
Scientific Notation (1 day)	Students will understand the concept of scientific notation.	• Note use of scientific notation to represent very large/small numbers. • Define standard form and requirements for a number to be in scientific notation. • Convert numbers from scientific notation to standard form and reverse. • Suggested activity: standard form and scientific notation scavenger hunt.	• Daily homework check • Exit ticket • 8.6 textbook mini assessment
Operations in Scientific Notation (3 days)	Students will perform operations with numbers written in scientific notation.	• Use a foldable to outline 4 scientific notation operations. • Multiplication/Division - emphasize using exponent rules "MADS" • Addition/Subtraction - emphasize obtaining a common power and balancing out the number (ie: if exponent goes up 1 power, then decimal must go down by 1 power of 10). • Suggested activity: all operations digital drag & drop activity.	• Daily homework check • Exit ticket • 8.7 textbook mini assessment
Review & Assess (2-3 days)	Students will demonstrate mastery of topics and concepts presented.	• Review using varied teacher created/chosen materials and tasks; some examples could include whiteboards, stations, online assessment tools, etc.	• Mastery of IXL Exponent & Scientific Notation topics • Chapter 8 Test

Standards

- NJSLS.8.EE.A.1
- NJSLS.8.EE.A.3
- NJSLS.8.EE.A.4

Suggested Modifications for Special Education, ELL and Gifted Students

*Consistent with individual plans, when appropriate.

- Students will be allowed to submit assignments using additional time per IEP/504 modifications.

- Students will receive modified assessments and use of multiplication chart and/or calculator according to IEP/504 modifications.

- ELL students will be allowed to use an internet translator or language glossary in order to translate vocabulary and assignments properly.

- ELL students may be allowed to work with another student who is fluent in their native language.

Suggested Technological Innovations/Use

- Instructional technology should be used to present and assess lessons such as; SmartNotebook, PowerPoint, and interactive whiteboards.

- Teachers are encouraged to use electronic assessments/activities to determine mastery of concepts taught. Examples of this include: IXL, Quizizz, Desmos, Link-It, etc.

Cross Curricular/Career Readiness, Life Literacies and Key Skills Practice

- 9.1: All students will demonstrate the creative, critical thinking, collaboration, and problem-solving skills needed to function successfully as both global citizens and workers in diverse ethnic and organizational cultures.
- 9.2: All students will be able to identify the importance of being knowledgeable about one's interests and talents, and being well informed about postsecondary and career options, career planning, and

career requirements.

Unit 6: Function and Linear Equations

Content Area: **Mathematics**
Course(s):
Time Period: **3rd Marking Period**
Length: **180**
Status: **Published**

Summary of the Unit

Students will gain understanding of what a function is, through observing charts, graphs, mapping and ordered pairs. They will then focus on graphing linear equations. They will identify linear equations as having a constant rate of change, also to be identified as slope. They will learn how to calculate slope and use it to describe characteristics of a graph. Students will also learn about slope intercept form, standard form, and point slope form and use these to graph equations on a coordinate plane.

MATH.8.F.A.1	Understand that a function is a rule that assigns to each input exactly one output. The graph of a function is the set of ordered pairs consisting of an input and the corresponding output.
MATH.8.F.A.3	Interpret the equation $y = mx + b$ as defining a linear function, whose graph is a straight line; give examples of functions that are not linear.
MATH.8.F.B.4	Construct a function to model a linear relationship between two quantities. Determine the rate of change and initial value of the function from a description of a relationship or from two (x, y) values, including reading these from a table or from a graph. Interpret the rate of change and initial value of a linear function in terms of the situation it models, and in terms of its graph or a table of values.
MATH.8.F.B.5	Describe qualitatively the functional relationship between two quantities by analyzing a graph (e.g., where the function is increasing or decreasing, linear or nonlinear). Sketch a graph that exhibits the qualitative features of a function that has been described verbally.
MATH.8.EE.B.5	Graph proportional relationships, interpreting the unit rate as the slope of the graph. Compare two different proportional relationships represented in different ways.

