

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







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DEPARTMENT Mathematics

COURSE Pre-Algebra, Grades 7 & 8

	Township of Oce	an Pacir	ng Guide
Week	Marking Period 1	Week	Marking Period 3
1	Sets of Real Numbers	21	Functions & Algebra
2	Sets of Real Numbers	22	Functions & Algebra
3	Sets of Real Numbers	23	Functions & Algebra
4	Sets of Real Numbers	24	Functions & Algebra
5	Simplifying Expressions	25	Functions & Algebra
6	Simplifying Expressions	26	Scatterplots
7	Simplifying Expressions	27	Scatterplots
8	Simplifying Expressions	28	Scatterplots
9	Simplifying Expressions	29	Transformations & Similar Shapes
10	Solving Equations & Systems of Equations	30	Transformations & Similar Shapes
Week	Marking Period 2	Week	Marking Period 4
11	Solving Equations & Systems of Equations	31	Transformations & Similar Shapes
12	Solving Equations & Systems of Equations	32	Angles & Lines
13	Solving Equations & Systems of Equations	33	Angles & Lines
14	Solving Equations & Systems of Equations	34	Angles & Lines
15	Solving Equations & Systems of Equations	35	Pythagorean Theorem
16	Solving Equations & Systems of Equations	36	Pythagorean Theorem
17	Functions & Algebra	37	Pythagorean Theorem





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18	Functions & Algebra	38	Volume
19	Functions & Algebra	39	Volume
20	Functions & Algebra	40	Volume

Core Instructional & Supplemental Materials including various levels of Texts

Core Instruction: Big Ideas Math Modeling Real Life Grade 8 (Big Ideas Learning)

Supplemental: NJSLA Released Questions, 3-Acts Math, Illuminations, Desmos, IXL Math

and Kuta

Special Education Supplemental: Prodigy

Time Frame	3 Weeks
	Topic
	Sets of Real Numbers
	Alignment to Standards
	8.NS.1, 8NS.2, 8.EE.2

Learning Objectives and Activities

SWBAT answer the following questions:

- Which fraction is larger? How do you know?
- Which decimals are rational numbers and which are irrational numbers?
- If a number is an integer, will it always be rational? Will it always be a whole number?
- What is a perfect square and how does it compare to a perfect cube?
- How do you find the side of a square if you are given its perimeter? If you are given its area?
- Which number is larger: $\sqrt{5}$ or $3\sqrt{5}$?

SWBAT demonstrate understanding of the following:

- Students will be able to determine which set(s) a number belongs to and how the number compares to other numbers (in terms of larger or smaller).
- Students will understand the differences between each set of real numbers, particularly between rational and irrational.
- Students will be able to estimate the values of square roots and cube roots.
- Students will understand the relationship between the area of a square and the

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length of its side.

 Students will understand that the square root of any non-perfect square is irrational.

Learning Activities:

- Matching Game (Verbal Sets to Sets Plotted on Number Line)
- Textbook: Glencoe/McGraw Hill: Looking for Pythagoras Pgs. 59, 62, 63
- Supplemental: Worksheets

Assessments

Formative:

- Graphic Organizer
- Classwork and Homework
- Teacher Observation
- Entrance/Exit Cards

Summative:

- Celebration of Knowledge and Mid-unit Quizzes
- Topic Tests

Alternative:

- Kahoot
- Quizizz
- Individual or group productive struggle assessment during introductory lessons

Interdisciplinary Connections

Science: MS-ETS1-1: Students estimate irrational numbers while defining the criteria and constraints of a design problem with sufficient precision to ensure a successful solution, taking into account relevant scientific principles and potential impacts on people and the natural environment that may limit possible solutions.

Career Readiness, Life Literacies, and Key Skills

Technology Integration

All students will use digital tools to access, manage, evaluate, and synthesize





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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 ConnectEd online practice & assessments 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.

Additional resources and extension activities will be posted on Google Classroom in order to encourage students to reflect on their learning and expand on their knowledge.

