



Township of Ocean Schools

Assistant Superintendent
Office of Teaching and Learning

SPARTAN MISSION:

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

DEPARTMENT Mathematics

COURSE Pre-Algebra, Grades 7 & 8

Curriculum Development Timeline

School: Township of Ocean Intermediate School

Course: Pre-Algebra, Grades 7 & 8

Department: Mathematics

Board Approval	Supervisor	Notes
July 2012	Janet Bluefield	Born Date
August 2016	Amanda Maltese	Revisions
July 2017	Nichole Kerney	Revisions/Alignment to NJSIS
March 2019	Nichole Kerney	Review
May 2022	Gerard Marrone	Name Change
August 2022	Gerard Marrone	Alignment to Standards
August 2025	Greg Colon	Revisions/Alignment to Standards

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COURSE Pre-Algebra, Grades 7 & 8

Township of Ocean Pacing Guide			
Week	Marking Period 1	Week	Marking Period 3
1	Solving Equations	21	Transformations
2	Solving Equations	22	Transformations
3	Solving Equations	23	Transformations
4	Solving Equations	24	Transformations
5	Linear Equations	25	Angles & Triangles
6	Linear Equations	26	Angles & Triangles
7	Linear Equations	27	Angles & Triangles
8	Linear Equations	28	Angles & Triangles
9	Linear Equations	29	Exponents & Scientific Notation
10	Systems of Equations	30	Exponents & Scientific Notation
Week	Marking Period 2	Week	Marking Period 4
11	Systems of Equations	31	Exponents & Scientific Notation
12	Systems of Equations	32	Exponents & Scientific Notation
13	Systems of Equations	33	Pythagorean Theorem
14	Systems of Equations	34	Pythagorean Theorem
15	Functions	35	Pythagorean Theorem
16	Functions	36	Data Analysis
17	Functions	37	Data Analysis
18	Functions	38	Volume
19	Functions	39	Volume
20	Functions	40	Volume

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Core Instructional & Supplemental Materials including various levels of Texts

Core Instruction: Big Ideas Math Modeling Real Life Grade 8 (Big Ideas Learning) ©2022
Supplemental: NJSLA Released Questions, IXL Math
Special Education Supplemental: Prodigy

Time Frame	4 Weeks
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Topic

Solving Equations

Alignment to Standards

8.EEC.7: Solve Linear Equations in one variable

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 in the form $x=a$, $a=a$, or $a=b$ results (where a and b are different numbers)

8.EE.C7.b: Solve linear equations with rational number coefficients, including equations whose solutions require expanding expressions using the distributive property and collecting like terms.

Learning Objectives and Activities

SWBAT answer the following questions:

- How do you solve an equation when the variable appears on both sides?
- Why is it important to simplify both sides of an equation before solving?
- What strategies help ensure accuracy when solving multi-step equations?
- How can you use properties of equality to solve linear equations?
- How do you know how many solutions a linear equation has?
- What does it mean when an equation has no solution? One solution? Infinitely many solutions?

SWBAT:

- Apply properties of equality to produce equivalent equations.
- Solve equations using addition, subtraction, multiplication, or division.
- Use equations to model and solve real-life problems.
- Apply properties to produce equivalent equations.

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- Solve multi-step equations.
- Use multi-step equations to model and solve real-life problems
- Explain how to solve an equation with variables on both sides.
- Determine whether an equation has one solution, no solution, or infinitely many solutions.
- Use equations with variables on both sides to model and solve real-life problems.

Learning Activities:

Motivate: Students will explore the idea of an inverse through a game.

Exploration: Students will use algebra tiles to model and solve equations

Big Ideas Chapter 1: Sections 1.1, 1.2, 1.3

- Additional Resources by Chapter
 - Extra Practice Pages
 - Reteach Pages
 - Puzzle Time Pages
 - Differentiating the Lesson
 - Tutorial Videos
 - Skills Review Handbook
 - Skills Trainer-online
- IXL Tutorial videos
- IXL Practice
- IXL Games

Assessments

Formative:

- Rich Thinking Tasks
- Classroom Observation
- Student Reflections and Math Talks
- Targeted Practice via IXL

Summative:

- Mid-unit Quizzes
- Topic Tests
- Performance Tasks/Projects

Alternative:

- NJSLA Released Problems

Interdisciplinary Connections

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Science: Students apply algebraic reasoning to formulas in science, such as solving for variables in speed, density, or chemical equations.

MS-ETS1-1 – Define the criteria and constraints of a design problem;

MS-PS1-2 – Analyze and interpret data on properties of substances.

Career Readiness, Life Literacies, and Key Skills

9.4.12.CI.1 Demonstrate the ability to reflect, revise, and explain reasoning and decision-making when solving problems collaboratively.

9.4.8.CI.2 Collaborate with others to develop a solution using multiple perspectives. Aligns with discussion, group presentations, or group project-based learning.

