

ROBBINSVILLE PUBLIC SCHOOLS

OFFICE OF CURRICULUM AND INSTRUCTION

MATHEMATICS

Pre-Algebra/Pre-Algebra Accelerated

Board of Education

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BOARD OF EDUCATION INITIAL ADOPTION DATE:

Course Philosophy

The content of a mathematics course is brought to life when the student is involved in investigating real-world applications using inductive reasoning, cooperative learning, and critical thinking skills. To be able to communicate effectively in mathematics, a student needs to have a conceptual understanding of the mathematical topics. Use of technology and the use of real-world data will expand the students' mathematics experience so that they are able to solve real problems, reason effectively, make logical connections, and think mathematically.

Course Description

This course, which is aligned to the Common Core Standards of Mathematics, is focused on the major concepts or Big Ideas: Proportional Reasoning, Number Systems, Expressions and Equations, and Probability and Statistics. Students will enhance their analytical, reasoning, and problem solving skills throughout the curriculum.

Core and Supplemental Instructional Materials

Core Materials	Supplemental Materials
<ul style="list-style-type: none"> ● Course 2 Common Core (2013 edition Pearson Education) ● Pre-Algebra (2009 edition Prentice Hall) 	<ul style="list-style-type: none"> ● Pre-Algebra Glencoe Math Common Core Edition (2014 McGraw Hill Education) ● Pre-Algebra Accelerated Glencoe Math Common Core Edition (2014 McGraw Hill Education) ● www.corestandards.org ● www.PHSchool.com ● www.Khanacademy.org ● http://illuminations.nctm.org/

Integration of 21st Century Themes and Skills

Educational Technology
Standards: (8.1.8.A.1, 8.1.8.A.3)
<ul style="list-style-type: none"> ● <u>Technology Operations and Concepts:</u> Demonstrate knowledge of a real world problem using digital tools. -Students will use on-line manipulatives to solve real world problems ● <u>Technology Operations and Concepts:</u> Use and/or develop a simulation that provides an environment to solve a real world problem or theory. -Students will create a 3-act real world problems to demonstrate an understanding of a concept.

Career Ready Practices

Standards: (CRP1, CRP6, CRP8)

CRP1. Act as a responsible and contributing citizen and employee Career-ready individuals understand the obligations and responsibilities of being a member of a community, and they demonstrate this understanding every day through their interactions with others. They are conscientious of the impacts of their decisions on others and the environment around them. They think about the near-term and long-term consequences of their actions and seek to act in ways that contribute to the betterment of their teams, families, community and workplace. They are reliable and consistent in going beyond the minimum expectation and in participating in activities that serve the greater good.

Students will demonstrate the responsibilities associated with being a member of a community when engaging collaboratively during sharing in pairs/trios, and participating in whole group discussions. Examples may include jigsaw and fishbowl activities.

CRP6. Demonstrate creativity and innovation.

Career-ready individuals regularly think of ideas that solve problems in new and different ways, and they contribute those ideas in a useful and productive manner to improve their organization. They can consider unconventional ideas and suggestions as solutions to issues, tasks or problems, and they discern which ideas and suggestions will add greatest value. They seek new methods, practices, and ideas from a variety of sources and seek to apply those ideas to their own workplace. They take action on their ideas and understand how to bring innovation to an organization.

Students will demonstrate creativity and innovation by engaging in different ways to problem solve. Examples may include 3-act tasks.

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

Career-ready individuals readily recognize problems in the workplace, understand the nature of the problem, and devise effective plans to solve the problem. They are aware of problems when they occur and take action quickly to address the problem; they thoughtfully investigate the root cause of the problem prior to introducing solutions. They carefully consider the options to solve the problem. Once a solution is agreed upon, they follow through to ensure the problem is solved, whether through their own actions or the actions of others.

Students will demonstrate critical thinking and perseverance when engaging in real-world problem solving. Examples may include finding patterns and writing equations when solving problems involving money.

Robbinsville Ready 21st Century Skill Integration

The following skills will be embedded throughout the curriculum and instruction of this course.