Enduring Understandings

Students will understand that functions are fundamental mathematical entities that model relationships between variables, representing how one quantity depends on another. Students will understand that linear equations model relationships with a constant rate of change, representing a straight-line graph.

Essential Questions

- What role do variables, domains, and ranges play in understanding functions?
- How do we determine if a relationship between two quantities is a function or not?
- What is the significance of the slope and y-intercept in a linear equation's graph?

- How do we determine the slope and y-intercept from different representations of linear equations?
- In what ways do changes in slope and y-intercept affect the graph of a linear equation?
- How do we represent linear equations in different forms (standard form, slope-intercept form, point-slope form), and what are the advantages of each form?

Summative Assessment and/or Summative Criteria

Students will take assessments to review concepts learned in Unit 6.

Students will demonstate mastery through various assessment criteria included in the unit.

Students will demonstrate mastery on the end of unit performance task

Resources

- Big Ideas Grade 8 Textbook
- IXL
- NJ Student Learning Standards for Mathematics
- Additional Resources located under the "Resource" tab

Unit Plan

Topic/Selection Timeframe	General Objectives	Instructional Activities	Benchmarks/Assessments
Functions (3 days)	Students will identify and represent functions using tables, graphs, ordered pairs and mapping.	- Define vocabulary of x and y values (input/output and domain and range) - Observe relations to identify domain and range of each relation - Observe relations to classify function vs. non-function - Learn about vertical line test and observe graphs to test for a function - Suggested Activity: Sorting activity- give students a variety of relations through graphs, charts, and ordered pairs to	- Daily homework check - Functions graded assignment - Exit ticket: Explain how your determine whether or not a relation is a function.

		classify as function/non function	
Slope of a Line (2 days)	Students will find the slope of a line by using the slope formula	• Review addition/subtraction integer rules • Define slope and classify the 4 types (positive/negative/zero/undefined) • Show "Slope Dude" video and complete foldable • Suggested Activity: Drag and Drop slope activity through Google Slides	• Daily homework check • 4.2 textbook mini assessment • Exit ticket
Review and Assess (2-3 days)	Students will demonstrate mastery of topics and concepts presented	Chapter review using varied teacher created/chosen materials and tasks	-Chapter Quiz
Graphing Linear Equations in Slope Intercept Form (2 days)	Students will identify slope and y-intercept and use them to graph linear equations	• Introduce slope intercept form: y=mx+b. Review what the m and b represent. Also discuss x and y being points on the line • Give equations where students need to identify the slope and y-intercept • Give slope and y-intercept and students will set up equations in slope intercept form • Graphing equations by plotting y-intercept first and using slope to create the line • Suggested activity: Use communicators with graphs-students work in teams to turn over task cards and graph equations	• Daily homework check • 4.4 textbook mini assessment • Exit ticket
Graphing Linear Equations in Standard Form (3 days)	Students will convert standard form to slope intercept form in order to graph equations Students will use standard form to identify intercepts of a line	• Part 1: Work with converting standard to slope intercept form and graphing • Part 2: Discuss what x and y intercepts are. Then, work to identify x and y intercepts by substituting 0 in and finding the necessary intercept • Suggested Activity- Bad Dog Google form activity	• Daily homework check • 4.5 textbook mini assessment • Exit ticket
Review and Assess (2-3 days)	Students will demonstrate mastery of topics and concepts	Chapter review using varied teacher created/chosen materials and tasks	-Chapter Quiz

	presented		
Writing Equations in Slope-intercept Form (1 day)	Students will be able to write equations in slope intercept form by identifying the slope and y-intercept.	• 4.6 Exploration 2 • Discuss parts to slope intercept form: must have slope and y-intercept • Observe charts and graphs to identify y-intercept and use slope formula to calculate slope	• Daily homework check • 4.6 textbook mini assessment • Exit ticket
Writing Equations in Point-Slope Form (3 days)	Students will be able to write point slope equations using a point and a slope Students will be able to write equations in point slope form and convert to slope intercept form	• Discuss point slope formula- discuss needing our m and plugging in for x_1 and x_1 • Identify point and slope given an equation in point-slope form • Write equations in point-slope form by substituting values in for the slope and an ordered pair • Work to write equations in slope intercept form, by first plugging in the point slope and converting over to slope intercept form	• Daily homework check • 4.7 textbook mini assessment • Exit ticket
Review and Assess (2-3)	Students will demonstrate mastery of topics and concepts presented	Chapter review using varied teacher created/chosen materials and tasks	-End of Unit Test -Master of IXL topics -Marking Period project-Stain Glass Project