9.4.8.CI.3 Use collaborative technologies to explore diverse viewpoints and generate ideas for solutions. Group problem-solving, peer teaching, or inquiry based tasks.

9.4.12.CI.2 Critically analyze ideas within and between groups to ensure productive collaboration. Encourages meaningful group work with clear roles and outcomes.

Technology Integration

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

- **9.4.8.TL.6:** Collaborate to develop and publish work that provides perspectives on a real-world problem.
- **9.4.8.TL.3:** Select appropriate tools to organize and present information digitally.
- **9.4.5.CT.3:** Describe how digital tools and technology may be used to solve problems.
- **9.4.12.TL.1:** Assess digital tools based on features such as accessibility options, capacities, and utility for accomplishing a specified task
- **9.4.12.TL.4:** Collaborate in online learning communities or social networks or virtual worlds to analyze and propose a resolution to a real-world problem.

Career Education

- **9.4.12.CI.2** – Communicate ideas clearly and effectively, using verbal, nonverbal, and digital communication techniques.
- **9.4.12.CT.3** – Engage in discussions to clarify ideas, present opinions, and build on others' contributions.

Time Frame	5 Weeks
Topic	
Linear Equations	

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COURSE Pre-Algebra, Grades 7 & 8

Alignment to Standards

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

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

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.

Learning Objectives and Activities

SWBAT answer the following questions:

- How can you recognize a proportional relationship from a graph, table, or equation?
- What does the slope of a graph tell us about the relationship between two quantities?
- How can we compare different proportional relationships represented in graphs, tables, or equations?
- What do the equations $y = mx$ and $y = mx + b$ represent, and how are they different?
- How do the slope and y-intercept affect the graph of a linear equation?

SWBAT demonstrate understanding of the following:

- Graphing linear equations
- Finding and interpreting the slope of a line
- Graphing proportional relationships
- Graphing linear equations in slope-intercept form and standard form
- Writing equations of lines in slope-intercept form
- Writing equations of lines in point slope form

Learning Activities:

Motivate: Students will play a game of coordinate BINGO to review creating and using ordered pairs

Exploration: Students will use a table of values and a graph to model a linear equation.

Big Ideas Chapter 4: Sections 4.1, 4.2, 4.3, 4.4, 4.6, 4.7

- Additional Resources by Chapter
 - Extra Practice Pages

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COURSE Pre-Algebra, Grades 7 & 8

- Reteach Pages
- Puzzle Time Pages
- Differentiating the Lesson
- Tutorial Videos
- Skills Review Handbook
- Skills Trainer-online
- IXL Tutorial videos
- IXL Practice
- IXL Games

Assessments

Formative:

- Rich Thinking Tasks
- Classroom Observation
- Student Reflections and Math Talks
- Targeted Practice via IXL

Summative:

- Mid-unit Quizzes
- Topic Tests
- Performance Tasks/Projects

Alternative:

- NJSLA Released Problems

Interdisciplinary Connections

Geography/Environmental Science (MS-ESS2-5): Develop graph-reading skills using real-world data sets .

- Interpreting graphs about climate change (e.g., CO₂ levels over time), where slope shows rate of change and y-intercept gives starting data.

Health & PE: 2.2.8. PF.4: Implement and assess the effectiveness of a fitness plan based on health data, the assessment of one's personal fitness levels and monitor health/fitness indicators before, during, and after the workout program.

- Tracking heart rate increase over time during exercise: slope represents rate of heart rate change, y-intercept is resting heart rate.

Career Readiness, Life Literacies, and Key Skills

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COURSE Pre-Algebra, Grades 7 & 8

9.1.8.PB.6 Construct a budget to save for short-term, long-term and charitable goals. Budget planning: $y = mx + b$ where m is monthly expenses and b is fixed costs (like rent). The slope shows how spending changes with time

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Technology Integration

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

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Career Education

- **9.4.12.CI.2** – Communicate ideas clearly and effectively, using verbal, nonverbal, and digital communication techniques.
- **9.4.12.CT.3** – Engage in discussions to clarify ideas, present opinions, and build on others' contributions.

Time Frame	5 Weeks
Topic	
Systems of Equations	
Alignment to Standards	

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COURSE Pre-Algebra, Grades 7 & 8

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

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

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.

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.

c. Solve real-world and mathematical problems leading to two linear equations in two variables.

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.

Learning Objectives and Activities

SWBAT answer the following questions:

- What does the point of intersection of two lines represent?
- How can you tell from a graph whether a system of equations has one solution, no solution, or infinitely many solutions?
- How can you solve a system of equations using substitution?
- When is graphing or inspection a useful strategy for solving systems?
- How can you use a system of equations to solve real-world problems?

SWBAT:

- Identify a linear equation.
- Describe a system of linear equations.
- Solve a system of linear equations.
- Model solving systems with different numbers of solutions.