Collaborative Team Member: Robbinsville students will learn more by working together than in isolation. As educational theorist Lev Vygotsky advocated, learning is a social process. Many workplaces today encourage employees to work in teams to solicit diverse perspectives, brainstorm new ideas and/or products, and solve problems. Further, collaboration fosters interpersonal relationships, self-management skills, cooperation, and a sense of collective responsibility. Collaborative team members are able to work with diverse groups of people who hold a variety of perspectives.

Effective Communicator: Robbinsville students must be able to clearly articulate their ideas orally, in writing, and across various media in order to successfully connect to the world around them. As the world becomes increasingly globalized, communication is more than just sharing one's ideas. Effective communicators are able to communicate their convictions, actively listen and analyze others' work to identify perspective and/or potential bias.

Emotionally Intelligent Learner: Robbinsville students who are emotionally intelligent learn to be empathetic, demonstrate integrity and ethical behavior, are kind, are self-aware, willing to change, and practice self-care. They are better able to cope with the demands of the 21st century digital society and workplace because they are reliable, responsible, form stable and healthy relationships, and seek to grow personally and professionally. Emotionally intelligent people are able to manage their emotions, work effectively on teams and are leaders who can grow and help to develop others.

Informed and Involved Citizen: Robbinsville students need to be digital citizens who are civically and globally aware. The concept of what it means to be "literate" has evolved along with 21st century technological and cultural shifts. Our progressive vision of literacy entails having our students explore real world problems in the classroom. Informed and involved citizens are able to safely and accurately communicate with people all around the world and are financially, environmentally and informationally literate.

Innovative Thinker: Robbinsville students must encompass innovative thinking skills in order to be successful lifelong learners in the 21st century world. As stated by Karl Fisch and Scott McLeod in the short film Shift Happens, "We are currently preparing students for jobs that don't yet exist . . . using technologies that haven't been invented . . . in order to solve problems we don't even know are problems yet." Innovative thinkers are able to think analytically, solve problems critically, creatively engage in curiosity and tinkering, and demonstrate originality.

Resilient and Self-Directed Learner: Robbinsville students need to take risks and ultimately make independent and informed decisions in an ever-

changing world. Author of Life, the Truth, and Being Free, Steve Maraboli stated, “Life doesn’t get easier or more forgiving, we get stronger and more resilient.” Self-directed scholars of the 21st century are able to set goals, initiate resolutions by seeking creative approaches, and adjust their thinking in light of difficult situations. Resilient students are able to take risks without fear of failure and overcome setbacks by utilizing experiences to confront new challenges. Resilient and self directed scholars will consistently embrace opportunities to initiate solutions and overcome obstacles.

**Robbinsville Public Schools
Scope, Sequence, Pacing and Assessment**

Pacing Guide:

- The first number listed indicated the pacing for Pre-Algebra
- The second number listed, which is written in parentheses, denoted the pacing for Accelerated Pre-Algebra
- Unit 10 is only for Accelerated Pre-Algebra – so only one number is listed
- Allow four days for the midterm exam (2 days for review and 2 days for the actual exam)
- Allow four days for the final exam (2 days for review and 2 days for the actual exam)
- A few days have been built in to this guide to allow for state testing, field trips, assemblies, etc.

**Robbinsville Public Schools
Scope, Sequence, Pacing and Assessment**

Pre-Algebra/Pre-Algebra Accelerated

Unit Title	Unit Understandings and Goals	Recommended Duration/ Pacing	Assessments			
			Formative	Summative	Common Benchmark Assessments (mid-course and end of course <u>only</u>)	Alternative Assessments (projects, etc. when appropriate)
Unit # 1: Ratios and Proportional Relationships	Students will extend their understanding of ratios and develop understanding of proportionality to solve real-world and mathematical problems. They will engage in instructional tasks that provide them with the opportunities to recognize and represent proportional relationships between quantities. Proportional relationships express how quantities change in their relationship to each other.	15 (12) Days Instructional 3 (3) Flex Days 3 (3) Days Assessments	Exit slips, Stations, White board, Unit quizzes	Unit Test		Shadow project: Indirect measurements
Unit #2: Percents	Students will extend their knowledge of percents and learn the different types of percent problems and how to represent the percent equations algebraically. They will also learn how to solve real-world application problems involving percents.	20 (17) Days Instructional 3 (3) Flex Day 3 (3) Days Assessments	Exit slips, White boards, Pair Share, Quizizz, Unit Quiz	Unit Test		