Standards

MATH.8.F.A.1	Understand that a function is a rule that assigns to each input exactly one output. The graph of a function is the set of ordered pairs consisting of an input and the corresponding output.
MATH.8.F.A.3	Interpret the equation 𝑦 = 𝑚𝑥 + 𝑏 as defining a linear function, whose graph is a straight line; give examples of functions that are not linear.
MATH.8.F.B.4	Construct a function to model a linear relationship between two quantities. Determine the rate of change and initial value of the function from a description of a relationship or from two (𝑥, 𝑦) values, including reading these from a table or from a graph. Interpret the rate of change and initial value of a linear function in terms of the situation it models, and in terms of its graph or a table of values.
MATH.8.F.B.5	Describe qualitatively the functional relationship between two quantities by analyzing a

graph (e.g., where the function is increasing or decreasing, linear or nonlinear). Sketch a graph that exhibits the qualitative features of a function that has been described verbally.

MATH.8.EE.B.5	Graph proportional relationships, interpreting the unit rate as the slope of the graph. Compare two different proportional relationships represented in different ways.

Suggested Modifications for Special Education, ELL and Gifted Students

*Consistent with individual plans, when appropriate.

- Students will be allowed to submit assignments using additional time per IEP/504 modifications.
- Students will receive modified assessments and use of multiplication chart and/or calculator according to IEP/504 modifications.
- ELL students will be allowed to use an internet translator or language glossary in order to translate vocabulary and assignments properly.
- ELL students may be allowed to work with another student who is fluent in their native language.

Suggested Technological Innovations/Use

- Instructional technology should be used to present and assess lessons such as: SMART Notebook, Powerpoint, and interactive whiteboards.
- Teachers are encouraged to use electronic assessments/activities to determine mastery of concepts taught. Examples of this include: IXL, Quizizz, Desmos, Linkit, etc.

Cross Curricular/Career Readiness, Life Literacies and Key Skills Practice

- 9.1: All students will demonstrate the creative, critical thinking, collaboration, and problem-solving skills needed to function successfully as both global citizens and workers in diverse ethnic and organizational cultures.
- 9.2: All students will be able to identify the importance of being knowledgeable about one's interests and talents, and being well informed about postsecondary and career options, career planning, and career requirements.

Unit 7: Systems of Linear Equations

Content Area: **Mathematics**
Course(s):
Time Period: **4th Marking Period**
Length: **180**
Status: **Published**

Summary of the Unit

In this unit, students will learn to recognize, represent, and solve systems of linear equations using various methods (graphing, substitution, and elimination). Practical applications of systems of equations, such as solving problems involving two variables and modeling real-world scenarios will be emphasized. By the end of the unit, students should be proficient in solving systems algebraically and graphically as well as interpret solutions in the context of problems.

MATH.8.F.B.4	Construct a function to model a linear relationship between two quantities. Determine the rate of change and initial value of the function from a description of a relationship or from two (x, y) values, including reading these from a table or from a graph. Interpret the rate of change and initial value of a linear function in terms of the situation it models, and in terms of its graph or a table of values.
MATH.8.EE.C.8	Analyze and solve pairs of simultaneous linear equations.
MATH.8.EE.C.8.a	Understand that solutions to a system of two linear equations in two variables correspond to points of intersection of their graphs, because points of intersection satisfy both equations simultaneously.
MATH.8.EE.C.8.b	Solve systems of two linear equations in two variables using the substitution method and estimate solutions by graphing the equations. Solve simple cases by inspection.
MATH.8.EE.C.8.c	Solve real-world and mathematical problems leading to two linear equations in two variables.
MATH.8.SP.A.3	Use the equation of a linear model to solve problems in the context of bivariate measurement data, interpreting the slope and intercept.