Learning Activities:

Motivate: Students will work with a partner to solve a “geometric equation” to figure out what a square and a triangle represent in each equation.

Exploration: Students will work with a partner to solve a problem involving the costs and

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COURSE Pre-Algebra, Grades 7 & 8

revenue associated with starting a bed and breakfast. Students will then use a graphing calculator to solve the resulting systems of equations.

Big Ideas Chapter 5: Sections 5.1, 5.2, 5.3, 5.4

- Additional Resources by Chapter
 - Extra Practice Pages
 - Reteach Pages
 - Puzzle Time Pages
 - Differentiating the Lesson
 - Tutorial Videos
 - Skills Review Handbook
 - Skills Trainer-online
- IXL Tutorial videos
- IXL Practice
- IXL Games

Assessments

Formative:

- Rich Thinking Tasks
- Classroom Observation
- Student Reflections and Math Talks
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Summative:

- Mid-unit Quizzes
- Topic Tests
- Performance Tasks/Projects

Alternative:

- NJSLA Released Problems

Interdisciplinary Connections

STEM (Engineering Design Process):

- Students can model constraints (like time and cost) to find optimal solutions when two conditions must be met (e.g., budget and material use).

Career Readiness, Life Literacies, and Key Skills

Financial Literacy (Standard 9.1.8.B.7): Create and solve systems to compare cell phone

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COURSE Pre-Algebra, Grades 7 & 8

plans, budgets, or payment options—each modeled with linear equations (e.g., flat fee + per-use cost)

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9.4.8.CI.3 Use collaborative technologies to explore diverse viewpoints and generate ideas for solutions. Group problem-solving, peer teaching, or inquiry based tasks.

9.4.12.CI.2 Critically analyze ideas within and between groups to ensure productive collaboration. Encourages meaningful group work with clear roles and outcomes.

Technology Integration

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

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- **9.4.12.TL.1:** Assess digital tools based on features such as accessibility options, capacities, and utility for accomplishing a specified task
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Career Education

- **9.4.12.CI.2** – Communicate ideas clearly and effectively, using verbal, nonverbal, and digital communication techniques.
- **9.4.12.CT.3** – Engage in discussions to clarify ideas, present opinions, and build on others' contributions.

Time Frame	6 weeks
Topic	
Functions	
Alignment to Standards	
8.EE.B.5 Graph proportional relationships, interpreting the unit rate as the slope of the graph.	

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Compare two different proportional relationships represented in different ways

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

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

8.F.A.2 Compare properties (e.g., rate of change, intercepts, domain and range) of two functions each represented in a different way (algebraically, graphically, numerically in tables, or by verbal descriptions).

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

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

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

Learning Objectives and Activities

SWBAT answer the following questions:

- When is a relation a function?
- How can you write a function rule to describe a relationship?
- How can functions be used to model linear relationships?
- What are the differences between linear and nonlinear functions?
- How do you create a function from a description, graph, or table of values?
- How can you tell if a function is increasing, decreasing, linear, or nonlinear by looking at its graph?

SWBAT:

- Identify functions.
- Represent functions in a variety of ways.
- Evaluate functions.
- Solve problems using function rules.

Learning Activities:

Motivate: Discuss vending machines and how they operate.

Exploration: Students will use familiar formulas to complete mapping diagrams.

Big Ideas Chapter 7: Sections 7.1, 7.2, 7.3, 7.4, 7.5

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COURSE Pre-Algebra, Grades 7 & 8

- Additional Resources by Chapter
 - Extra Practice Pages
 - Reteach Pages
 - Puzzle Time Pages
 - Differentiating the Lesson
 - Tutorial Videos
 - Skills Review Handbook
 - Skills Trainer-online
- IXL Tutorial videos
- IXL Practice
- IXL Games

Assessments

Formative:

- Rich Thinking Tasks
- Classroom Observation
- Student Reflections and Math Talks
- Targeted Practice via IXL

Summative:

- Mid-unit Quizzes
- Topic Tests
- Performance Tasks/Projects

Alternative:

- NJSLA Released Problems

Interdisciplinary Connections

RST.6-8.7: Integrate quantitative or technical information expressed in words in a text with a version of that information expressed visually (e.g., in a flowchart, diagram, model, graph, or table)

Career Readiness, Life Literacies, and Key Skills

9.1.8.C.1: When applying linear functions to variable rates and constant rates students will compare and contrast credit cards and debit cards and the advantages and disadvantages of using each.

9.4.12.CI.1 Demonstrate the ability to reflect, revise, and explain reasoning and decision-making when solving problems collaboratively.

9.4.8.CI.2 Collaborate with others to develop a solution using multiple perspectives. Aligns with discussion, group presentations, or group project-based learning.

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9.4.8.CI.3 Use collaborative technologies to explore diverse viewpoints and generate ideas for solutions. Group problem-solving, peer teaching, or inquiry based tasks.