Unit # 3: Integers	Students will extend their knowledge of integers to understand that operations of whole numbers is extended to integers by requiring that operations continue to satisfy properties of operations.	12 (10) days Instructional 2 (2) Flex Day 2 (3) Days Assessment	Pre- assessment, Exit slips, White Boards, Student checkers, error analysis, Unit Quiz	Unit Test		Break out box Project
Unit # 4: Rational Numbers	Student will solve real-world and mathematical problems involving the four operations with rational numbers.	12 (8) Days Instructional 2 (2) Flex Days 2 (2) Days Assessments	Exit Slip, Khan Academy, Thumbs up/down, Unit Quiz	Unit Test	Mind year Benchmark Units 1-4	Pizza Project
Unit # 5: Expressions	Algebraic expressions are used to model real-life problems and represent quantitative relationships, so that the numbers and symbols can be manipulated to make sense of the relationship.	10 (10) Days Instructional 2 (2) Flex days 2 (2) Days Assessments	Exit Slips, Student checkers, Error Analysis, pair share, debates, Unit Quiz	Unit Test		
Unit # 6: Equations	Algebraic Equations are used to model real-life problems and represent quantitative relationships, so that the numbers and symbols can be manipulated to reach a solution.	20 (18) Days Instructional 3 (3) Flex Days 3 (3) Days Assessments	Exit slip, conferencing error analysis, debates, Khan academy, pair share, white boards, quiz, trade Unit quiz	Unit Test		

Unit #7 : Inequalities	Students will build on and apply their knowledge of equations to writing and solving inequalities. Students will demonstrate that the solutions to a one-variable inequality is more than just one number and needs to be represented on a number line.	11 (7) Days Instructional 2 (2) Flex Day 2 (2) Days Assessments	Exit slip, error analysis, whit boards, quiz, quiz, trade Unit Quiz	Unit Test		
Unit #8: Geometry	Geometric principles can be used to solve real life and mathematical problems. Geometry is the mathematics of the properties and relationships of points, lines, planes, and surfaces in 1, 2 and 3 dimensions.	7 (7)Days Instructional 2 (2)Flex Days 2 (2)Days Assessments	Exit slips, stations, pair share Unit quiz	Unit Test		
Unit #9: Probability	The rules of probability can lead to more valid and reliable predictions about the likelihood of an event occurring. Students will understand the importance of, and be able to differentiate between, both theoretical and experimental probability, and independent and dependent events. Students will solve real-world probability problems using data from tables and diagrams.	10 (8) Days Instructional 2 (2) Flex Days 2 (2) Days Assessments	Exit slips, google forms, debates, unit Quiz	Unit Test		
Unit # 10: Intro to Functions (Accelerated only)	A function is a relationship between variables in which each value of the input variable is associated with a unique value of the output variable. Functions can be represented in a variety of ways, such as graphs, tables, equations, or words. Linear functions represent situations involving a constant rate of change. A line on a graph can be represented by a linear function.	(12) Days Instructional (2) Flex Days (2) Days Assessments	Exit slips, white boards, Khan academy, Unit Quiz	Unit Test	Final Benchmark Units 5-9	stained glass project

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Unit #: 1 Ratios and Proportional Reasoning

<p>Enduring Understandings: Students will extend their understanding of ratios and develop understanding of proportionality to solve real-world and mathematical problems. They will engage in instructional tasks that provide them with the opportunities to recognize and represent proportional relationships between quantities. Proportional relationships express how quantities change in their relationship to each other.</p>	<p>Essential Questions:</p> <ul style="list-style-type: none"> ● 1. What is a ratio? ● 2. How are ratios related to fractions and division? ● 3. What is the relationship between a ratio and a proportion? ● 4. How do rates and proportions help us solve everyday problems? ● 5. What is a proportion? ● 6. When and why do I use proportional comparisons? ● 7. How are proportions useful when working with similar figures?
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Interdisciplinary Connection