Enduring Understandings

Through the study of systems of equations, students develop the ability to model and analyze real-world situations. This unit equips students with the skills to solve systems using algebraic techniques, such as substitution and elimination, as well as graphical methods. Furthermore, students gain an appreciation for the versatility of systems of equations in addressing diverse problem types, fostering critical thinking, and preparing them for more advanced mathematical concepts.

Essential Questions

1. What is a system of equations, and how does it differ from a single equation?

2. In what real-world situations can a system of equations be used to model and solve problems?

3. What strategies can be employed to determine the number of solutions a system of equations may have?

4. How do variables in a system of equations relate to different aspects of a problem scenario, and how can they be interpreted in context?

5. How can graphical representations aid in understanding and solving systems of equations?

6. In what ways do substitution and elimination methods contribute to the solution of systems of equations?

Summative Assessment and/or Summative Criteria

- Students will take a test to review concepts learned in Unit 7

- Students will demonstrate mastery through various assessment criteria included the unit

Resources

- Big Ideas Grade 8 Textbook
- IXL
- NJ Student Learning Standards for Mathematics
- Additional Resources located under the "Resource" tab

Unit Plan

In this section you may fill in this table or delete it and paste your own.

THEN you will associate your standards by selecting the "standards" tab above, clicking "associate standards" and selecting your standards for this unit from the list.

Topic/Selection Timeframe	General Objectives	Instructional Activities	Benchmarks/Assessments
Solving Systems of Linear Equations by Graphing (2 days)	Students will understand how to solve systems of linear equations by graphing.	- Review graphing linear equation process. - Define and identify 3 solution types on a graph: one solution, no solution, infinitely many solutions. - Discuss point(s) of intersection being solutions that satisfy both equations. - Incorporate word problems and interpret solution(s) to the system of	- Daily homework check - Exit ticket 5.1 textbook mini assessment

		• linear equations in its context. • Suggested activity: 5.1 digital textbook Big Ideas Assignment.	
Solving Systems of Linear Equations by Substitution (2 days)	Students will understand how to solve systems of linear equations by substitution.	• Review solving multi-step equations and equations with variables on both sides. • Identify how each solution type looks like algebraically. • Incorporate word problems and interpret solution(s) to the system of linear equations in its context. • Suggested activity: Pairs Check Substitution Worksheet.	• Daily homework check • Exit ticket • 5.2 textbook mini assessment
Review & Assess (2-3 days)	Students will demonstrate mastery of topics and concepts presented.	• Review using varied teacher created/chosen materials and tasks; some examples could include whiteboards, stations, online assessment tools, etc.	• 5.1-5.2 Quiz
Solving Systems of Linear Equations by Elimination (2 days)	Students will understand how to solve systems of linear equations by elimination.	• Addition/Subtraction - Review additive inverse property and apply it to eliminate one variable in a system of linear equations. • Multiplication - Review distributive property and apply it to create a common coefficient in order to eliminate one variable in a system of linear equations. • Incorporate word problems and interpret solution(s) to the system of linear equations in its context. • Suggested activity: elimination digital drag & drop activity.	• Daily homework check • Exit ticket • 5.3 textbook mini assessment
Review & Assess (2-3 days)	Students will demonstrate mastery of topics and concepts presented.	• Review using varied teacher created/chosen materials and tasks; some examples could include whiteboards, stations, online assessment tools, etc.	• Mastery of IXL Systems of Equations topics • Chapter 5 Test

Standards

- NJSLS.8.EE.C.8a
- NJSLS.8.EE.C.8b
- NJSLS.8.EE.C.8c
- NJSLS.8.F.B.4
- NJSLS.8.SP.A.3

Suggested Modifications for Special Education, ELL and Gifted Students

*Consistent with individual plans, when appropriate.