9.4.12.CI.2 Critically analyze ideas within and between groups to ensure productive collaboration. Encourages meaningful group work with clear roles and outcomes.

Technology Integration

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

- **9.4.8.TL.6:** Collaborate to develop and publish work that provides perspectives on a real-world problem.

Students will access the Big Ideas online ebook to further investigate lesson concepts and demonstrate understanding of standards.

- **9.4.8.TL.3:** Select appropriate tools to organize and present information digitally. Students will use internet based game sites such as Quizizz, Kahoot, and Quizlet live to reflect on their learning progress.

- **9.4.5.CT.3:** Describe how digital tools and technology may be used to solve problems. Supplemental instruction and math games will be presented using IXL Math and Video Tutor bigideasmath.com.

- **9.4.12.TL.1:** Assess digital tools based on features such as accessibility options, capacities, and utility for accomplishing a specified task

Students will use Google Classroom to collaborate, work towards solving authentic problems, or participate in an online classroom discussion utilizing pre-learned etiquette about blended learning platforms.

- **9.4.12.TL.4:** Collaborate in online learning communities or social networks or virtual worlds to analyze and propose a resolution to a real-world problem.

Career Education

- **9.4.12.CI.2** – Communicate ideas clearly and effectively, using verbal, nonverbal, and digital communication techniques.

- **9.4.12.CT.3** – Engage in discussions to clarify ideas, present opinions, and build on others' contributions.

Time Frame	4 weeks
Topic	
Transformations	

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Alignment to Standards

8.G.A.1 Verify experimentally the properties of rotations, reflections, and translations: a. Lines are transformed to lines, and line segments to line segments of the same length. b. Angles are transformed to angles of the same measure. c. Parallel lines are transformed to parallel lines.

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

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

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

Learning Objectives and Activities

SWBAT answer the following questions:

- When a figure is translated up or down, which coordinate changes? How? Why? What if the figure is translated left or right?
- When a figure is reflected over the x-axis, which coordinate changes and why? What if the figure is reflected over the y-axis?
- Which transformation maintains the orientation of the figure?
- Which transformation does not maintain the size of the figure?
- How does a resulting image differ when the pre-image has a scale factor of 2 and when the pre-image has a scale factor of $\frac{1}{2}$?
- How can you determine if a shape will become bigger or smaller under a dilation?
- How do you know if two shapes are similar? What's the difference between similar shapes and congruent shapes?
- Is the perimeter of a shape maintained under dilation? Is the area? Why or why not?
- Are the angle measures of a shape maintained under dilation? Why or why not?

SWBAT:

- Identify a translation
- Describe a transformation
- Describe a sequence of rigid motions between two congruent figures
- Solve real-life problems involving transformations

Learning Activities:

Motivate: Model translations by having all students stand in an open area facing in the same direction. Give directions such as : two steps right, three steps back, etc. Students should step as needed without turning to keep their orientation.

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COURSE Pre-Algebra, Grades 7 & 8

Exploration: Students will use geoboards to explore congruent triangles and make a conclusion about the side lengths of congruent triangles.

Big Ideas Chapter 2: Sections 2.1, 2.2, 2.3, 2.4, 2.5, 2.6, 2.7

- Additional Resources by Chapter
 - Extra Practice Pages
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 - Puzzle Time Pages
 - Differentiating the Lesson
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Assessments

Formative:

- Rich Thinking Tasks
- Classroom Observation
- Student Reflections and Math Talks
- Targeted Practice via IXL

Summative:

- Mid-unit Quizzes
- Topic Tests
- Performance Tasks/Projects

Alternative:

- NJSLA Released Problems

Interdisciplinary Connections

NJ Visual and Performing Arts Standards — Visual Arts

1.1.8.Cr1a Generate and conceptualize artistic ideas and work.

- Students explore and experiment with elements of art and principles of design, including symmetry, pattern, and repetition, to create compositions such as tessellations, mosaics, and fractals.

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COURSE Pre-Algebra, Grades 7 & 8

1.1.8.Cr2a Organize and develop artistic ideas and work.

- Apply concepts of geometric transformations (rotations, reflections, translations, and dilations) to create visual art projects that emphasize pattern, rhythm, and balance.

1.1.8.Cr3a Refine and complete artistic work.

- Use symmetry and pattern concepts to refine artworks, such as creating tessellations or mosaic patterns, demonstrating understanding of repetition and transformations.

Career Readiness, Life Literacies, and Key Skills

Digital Literacy (9.4.8.DC.1):

Using coordinate geometry and technology supports digital fluency crucial for STEM Careers.

9.4.12.CI.1

Demonstrate the ability to reflect, revise, and explain reasoning and decision-making when solving problems collaboratively.

9.4.8.CI.2

Collaborate with others to develop a solution using multiple perspectives. Aligns with discussion, group presentations, or group project-based learning.