MS-ESS1-3. Analyze and interpret data to determine scale properties of objects in the solar system. [Clarification Statement: Emphasis is on the analysis of data from Earth-based instruments, space-based telescopes, and spacecraft to determine similarities and differences among solar system objects. Examples of scale properties include the sizes of an object’s layers (such as crust and atmosphere), surface features (such as volcanoes), and orbital radius. Examples of data include statistical information, drawings and photographs, and models.] [Assessment Boundary: Assessment does not include recalling facts about the properties of the planets and other solar system bodies.]

-Students will use scale drawing section to increase and enlarge images.

Guiding / Topical Questions with Specific Standards	Content, Themes, Concepts, and Skills	Teaching Strategies	Instructional Resources and Materials	Assessment Strategies
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7.RP.1	What is a ratio and how are ratios related to fractions and division	Write ratios in simplest form	Poll student's favorite color and write on the front board. Have students write ratios as fractions in simplest forms for different combinations of colors.	White boards/communicators	Communicator check: Ask students to write different ratios. For example i's to s's in Mississippi, or 20 minutes to 2 hours
7.RP.1 9.1.4.E.1 9.1.4.E.2 9.1.8.E.6	How do rates and proportions help us solve everyday problems	Find unit rates and compare quantities using unit rates	Use grocery ads to compare prices using unit rates to find the better buy.	Calculator	Error Analysis. Have students analyze ads to find errors in unit rates
7.RP.2	What is a proportion	Determine if two quantities are in a proportional relationship from a table, an equation, and a verbal description	Show different types of relationships and have students discuss what it means to be proportional (show tables, equations, and word problems).	Small group station work, Calculator	Class discussion: How can we use the Cross-Product Property to determine if ratios are proportional?
7.RP.2	What makes a relationship proportional	Identify proportional relationships by graphing in the coordinate plane	Using stations (1 – given a graph, 2 – given ordered pairs, 3 –given word problems) students work together to determine if each relationship is proportional	Small group station work, Calculator	Group discussions, class discussions, teacher observations
7.RP.2	What role does the unit rate play in a proportional relationship	Identify constant rates of change using tables, graphs and verbal descriptions. Explain what point (x, y) on the graph of a proportional relationship means in terms of the situation including the points (0, 0) and (1, r), where r is the unit rate.	Students will respond to teacher-posed problems using communicators	White boards/communicators, Calculator	Communicator check: Who's correct, pose two students work and have the students determine who's correct.
7.RP.3 9.1.4.E.1 9.1.4.E.2 9.1.8.E.6	How can we use proportions to solve real world problems	Using proportions to solve problems	Students will use proportions to solve real-world problems	Calculator	Teacher checks student response

7.RP.3	What is a scale drawing?	Use Scale to find missing measures and missing distances and the corresponding scale factor	Use maps of NJ to find actual distances between towns using scale factor	Maps of NJ, Calculator	Pair Share
7.RP.3	What are similar polygons? How can I solve similar figure problems using proportions?	Use scale factor to find the measure of an unknown side and identify corresponding parts of similar figures	On grid paper, students create a shape. Then using a scale factor, create a larger or smaller similar figure. Exchange with a partner to find missing side lengths.	Calculator	Give students a blueprint of a house and have them find actual dimensions of the house. Students share answers

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Unit # 2: Percents

<p>Enduring Understandings:</p> <ul style="list-style-type: none"> Students will extend their knowledge of percents and learn the different types of percent problems and how to represent the percent equations algebraically. They will also learn to solve real-world application problems involving percents. 	<p>Essential Questions</p> <ul style="list-style-type: none"> How are fractions, decimals and percents related? How can the same value be shown in different ways? How does the context of a problem help determine the best representation of a number? How can percents help you understand the situation involving money? How can we use fractions, decimals and percents in real world situations including sales tax, discounts, and commission situations?
<p>Interdisciplinary Connection</p> <p>Personal Financial Literacy 9.1.8.E.5 Analyze interest rates and fees associated with financial services, credit cards, debit cards, and gift cards. -Students will solve problems involving interest rates and fees associated with financial services.</p>	