- Students will be allowed to submit assignments using additional time per IEP/504 modifications.

- Students will receive modified assessments and use of multiplication chart and/or calculator according to IEP/504 modifications.

- ELL students will be allowed to use an internet translator or language glossary in order to translate vocabulary and assignments properly.

- ELL students may be allowed to work with another student who is fluent in their native language.

Suggested Technological Innovations/Use

- Instructional technology should be used to present and assess lessons such as; SmartNotebook, PowerPoint, and interactive whiteboards.

- Teachers are encouraged to use electronic assessments/activities to determine mastery of concepts taught. Examples of this include: IXL, Quizizz, Desmos, Link-It, etc.

Cross Curricular/Career Readiness, Life Literacies and Key Skills Practice

- 9.1: All students will demonstrate the creative, critical thinking, collaboration, and problem-solving skills needed to function successfully as both global citizens and workers in diverse ethnic and organizational cultures.
- 9.2: All students will be able to identify the importance of being knowledgeable about one's interests and talents, and being well informed about postsecondary and career options, career planning, and career requirements.

Unit 8: Data Analysis and Displays

Content Area: **Mathematics**
Course(s):
Time Period: **4th Marking Period**

Length: **180**
Status: **Published**

Summary of the Unit

In this unit, students will focus on modeling data to make predictions. They will represent data using scatter plots and two-way tables. While observing various representations, students will draw conclusions and make comparisons between sets of data.

MATH.8.SP.A.1	Construct and interpret scatter plots for bivariate measurement data to investigate patterns of association between two quantities. Describe patterns such as clustering, outliers, positive or negative association, linear association, and nonlinear association.
MATH.8.SP.A.2	Know that straight lines are widely used to model relationships between two quantitative variables. For scatter plots that suggest a linear association, informally fit a straight line, and informally assess the model fit (e.g., line of best fit) by judging the closeness of the data points to the line.
MATH.8.SP.A.3	Use the equation of a linear model to solve problems in the context of bivariate measurement data, interpreting the slope and intercept.
MATH.8.SP.A.4	Understand that patterns of association can also be seen in bivariate categorical data by displaying frequencies and relative frequencies in a two-way table. Construct and interpret a two-way table summarizing data on two categorical variables collected from the same subjects. Use relative frequencies calculated for rows or columns to describe possible association between the two variables.

Enduring Understandings

The way data is collected, organized and displayed influences interpretation. By using different methods of representing data, relationships can be displayed to model real-world data.

Essential Questions

- o How does the overall pattern of points in a scatter plot provide information about the relationship between the two variables?
- o What can be inferred about the data based on the clustering or dispersion of points?
- o How can you determine if there is a positive, negative, or no correlation between the variables by examining a scatter plot?
- o How do outliers in a scatter plot affect the interpretation of the overall trend or pattern?
- o What is the purpose of a line of best fit in a scatter plot?
- o How can a scatter plot be used to make predictions about one variable based on the other?
- o How can scatter plots be used to compare relationships between different groups or categories?

Summative Assessment and/or Summative Criteria

Students will take an assessment to review concepts learned in Unit 8.

Students will demonstrate mastery through various assessment criteria included in the unit.

Resources

-Big Ideas Grade 8 Textbook

-IXL

-NJ Student Learning Standards for Mathematics

-Additional Resources located under the "Resource" tab

Unit Plan

Topic/Selection Timeframe	General Objectives	Instructional Activities	Benchmarks/Assessments
Scatter Plots (1 day)	Students will create scatter plots to describe patters and relationships between two quantities	- Key idea: Define what a scatter plot is - Demonstrate using visuals to show correlation on scatter plots "Thumbs up, thumbs down" to help determine type of correlation of relationships - Create scatter plots from ordered pairs and determine relationships	-Daily homework check -6.1 textbook mini assessment -Exit ticket
Lines of Fit (2 day)	Students will create and interpret equations to model a line of fit	- Review finding slopes and y-intercepts - Demonstrate how to create a line of best fit that goes approximately through the center of the data - Set up equations by plugging slope and a	-Daily homework check -6.2 textbook mini assessment -Exit ticket