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

Career Education

CRP4: Communicate clearly and effectively with reason.

CRP8: Utilize critical thinking to make sense of problems and persevere in solving them.

Time Frame 5 Weeks

Topic

Simplifying Expressions

Alignment to Standards

8.EE.1, 8.EE.3, 8.EE.4

Learning Objectives and Activities

SWBAT answer the following questions:

- What is the difference in the simplified answer of x + x and $x \circ x$?
- When and why is the distributive property used?



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- What happens when a number is multiplied by a power of ten? Divided by a power of ten?
- Why in scientific notation does the decimal point move to the left is the exponent is negative and to the right if the exponent is positive?
- When you multiply two numbers that are in scientific notation, why can you combine the exponents of the two base tens?

SWBAT demonstrate understanding of the following:

- Students will understand how to combine like terms and use the distributive property using their knowledge of order of operations.
- Students will understand that multiplying a variable by itself relates to multiplying a number by itself, which results in the variable being squared.
- Students will be able to multiply or divide by powers of ten without using a calculator.
- Students will be able to simplify operations with scientific notation without converting to standard form first.

Learning Activities:

- Textbook: Glencoe/McGraw Hill: Say it with Symbols
- Investigation 2, Sections 3.1 and 3.2
- Supplemental: Worksheets

Assessments

Formative:

- Daily Workbook Practice Problems
- IXL Practice
- Math Scavenger Hunt/Trail
- Entrance/Exit Cards

Summative:

- Celebration of Knowledge and Mid-unit Quizzes
- Topic Tests

Alternative:

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- Quizizz
- Individual or group productive struggle assessment during introductory lessons

Interdisciplinary Connections





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Career Readiness, Life Literacies, and Key Skills

Technology Integration

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Career Education

CRP6: Demonstrate creativity and innovation

Time Frame	7 Weeks
	Topic
	Solving Equations and Systems of Equations
	Alignment to Standards
	8.EE.7.a, 8.EE.7.b, 8.EE.8.a, 8.EE.8.b, 8.EE.8.c





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COURSE Pre-Algebra, Grades 7 & 8

Learning Objectives and Activities

SWBAT answer the following questions:

- What is the difference in the mathematical translation of the phrases "greater than" and "is great than"?
- What does the solution represent for an equation and for a system of equations?
- How do you check a solution to an equation to make sure that it is correct?
- What is your ultimate goal when solving an equation?
- Can a system of equations have no solution? Infinite solutions? If so, how? If not, why?

SWBAT demonstrate learning of the following:

- Students will understand that when solving an equation, division is done in the last step in order to give the variable a coefficient of positive one.
- Students will understand that in order to clear fractions in an equation, the equation must be multiplied by the least common multiple of all fractions' denominators.
- Students will understand that if variables cancel out when solving an equation and a
 false statement remains, then there is no solution. If a true statement remains, then
 there are infinite solutions.
- Students will know the mathematical symbols that are used to represent English words.
- Students will understand that if an ordered pair is a solution to an equation, then it must be on the graph of the equation.
- Students will understand that a solution to an equation (or system of equations) is the value of the variable that makes the equation (or both equations) true.
- Students will understand that equations and systems of equations can be used to model and interpret real world data

Learning Activities:

- Solving Systems of Equations by Graphing Discovery
- Textbook: Glencoe/McGraw Hill Math Course 3: Sections 1-1, 1-6, 2-4, 3-6, 10-1, 10-2, 10-3, 10-6
- Say it with Symbols Investigations 4.1-4.3
- Supplemental: Worksheets

Assessments

Formative:

- Teacher Observation
- Class Debate of Approaches/Mathematical Methods
- Math Scavenger Hunt/Trail



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COURSE Pre-Algebra, Grades 7 & 8

Entrance/Exit Cards

Summative:

- Celebration of Knowledge and Mid-unit Quizzes
- Topic Tests
- Problem-based Quiz/Test on Systems of Equations in the Real-world (i.e. How can this help us make the best purchase/decision?)