Guiding / Topical Questions with Specific Standards	Content, Themes, Concepts, and Skills	Teaching Strategies	Instructional Resources and Materials	Assessment Strategies
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7.NS.2c	What strategies can I use to find common fractions?	Identify common fractions	Students will create a chart of common fractions, decimals, and percents		Fill in 3 column chart (decimals, fractions, percents) with missing information when one number was provided.
7.NS.2c	How do I convert from one form of a number to another?	Convert between fractions, decimals and percents	Students will receive a bag with a variety of colored chips. Their job will be to see how many of each color they have out of the total and convert into fractions, decimals and percents.	Colored chips and bags	Turn and talk with pairs
7.EE.3	How are fractions and percents related?	Finding percent of a number using fractions	Students will respond to teacher-posed questions using communicators	Communicators	Communicator check: students should use knowledge of common fraction to find the percent of a number. 12.5% of 32 would translate to $\frac{1}{8}$ of 32
7.EE.3	How can I quickly estimate percents in the real world?	Estimating percents using the fraction method	Write different ice cream flavors on the board. Have students place a tally mark under their favorite flavor. using common fractions, estimate the percentage for each flavor.		Ask clarifying questions(what percent of students do not like chocolate)
7.RP.3	What is part? What is whole? How do you find percent, part and whole?	Use the percent proportion to find part, percent or whole	Students will model the percent proportion on grid paper showing part, whole, percent and 100. Show how part/whole is equal to percent/100	Grid paper, Calculator	Solved problems
7.RP.3	What do the words “of” and “is” represent? How can equations help me find percents, part and whole?	Use the percent equation	Students will walk around the room and solve various problems	Calculator	Answer key Do you prefer proportions or equations?

7.RP.3	What is percent of change and how is it used in the real world?	Find percent of change	Use percent/100 = change/original	White Boards, Calculator	White boards to show answers
7.RP.3 7.EE.2 9.1.8.A. 1	How can percents be used in the real world? What is sales tax and why do we have it? Is there more than one way to find mark-up?	Solve problems involving sales tax, tip and mark-up	Given menus, students will order a meal. The server will total the bill and find the tax, the customer will find the tip on the total bill and then switch roles.	Menus, Calculator	Student menu final totals
7.RP.3 7.EE.2 9.1.8.D. 1	How can percents be used in the real world? Is there more than one way to find discount?	Solve problems involving discount	Using sale fliers, students will find discounts on items and find the better deal	Sale Flier, Calculator	Student sheet with prices and their discount prices
7.RP.3 9.1.8.C. 4 9.1.8.E. 5	What is simple interest and how do you find it?	Compute simple interest	Explore different student loans over time to find simple interest, balance, rates, and time	Calculator	Students will compare how changing the rate or the principal affects their total interest.
7.RP.3 9.1.8.C. 4 9.1.8.E. 5	What is compound interest and how do you find it?	Compute compound interest (Accelerated Pre-Algebra Only)	Students will decide on which competing bank would be the best investment for their money. Bank A: 2% interest compounded quarterly or Bank B: 2.015% compounded annually	Calculator	Students will defend their choices, showing growth over 10 years

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Unit #3: Integers

<p>Enduring Understandings:</p> <ul style="list-style-type: none"> ● Students will expand their knowledge of integers to understand that operations of whole numbers is extended to integers by requiring that operations continue to satisfy properties of operations. 	<p>Essential Questions</p> <ul style="list-style-type: none"> ● How can mathematical ideas be represented? ● What are integers? ● What are the rules for adding, subtracting, multiplying and dividing integers? ● Why is it important to understand procedures for working with different kinds of numbers? ● How does the opposite of n differ from the absolute value of n? ● Why is the order of operations important when performing mathematical computations?
<p>Interdisciplinary Connection</p> <p>Personal Financial Literacy 9.1.8.C.9 Summarize the causes and consequences of personal bankruptcy</p> <p>-Students will create a presentation to show their understanding of surplus versus debt.</p>	