9.4.8.CI.3

Use collaborative technologies to explore diverse viewpoints and generate ideas for solutions. Group problem-solving, peer teaching, or inquiry based tasks.

9.4.12.CI.2 Critically analyze ideas within and between groups to ensure productive collaboration. Encourages meaningful group work with clear roles and outcomes.

Technology Integration

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

- **9.4.8.TL.6:** Collaborate to develop and publish work that provides perspectives on a real-world problem.
- **9.4.8.TL.3:** Select appropriate tools to organize and present information digitally.
- **9.4.5.CT.3:** Describe how digital tools and technology may be used to solve problems.
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Career Education

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DEPARTMENT Mathematics

COURSE Pre-Algebra, Grades 7 & 8

- **9.4.12.CI.2** – Communicate ideas clearly and effectively, using verbal, nonverbal, and digital communication techniques.
- **9.4.12.CT.3** – Engage in discussions to clarify ideas, present opinions, and build on others' contributions.

Time Frame	4 Weeks
Topic	
Angles	
Alignment to Standards	
8.G.A.1 Verify experimentally the properties of rotations, reflections, and translations: a. Lines are transformed to lines, and line segments to line segments of the same length. b. Angles are transformed to angles of the same measure. Parallel lines are transformed to parallel lines. 8.G.A.4 Understand that a two-dimensional figure is similar to another if the second can be obtained from the first by a sequence of rotations, reflections, translations, and dilations; given two similar two-dimensional figures, describe a sequence that exhibits the similarity between them. 8.G.A.5 Use informal arguments to establish facts about the angle sum and exterior angle of triangles, about the angles created when parallel lines are cut by a transversal, and the angle-angle criterion for similarity of triangles.	
Learning Objectives and Activities	
SWBAT answer the following questions: ● Name a pair of angles in the given figure that are complementary/supplementary. ● Identify which angles are congruent and explain how you know using vocabulary. ● Will a transversal always create a pair of congruent obtuse angles and a pair of congruent acute angles? SWBAT: ● Identify congruent angles when a transversal intersects parallel lines. ● Find angle measures when a transversal intersects parallel lines. ● Understand properties of interior and exterior angles of triangles. ● Use equations to find missing angle measures of triangles. ● Use interior and exterior angles of a triangle to solve real-life problems. ● Find interior angle measures of polygons. ● Explain how to find the sum of the interior angle measures of a polygon. I	

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- Use an equation to find an interior angle measure of a polygon.
- Find the interior angle measures of a regular polygon.
- Use similar triangles to find missing measures.

Learning Activities:

Motivate: Students will explore the intersection of lines using the geometry software available on Big Ideas Math

Exploration: Working with a partner, students will draw parallel lines, then draw a third line that intersects the parallel lines. They will then label the angles formed by the 3rd line (transversal) and determine which of the angles have equal measures.

Big Ideas Chapter 3: Sections 3.1, 3.2, 3.3, 3.4

- Additional Resources by Chapter
 - Extra Practice Pages
 - Reteach Pages
 - Puzzle Time Pages
 - Differentiating the Lesson
 - Tutorial Videos
 - Skills Review Handbook
 - Skills Trainer-online
- IXL Tutorial videos
- IXL Practice
- IXL Games

Assessments

Formative:

- Rich Thinking Tasks
- Classroom Observation
- Student Reflections and Math Talks
- Targeted Practice via IXL

Summative:

- Mid-unit Quizzes
- Topic Tests
- Performance Tasks/Projects

Alternative:

- NJSLA Released Problems

Interdisciplinary Connections

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NJ Visual and Performing Arts Standard 1.3A.5–8 (Creating artworks using elements of design) Connection: Artists often create congruent shapes using transformations to achieve balance and symmetry in their work. Activity Idea: Students create geometric art using congruent shapes formed by transformations.

Career Readiness, Life Literacies, and Key Skills

9.4.12.CI.1

Demonstrate the ability to reflect, revise, and explain reasoning and decision-making when solving problems collaboratively.

9.4.8.CI.2

Collaborate with others to develop a solution using multiple perspectives. Aligns with discussion, group presentations, or group project-based learning.

9.4.8.CI.3

Use collaborative technologies to explore diverse viewpoints and generate ideas for solutions. Group problem-solving, peer teaching, or inquiry based tasks.

9.4.12.CI.2

Critically analyze ideas within and between groups to ensure productive collaboration. Encourages meaningful group work with clear roles and outcomes.