Benchmark:

 Cumulative midterm exam with multiple choice, short answer, and extended constructed response questions.

Alternative:

- Observation Assessment with Problem-solving
- Kahoot/Quizizz

Interdisciplinary Connections

Career Readiness, Life Literacies, and Key Skills

Technology Integration

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

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COURSE Pre-Algebra, Grades 7 & 8

Career Education

CRP2: Apply appropriate academic and technical skills.

CRP6: Demonstrate creativity and innovation.

CRP8: Utilize critical thinking to make sense of problems and persevere in solving

them.

CRP11: Use technology to enhance productivity.

Time Frame 9 Weeks

Topic

Functions and Algebra

Alignment to Standards

8.F.1, 8.F.2, 8.F.3, 8.F.4, 8.F.5, 8.EE.5, 8.EE.6

Learning Objectives and Activities

SWBAT answer the following questions:

- Which representation of a pattern more clearly shows whether or not the pattern is linear: a table of values or a graph of the pattern? Why can the "Vertical Line Test" be used to determine if a graph represents a function?
- Are all functions linear? Are all lines functions?
- Why is the slope always the coefficient of x in an equation?
- What does the slope tell you about the graph of an equation?
- What do you expect to see in this graph given its equation?
- What values are constant in a vertical line? In a horizontal line?
- What is the slope of a horizontal line? What does this tell you on a distance-time graph? On a speed-time graph?
- What information is needed to write an equation?

SWBAT demonstrate understanding of the following:

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





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COURSE Pre-Algebra, Grades 7 & 8

Learning Activities:

- Popcorn Graphs
- Slope Investigation with Graphing Calculators
- Textbook: Glencoe/McGraw Hill Math Course 3: sections 11-1, 11-2, 11-3, 12-4, 12-5, 12-6
- Thinking with Mathematical Models Pgs. 48-54 (distance/time graphs); Pgs. 55-56 (graphing and equations); Assessment Pgs. 67-71 (linear vs. non-linear)
- Supplemental: Worksheets (including ECRs: Apple Picker, Kim & Cyndi's Tutoring Business, CDs & DVDs, Car Wash, Standard 3, Limousine Rental, Quarters, and Cosmetic Commission)

Assessments

Formative:

- Classwork and Homework
- Daily Workbook Practice Problems
- IXL Practice
- Teacher Observation
- Entrance/Exit Cards

Summative:

- Celebration of Knowledge and Mid-unit Quizzes
- Topic Tests
- Problem-based Quiz/Test on Rate of Change

Alternative:

- Observation Assessment with Problem-solving
- Individual or group productive struggle assessment during introductory lessons

Interdisciplinary Connections

Science: MS-PS3-1: In lessons on comparing distance-time graphs to speed-time graphs students will construct and interpret graphical displays of data to describe the relationships of kinetic energy to the mass of an object and to the speed of an object.

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.





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Technology Integration

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

Career Education

CRP2: Apply appropriate academic and technical skills.

CRP6: Demonstrate creativity and innovation.

Time Frame 3 Weeks

Topic

Scatter Plots

Alignment to Standards

8.SP.1, 8.SP.2, 8.SP.3, 8.SP.4

Learning Objectives and Activities



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COURSE Pre-Algebra, Grades 7 & 8

SWBAT answer the following questions:

- What do you expect to see in the scatter plot based on the predicted correlation from the data?
- Using the best-fit-line equation, find the x-value(s) for the given y-value and vice versa.
- Is the y-intercept of the best-fit-line equation reasonable for the given situation?
- Why do you think the data does/doesn't have a linear trend?

SWBAT demonstrate understanding of the following:

- Students will be able to create scatter plots both by hand and with technology.
- Students will model and analyze real world data with scatter plots and will use the scatter plots to make predictions about future data.
- Students will be able to determine if the scatter plots model linear data or other types of data.
- Students will be able to incorporate their knowledge of equations to better understand the meaning of the data displayed in scatter plots.