		point into point slope form and converting to slope intercept form	
Two-Way Tables	Students will use two-way tables to represent data	• Vocabulary- Definte two-way table, joint frequency, and marginal frequencies • Practice reading a two-way table • Observe a study and interpret the marginal frequencies • Practice making two-way tables using data	-Daily homework check -6.3 textbook mini assessment -Exit ticket
Review and Assess (2-3 days)	Students will demonstrate mastery of topics and concepts presented	Chapter review using varied teacher created/chosen materials and tasks	-End of Unit Test -Mastery of IXL topics

Standards

MATH.8.SP.A.1	Construct and interpret scatter plots for bivariate measurement data to investigate patterns of association between two quantities. Describe patterns such as clustering, outliers, positive or negative association, linear association, and nonlinear association.
MATH.8.SP.A.2	Know that straight lines are widely used to model relationships between two quantitative variables. For scatter plots that suggest a linear association, informally fit a straight line, and informally assess the model fit (e.g., line of best fit) by judging the closeness of the data points to the line.
MATH.8.SP.A.3	Use the equation of a linear model to solve problems in the context of bivariate measurement data, interpreting the slope and intercept.
MATH.8.SP.A.4	Understand that patterns of association can also be seen in bivariate categorical data by displaying frequencies and relative frequencies in a two-way table. Construct and interpret a two-way table summarizing data on two categorical variables collected from the same subjects. Use relative frequencies calculated for rows or columns to describe possible association between the two variables.

Suggested Modifications for Special Education, ELL and Gifted Students

*Consistent with individual plans, when appropriate.

- Students will be allowed to submit assignments using additional time per IEP/504 modifications.
- Students will receive modified assessments and use of multiplication chart and/or calculator according to IEP/504 modifications.
- ELL students will be allowed to use an internet translator or language glossary in order to translate vocabulary and assignments properly.
- ELL students may be allowed to work with another student who is fluent in their native language.

Suggested Technological Innovations/Use

- Instructional technology should be used to present and assess lessons such as: SMART Notebook, Powerpoint, and interactive whiteboards.
- Teachers are encouraged to use electronic assessments/activities to determine mastery of concepts taught. Examples of this include: IXL, Quizizz, Desmos, Linkit, etc.

Cross Curricular/Career Readiness, Life Literacies and Key Skills Practice

- 9.1: All students will demonstrate the creative, critical thinking, collaboration, and problem-solving skills needed to function successfully as both global citizens and workers in diverse ethnic and organizational cultures.
- 9.2: All students will be able to identify the importance of being knowledgeable about one's interests and talents, and being well informed about postsecondary and career options, career planning, and career requirements.

Unit 9: Volume and Similar Solids (Additional Standard)

Content Area: **Mathematics**
Course(s):
Time Period: **4th Marking Period**
Length: **180**
Status: **Published**

Summary of the Unit

In this unit students will focus on analyzing two and three dimensional figures. Students will also apply formulas to calculate the circumference, area, and volume of various geometrical figures.

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

Enduring Understandings

Volume is a fundamental geometric property that enables students to quantify and compare the capacity of three-dimensional objects. The study of volume equips students with the tools to calculate volumes of cylinders, cones, and spheres, using both formulas and proportional reasoning. Furthermore, students gain insights into real-world applications, such as problem-solving scenarios involving capacity, design, and optimization.

Essential Questions

1. What is volume, and how does it differ from other geometric measurements, such as area?

2. In what ways does the concept of volume apply to real-world scenarios and problem-solving situations?

3. How can technology, such as computer software or calculators, assist in visualizing and calculating volumes of three-dimensional objects?

4. How do changes in the dimensions of a three-dimensional object affect its volume, and how can this understanding be applied to design and optimization?