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Career Education

- **9.4.12.CI.2** – Communicate ideas clearly and effectively, using verbal, nonverbal, and digital communication techniques.
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COURSE Pre-Algebra, Grades 7 & 8

Time Frame	4 Weeks
Topic	
Exponents	
Alignment to Standards	
8.EE.A.1 Know and apply the properties of integer exponents to generate equivalent numerical expressions. 8.EE.A.3 Use numbers expressed in the form of a single digit times 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. 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.	
Learning Objectives and Activities	
SWBAT answer the following questions: • How can you write products using exponents? • How can you evaluate expressions involving powers? • How can you find products of powers that have the same base? • What are powers of powers? • How can you simplify expressions using the Quotient of Powers Property? • Describe how to simplify algebraic expressions involving zero and negative exponents? • What are the benefits of scientific notation vs. standard form? • Describe how to perform operations on numbers written in scientific notation? SWBAT: • Write products using exponents. • Describe the value of powers. • Evaluate expressions using powers properties • Compare quantities using scientific notation. Learning Activities: Motivate: Students will work with partners to raise negative numbers to whole number exponents and observe patterns that emerge. Exploration: Students will review writing numbers raised to a power as a whole number, then solve a riddle by writing numbers in powers.	

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Big Ideas Chapter 8: Section 8.1,8.2,8.3,8.4, 8.5, 8.6, 8.7

- Additional Resources by Chapter
 - Extra Practice Pages
 - Reteach Pages
 - Puzzle Time Pages
 - Differentiating the Lesson
 - Tutorial Videos
 - Skills Review Handbook
 - Skills Trainer-online
- IXL Tutorial videos
- IXL Practice
- IXL Games

Assessments

Formative:

- Rich Thinking Tasks
- Classroom Observation
- Student Reflections and Math Talks
- Targeted Practice via IXL

Summative:

- Mid-unit Quizzes
- Topic Tests
- Performance Tasks/Projects

Alternative:

- NJSLA Released Problems

Interdisciplinary Connections

MS-ESS1-1 Earth's Place in the Universe:

Students analyze and interpret data to determine scale properties of objects in the solar system using scientific notation (e.g., comparing the sizes and distances of planets, stars).

Career Readiness, Life Literacies, and Key Skills

9.4.12.CI.1 Demonstrate the ability to reflect, revise, and explain reasoning and decision-making when solving problems collaboratively.

9.4.8.CI.2 Collaborate with others to develop a solution using multiple perspectives. Aligns with discussion, group presentations, or group project-based learning.

9.4.8.CI.3 Use collaborative technologies to explore diverse viewpoints and generate ideas

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COURSE Pre-Algebra, Grades 7 & 8

for solutions. Group problem-solving, peer teaching, or inquiry based tasks.

9.4.12.CI.2 Critically analyze ideas within and between groups to ensure productive collaboration. Encourages meaningful group work with clear roles and outcomes.

Technology Integration

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

- **9.4.8.TL.6:** Collaborate to develop and publish work that provides perspectives on a real-world problem.

Students will access the Big Ideas online ebook to further investigate lesson concepts and demonstrate understanding of standards.

- **9.4.8.TL.3:** Select appropriate tools to organize and present information digitally. Students will use internet based game sites such as Quizizz, Kahoot, and Quizlet live to reflect on their learning progress.

- **9.4.5.CT.3:** Describe how digital tools and technology may be used to solve problems. Supplemental instruction and math games will be presented using IXL Math and Video Tutor bigideasmath.com.

- **9.4.12.TL.1:** Assess digital tools based on features such as accessibility options, capacities, and utility for accomplishing a specified task

Students will use Google Classroom to collaborate, work towards solving authentic problems, or participate in an online classroom discussion utilizing pre-learned etiquette about blended learning platforms.

- **9.4.12.TL.4:** Collaborate in online learning communities or social networks or virtual worlds to analyze and propose a resolution to a real-world problem.

Career Education

- 9.4.12.CI.2 – Communicate ideas clearly and effectively, using verbal, nonverbal, and digital communication techniques.

- 9.4.12.CT.3 – Engage in discussions to clarify ideas, present opinions, and build on others' contributions.

Time Frame	3 Weeks
Topic	
Real Numbers and Pythagorean Theorem	
Alignment to Standards	

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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.

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.

8.EE.A.2.b Simplify numerical radicals, limiting to square roots (i.e. nonperfect squares).

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.

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).

8.NS.A.3 Understand that the sum or product of two rational numbers is rational; that the sum of a rational number and an irrational number is irrational; and that the product of a nonzero rational number and an irrational number is irrational.

Learning Objectives and Activities

SWBAT answer the following questions:

- What makes a number rational or irrational, and why does it matter?
- How can we represent irrational numbers on a number line or with decimal approximations?
- Why is it important to understand the different subsets of the real number system?
- How can we estimate or compare irrational numbers without a calculator?
- What does the Pythagorean Theorem tell us about the relationship between the side lengths of a right triangle?
- How can we determine whether a triangle is a right triangle using the Pythagorean Theorem?
- In what ways is the distance formula connected to the Pythagorean Theorem?