Learning Activities:

- Textbook: Glencoe/McGraw Hill Math Course 3: Sections 4-7
- Thinking with Mathematical Models: Investigation 1 (Pgs. 15-25)
- Supplemental: Worksheets (including ECRs: Sleep Survey, Animal's Food Consumption and Weight, Population of Mercer County)

Assessments

Formative:

- Classwork and Homework
- Daily Workbook Practice Problems
- Teacher Observation
- Class Debate of Approaches/Mathematical Methods

Summative:

- Celebration of Knowledge and Mid-unit Quizzes
- Topic Tests

Alternative:

- Scatter Plot Project Collect and analyze your own data using knowledge of linear functions what can you conclude?
- Kahoot/Quizizz

Interdisciplinary Connections





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Career Readiness, Life Literacies, and Key Skills

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

Career Education

CRP2: Apply appropriate academic and technical skills.

CRP11: Use technology to enhance productivity.

Time Frame	3 Weeks
	Topic
Transformations and Similar Shapes	
Alignment to Standards	
8.G.1.a, 8.G.1.b, 8.G.1.c, 8.G.2, 8.G.3, 8.G.4	





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COURSE Pre-Algebra, Grades 7 & 8

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 ½?
- 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 demonstrate understanding of the following:

- Students will be able to explain how to obtain an image from its pre-image and vice versa.
- Students will understand the difference between congruent shapes and similar shapes and will be able to recognize sets of each.
- Students will be able to identify the scale factor between a set of similar shapes and use it to create more similar shapes.

Learning Activities:

- Transformation Investigation
- Transformations and Similar Shapes Responder Activity
- "World of Transformations" Activities by Gloria Sanok
- "The Transformation Game" by Glencoe/McGraw Hill- Mathematics Course 3 Text
- Textbook: Glencoe/McGraw Hill Math Course 3: Section 5-6, 5-7, 7-5, 7-6, 7-7, 7-8
- Supplemental: Worksheets

Assessments

Formative:

- Daily Workbook Practice Problems
- IXL Practice
- Teacher Observation
- Entrance/Exit Cards

Summative:





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- Celebration of Knowledge and Mid-unit Quizzes
- Topic Tests

Alternative:

- Dilation Project How can we use dilations to shrink or blow up an image?
- Kahoot/Quizizz

Interdisciplinary Connections

Career Readiness, Life Literacies, and Key Skills

Technology Integration

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

Career Education

CRP6: Demonstrate creativity and innovation.

Time Frame	3 Weeks
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COURSE Pre-Algebra, Grades 7 & 8

Topic

Angles and Lines

Alignment to Standards

8.G.5

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 demonstrate understanding of the following:

• Find the missing angles in shapes and sets of lines using their vocabulary knowledge

Learning Activities:

- Geoboard Angles and Lines Activity
- Sum of Interior Angles of Polygons Discovery
- Textbook: Glencoe/McGraw Hill Math Course 3: sections 5-1, 5-2, 5-3, 5-4
- Supplemental: Worksheets

Assessments

Formative:

- Classwork and Homework
- Graphic Organizer
- Math Scavenger Hunt/Trail
- Entrance/Exit Cards

Summative:

- Celebration of Knowledge and Mid-unit Quizzes
- Topic Tests

Alternative:

Observation Assessment with Discovery/Student Discussion

Interdisciplinary Connections



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Career Readiness, Life Literacies, and Key Skills

Technology Integration

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

Career Education

CRP2: Apply appropriate academic and technical skills. CRP4: Communicate clearly and effectively with reason.