Summative Assessment and/or Summative Criteria

- Students will take a test to review concepts learned in Unit 9

- Students will demonstrate mastery through various assessment criteria included the unit

Resources

- Big Ideas Grade 8 Textbook
- IXL
- NJ Student Learning Standards for Mathematics
- Additional Resources located under the "Resource" tab

Unit Plan

In this section you may fill in this table or delete it and paste your own.

THEN you will associate your standards by selecting the "standards" tab above, clicking "associate standards" and selecting your standards for this unit from the list.

Topic/Selection Timeframe	General Objectives	Instructional Activities	Benchmarks/Assessments
Volumes of Cylinders (1 day)	Students will find the volume of a cylinder.	- Introduce 3-D figures, key vocabulary terms, volume definition. - Use a foldable/graphic organizer for Chapter 10 volume formulas. - Review area of a circle formula and demonstrate how it is applied to the volume of a cylinder. - Manipulate radius and height to change a figure's volume. - Suggested activity: Desmos "Cylinders" activity.	- Daily homework check - Exit ticket 10.1 textbook mini assessment
Volumes of Cones (1 day)	Students will find the volume of a cone.	- Define cone and its volume formula. - Lead class discussion of how cone formula relates to that of a cylinder. - Demonstrate connection with use of 3-D plastic figures and rice, pouring 3 cones into 1 cylinder. - Incorporate real-world word problems calculating the volume/dimensions of cones. - Suggested activity: Volume of Cones maze worksheet.	- Daily homework check - Exit ticket 10.2 textbook mini assessment
Volume of Spheres (1 day)	Students will find the volume of a	- Define sphere and its volume formula. - Have class work in small groups to complete 8.G.A.9: "How Much Ice	- Daily homework check - Exit ticket 10.3 textbook mini

	sphere.	Cream" task where they will apply knowledge of 3-D figures' volume. • Suggested activity: digital task cards.	assessment
Review & Assess (2-3 days)	Students will demonstrate mastery of topics and concepts presented.	• Review using varied teacher created/chosen materials and tasks; some examples could include whiteboards, stations, online assessment tools, etc.	• 10.1-10.3 Quiz
Surface Areas and Volumes of Similar Solids (2 days)	Students will find the surface areas and volumes of similar solids.	• Review surface area, volume, and proportions. • Identify similar solids and use them to set up/solve proportions for an unknown measurement. • Define similar solid surface area and volume formulas. • Incorporate real-world word problems using similar solids. • Suggested activity: 10.4 digital textbook Big Ideas Assignment.	• Daily homework check • Exit ticket • 10.4 textbook mini assessment
Review & Assess (2-3 days)	Students will demonstrate mastery of topics and concepts presented.	• Review using varied teacher created/chosen materials and tasks; some examples could include whiteboards, stations, online assessment tools, etc.	• Mastery of IXL Volume topics • Chapter 10 Test

Standards

- NJSLS.8.G.C.9

Suggested Modifications for Special Education, ELL and Gifted Students

*Consistent with individual plans, when appropriate.

- Students will be allowed to submit assignments using additional time per IEP/504 modifications.

- Students will receive modified assessments and use of multiplication chart and/or calculator according to IEP/504 modifications.

- ELL students will be allowed to use an internet translator or language glossary in order to translate vocabulary and assignments properly.

- ELL students may be allowed to work with another student who is fluent in their native language.

Suggested Technological Innovations/Use

- Instructional technology should be used to present and assess lessons such as; SmartNotebook, PowerPoint, and interactive whiteboards.

- Teachers are encouraged to use electronic assessments/activities to determine mastery of concepts taught. Examples of this include: IXL, Quizizz, Desmos, Link-It, etc.

Cross Curricular/Career Readiness, Life Literacies and Key Skills Practice

- 9.1: All students will demonstrate the creative, critical thinking, collaboration, and problem-solving skills needed to function successfully as both global citizens and workers in diverse ethnic and organizational cultures.
- 9.2: All students will be able to identify the importance of being knowledgeable about one's interests and talents, and being well informed about postsecondary and career options, career planning, and career requirements.