SWBAT demonstrate understanding of the following:

- Understand the concept of a square root of a number
- Understand the Pythagorean Theorem
- Understand the concept of a cube root of a number
- Convert between different forms of rational numbers
- Understand the concept of irrational numbers
- Understand the converse of the Pythagorean Theorem

Learning Activities:

Motivate: Students will use centimeter grid paper to draw different sized squares. They will then determine two different methods for finding the area of the squares.

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COURSE Pre-Algebra, Grades 7 & 8

Exploration: Given the area, students will determine the side lengths of various sized squares.

Big Ideas Chapter 9: Sections 9.1, 9.2, 9.3, 9.4, 9.5, 9.6

- Additional Resources by Chapter
 - Extra Practice Pages
 - Reteach Pages
 - Puzzle Time Pages
 - Differentiating the Lesson
 - Tutorial Videos
 - Skills Review Handbook
 - Skills Trainer-online
- IXL Tutorial videos
- IXL Practice
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Assessments

Formative:

- Rich Thinking Tasks
- Classroom Observation
- Student Reflections and Math Talks
- Targeted Practice via IXL

Summative:

- Mid-unit Quizzes
- Topic Tests
- Performance Tasks/Projects

Alternative:

- NJSLA Released Problems

Interdisciplinary Connections

Science: MS-PS2-2 Motion and Stability: Students apply square and square root relationships when calculating force, speed, or acceleration, especially when working with formulas like Newton's Laws (e.g., $a=F/ma = F/ma=F/m$, energy equations involving squared terms).

Career Readiness, Life Literacies, and Key Skills

9.4.12.CI.1 Demonstrate the ability to reflect, revise, and explain reasoning and decision-making when solving problems collaboratively.

9.4.8.CI.2 Collaborate with others to develop a solution using multiple perspectives. Aligns

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with discussion, group presentations, or group project-based learning.

9.4.8.CI.3 Use collaborative technologies to explore diverse viewpoints and generate ideas for solutions. Group problem-solving, peer teaching, or inquiry based tasks.

9.4.12.CI.2 Critically analyze ideas within and between groups to ensure productive collaboration. Encourages meaningful group work with clear roles and outcomes.

Technology Integration

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Career Education

- **9.4.12.CI.2** – Communicate ideas clearly and effectively, using verbal, nonverbal, and digital communication techniques.
- **9.4.12.CT.3** – Engage in discussions to clarify ideas, present opinions, and build on others' contributions.

Time Frame	3 Weeks
Topic	
Volume and Similar Solids	
Alignment to Standards	
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. 8.EE.A.2 Use square root and cube root symbols to represent solutions to equations of the form $x^2 = p$ and $x^3 = p$, where p is a positive rational number. Evaluate square roots of small perfect squares and cube roots of small perfect cubes. Know that $\sqrt{2}$ is irrational. 8.EE.C.7b. Solve linear equations with rational number coefficients, including equations	

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DEPARTMENT Mathematics

COURSE Pre-Algebra, Grades 7 & 8

whose solutions require expanding expressions using the distributive property and collecting like terms.

Learning Objectives and Activities

SWBAT answer the following questions:

- How are the formulas for cones, cylinders, and spheres related?
- What do these formulas tell us about the space each shape occupies?
- How do you decide which formula to use when solving a volume problem?

SWBAT demonstrate understanding of the following:

- Students will know that volume is the same as area but in three-dimensions instead of two dimensions. Knowing this, they will understand that in order to determine a shape's volume, they must multiply the area of the shape's base by the height of the shape.
- Students will understand that π is used for calculations with any shape involving a circle.
- Students will know how to leave answers in terms of π to give the exact answer and will also know how to approximate the answer without using a calculator.
- Students will know when to use the Pythagorean Theorem for volume.

Learning Activities:

Motivate: Compare the volume of two different sized cans of tomatoes to do a cost analysis of the contents

Exploration: Students will reason about volume of a cylinder using stacks of coins

Big Ideas Chapter 10: Sections 10.1, 10.2, 10.3, 10.4

- Additional Resources by Chapter
 - Extra Practice Pages
 - Reteach Pages
 - Puzzle Time Pages
 - Differentiating the Lesson
 - Tutorial Videos
 - Skills Review Handbook
 - Skills Trainer-online
- IXL Tutorial videos
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Assessments

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DEPARTMENT Mathematics

COURSE Pre-Algebra, Grades 7 & 8

Formative:

- Rich Thinking Tasks
- Classroom Observation
- Student Reflections and Math Talks
- Targeted Practice via IXL

Summative:

- Mid-unit Quizzes
- Topic Tests
- Performance Tasks/Projects

Alternative:

- NJSLA Released Problems

Interdisciplinary Connections

Science: MS-PS1-1, MS-PS1-2 – Matter and Its Interactions

- Apply volume formulas when investigating **density** and **mass** relationships (e.g., calculating the volume of irregular solids like cones or spheres to determine density).
- Use volume to understand the properties of gases and liquids in physical science labs

Career Readiness, Life Literacies, and Key Skills

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DEPARTMENT Mathematics

COURSE Pre-Algebra, Grades 7 & 8

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Career Education

- **9.4.12.CI.2** – Communicate ideas clearly and effectively, using verbal, nonverbal, and digital communication techniques.
- **9.4.12.CT.3** – Engage in discussions to clarify ideas, present opinions, and build on others' contributions.