Time Frame 3 Weeks

Topic

Pythagorean Theorem

Alignment to Standards

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COURSE Pre-Algebra, Grades 7 & 8

8.G.6, 8.G.7, 8.G.8

Learning Objectives and Activities

SWBAT answer the following questions:

- How can you find the length of the diagonal of a square if you know the square's area?
- Which is a shorter route around a triangle: the hypotenuse or both legs?
- Find the area of the isosceles triangle/trapezoid given the length of its base and legs.
- Find the perimeter of the isosceles triangle/trapezoid given the length of its base and its height.
- Prove that the triangle is a right triangle without measuring its angles.
- When is the Pythagorean Theorem applicable?

SWBAT demonstrate understanding of the following:

- Students will be able to estimate the side lengths of right triangles using the Pythagorean Theorem and their knowledge of square roots and perfect squares.
- Students will be able to solve real world problems using the Pythagorean Theorem.
- Students will be able to prove if triangles are right triangles using the converse of the Pythagorean Theorem.
- Students will understand that the distance formula is derived from the Pythagorean Theorem
- Students will know that the hypotenuse must always be the longest side of any right triangle

Learning Activities:

- Pythagorean Theorem Discovery
- Distance Formula Discovery
- Textbook: Glencoe/McGraw Hill Math Course 3: sections 6-1, 6-2, 6-3, Looking for Pythagoras Pgs. 19-21, 30-39, 50, 51
- Supplemental: Worksheets

Assessments

Formative:

- Daily Workbook Practice Problems
- IXL Practice
- Teacher Observation
- Entrance/Exit Cards

Summative:

Celebration of Knowledge and Mid-unit Quizzes



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COURSE Pre-Algebra, Grades 7 & 8

- Topic Tests
- Problem-based Quiz/Test on Pythagorean Theorem and it's real-world application

Alternative:

- Observation Assessment with Problem-solving
- Kahoot/Quizziz
- Individual or group productive struggle assessment during introductory lessons

Interdisciplinary Connections

Career Readiness, Life Literacies, and Key Skills

Technology Integration

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Additional resources and extension activities will be posted on Google Classroom in order to encourage students to reflect on their learning and expand on their knowledge.

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

Career Education

CRP6: Demonstrate creativity and innovation.





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SPARTAN MISSION:

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

DEPARTMENT <u>Mathematics</u> COURSE <u>Pre-Algebra</u>, <u>Grades 7 & 8</u>

Time Frame 3 Weeks

Topic

Volume

Alignment to Standards

8.G.7, 8.G.9

Learning Objectives and Activities

SWBAT answer the following questions:

- Find the volume of the pyramid/cone given the length of its base and its slant height.
- What are the units for volume and why?
- Why must you find the area of a figures base and multiply that by its height in order to find its volume?
- For which shapes is π needed in order to find the volume?

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
 shapes volume, they must multiply the area of the shapes' 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:

- Totally Tubular
- Textbook: Glencoe/McGraw Hill Math Course 3: sections 6-6, 6-7, 6-10
- Supplemental: Worksheets

Assessments

Formative:

- Classwork and Homework
- IXL Practice
- Teacher Observation



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- Graphic Organizer
- Math Scavenger Hunt/Trail

Summative:

- Celebration of Knowledge and Mid-unit Quizzes
- Topic Tests

Benchmark:

 Cumulative final exam with multiple choice, short answer, and extended constructed response questions.

Alternative:

- Kahoot/Quizziz
- Individual or group productive struggle assessment during introductory lessons

Interdisciplinary Connections

ELA: W.8.1: When students are justifying their reasoning on short answer and extended constructed response questions they write arguments to support claims with clear reasons and relevant evidence.

Career Readiness, Life Literacies, and Key Skills

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 ConnectEd online practice & assessments 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.

Additional resources and extension activities will be posted on Google Classroom in order to encourage students to reflect on their learning and expand on their knowledge.

9.4.8.TL.6: Collaborate to develop and publish work that provides perspectives





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on a real-world problem.

Career Education

CRP8: Utilize critical thinking to make sense of problems and persevere in solving

CRP11: Use technology to enhance productivity.

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



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Gifted and Talented:

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

Supports for Students With 504 Plans:

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