Time Frame	2 Weeks
Topic	
Data Analysis and Displays	
8.SP.A.1 Construct and interpret scatter plots for bivariate measurement data to investigate patterns of association between two quantities. Describe patterns such as clustering, outliers, positive or negative association, linear association, and nonlinear association. 8.SP.A.2 Know that straight lines are widely used to model relationships between two quantitative variables. For scatter plots that suggest a linear association, informally fit a straight line, and informally assess the model fit (e.g., line of best fit) by judging the closeness of the data points to the line. 8.SP.A.3 Use the equation of a linear model to solve problems in the context of bivariate measurement data, interpreting the slope and intercept. 8.SP.A.4 Understand that patterns of association can also be seen in bivariate categorical data by displaying frequencies and relative frequencies in a two-way table. Construct and interpret a two-way table summarizing data on two categorical variables collected from the same subjects. Use relative frequencies calculated for rows or columns to describe possible association between the two variables.	
Learning Objectives and Activities	
SWBAT answer the following questions: ● How do you decide whether a straight line is a good model for the data in a scatter plot? ● What does it mean for a line to "fit" a set of data? ● How can you use the equation of a line to describe and solve problems based on	

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data?

- How can a two-way table help you compare two categorical variables?
- What can relative frequencies in a table tell you about the relationship between two variables?
- How can you determine if there is an association between two categorical variables?

SWBAT:

- Use scatter plots to describe patterns and relationships between two quantities.
- Use lines of fit to model data.
- Use two-way tables to represent data.
- Use appropriate data displays to represent situations.

Learning Activities:

Motivate: Students will write ordered pairs from a table that shows absences and final grades then plot them on a coordinate plane. Students then analyze the data and use the data to make predictions.

Exploration: Students will graph the weights and circumferences of several sports balls then determine if there is a relationship between the size and weight of the sports ball

Big Ideas Chapter 6: Section 6.1, 6.2, 6.3, 6.4

Additional Resources by Chapter

- Extra Practice Pages
- Reteach Pages
- Puzzle Time Pages
- Differentiating the Lesson
- Tutorial Videos
- Skills Review Handbook
- Skills Trainer-online
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- IXL Games

Assessments

Formative:

- Rich Thinking Tasks
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COURSE Pre-Algebra, Grades 7 & 8

Summative:

- Mid-unit Quizzes
- Topic Tests
- Performance Tasks/Projects

Alternative:

- NJSLA Released Problems

Interdisciplinary Connections

Science: MS-PS1, MS-LS1, MS-ESS3 – Across Physical, Life, and Earth Sciences:

- Students collect and graph real experimental data:
Temperature vs. time in chemical reactions (MS-PS1)
- Heart rate vs. activity level in body systems (MS-LS1)
- CO₂ levels vs. global temperature for climate study (MS-ESS3)

Career Readiness, Life Literacies, and Key Skills

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COURSE Pre-Algebra, Grades 7 & 8

- **9.4.12.CI.2** – Communicate ideas clearly and effectively, using verbal, nonverbal, and digital communication techniques.
- **9.4.12.CT.3** – Engage in discussions to clarify ideas, present opinions, and build on others' contributions.

Modifications (ELL, Special Education, At-Risk Students, Gifted & Talented, & 504 Plans)

ELL:

- Work toward longer passages as skills in English increase
- Use visuals
- Introduce key vocabulary before lesson
- Teacher models reading aloud daily
- Provide peer tutoring
- Use of Bilingual Dictionary
- Guided notes and/or scaffold outline for written assignments
- Provide students with English Learner leveled readers.

Supports for Students With IEPs:

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

At-Risk Students:

- Guided notes and/or scaffold outline for written assignments
- Introduce key vocabulary before lesson
- Work in a small group
- Lesson taught again using a differentiated approach
- Allow answers to be given orally or dictated
- Use visuals / Anchor Charts
- Leveled texts according to ability

Gifted and Talented:

- Create an enhanced set of introductory activities (e.g. advance organizers, concept maps, concept puzzles)
- Provide options, alternatives and choices to differentiate and broaden the curriculum

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- Organize and offer flexible small group learning activities
- Provide whole group enrichment explorations
- Teach cognitive and methodological skills
- Use center, stations, or contracts
- Organize integrated problem-solving simulations
- Propose interest-based extension activities
- Expose students to beyond level texts.

Supports for Students With 504 Plans:

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

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