Guiding / Topical Questions with Specific Standards		Content, Themes, Concepts, and Skills	Teaching Strategies	Instructional Resources and Materials	Assessment Strategies
7.NS.1 a 7.NS.1 b	What is absolute value? How does it differ from the opposite of a number?	Compare, order and find the absolute value of an integer	Give students a card with an integer on it. In small groups have them compare and order themselves. Have students find their absolute value and opposite on a number line.	Integer cards	Observe student discussion in small groups
7.NS.1	What are the rules for adding and subtracting integers?	Adding and subtracting integers	Use counters to model combining integers to discover the rules for combining integers. Students create problems for their partner with counters, then without counters, applying the integer rules discovered	Counters, Integer mat	Conference with students to check for understanding

7.NS.2	What are the rules for multiplying and dividing integers?	Multiply and divide integers	Students will respond to teacher-posed problems using communicators	Communicators	Communicator check
7.NS.2 a	What are exponents and how do negative affect their outcome?	Identify the base and power of an exponent and then write and evaluate an expression containing exponents	Exponents War: In groups of 2-3 deal out all of the cards to the deck(excluding kings, queens, jacks, aces are one). Each student will flip over two cards, the first is the base the second is the exponent. The player with the largest number gets the cards in the pile. Player with the largest pile in the end wins	Cards	Exit slips: what's the difference between -4^2 and $(-4)^2$?
7.NS.3	What are the order of operations? What are common mistakes, when following the order of operations?	Apply integer rules while following the order of operations	Order of operations relay race	Relay papers	Error Analysis: Have students examine integer operations problems and justify the work
8.EE.1	How can we work with exponents that have the same bases? What happens when the exponent is negative or zero?	Write and evaluate expressions using zero and negative exponents (Accelerated Pre-Algebra Only)	Show on the board $2^4, 2^3, 2^2, 2^1$. Have students write these in descending order and evaluate. They will work in pairs to find the pattern as the exponents decrease. Once they've discovered a pattern have them find $2^0, 2^{-1}, 2^{-2}$, etc. Student will come up with a rule for zero and negative exponents		Have students simplify : $2x^{-2} \cdot 3x$. Then evaluate the expression if $x = 3$

8.EE.1	How do we multiply and divide exponents with the same base?	Multiply and divide powers with the same base and raise a power to a power (Accelerated Pre-Algebra Only)	Students will explore the rules for multiplying, dividing and raising a power to a power, by filling a chart that shows the expressions and asks the students to write the expanded form and a simplified form. They will then find the rules for each.		Students will explain how they simplify expressions by naming the rule and the steps they used.
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Unit #4: Rational Numbers

<p>Enduring Understandings:</p> <ul style="list-style-type: none"> ● Student will solve real-world and mathematical problems involving the four operations with rational numbers. 	<p>Essential Questions:</p> <ul style="list-style-type: none"> ● What are rational numbers? Irrational numbers? ● How can you determine if two rational numbers are equal? ● What are the rules for adding, subtracting, multiplying and dividing rational numbers?
<p>Interdisciplinary Connection</p> <p>Personal Financial Literacy 9.1.8.B.2 Construct a simple personal savings and spending plan based on various sources of income. -Students will use rational numbers to construct a savings and spending plan.</p>	

Duration of Unit: 4 weeks

Guiding / Topical Questions with Specific Standards		Content, Themes, Concepts, and Skills	Teaching Strategies	Instructional Resources and Materials	Assessment Strategies
7.NS.1 7.NS.2 b 8.NS.1	What are number sets and how do I classify numbers according to their number set?	Classify numbers according to number sets	Show a bulls-eye diagram to explain the relationship between number sets, Teacher gives students post-its with numbers, students have to place them in the correct number sets	Post-its	Students create own numbers, examples of each type and correctly place them
7.NS.1 b 7.NS.1c 7.NS.1 d	How do I add and subtract mixed numbers?	Add and Subtract rational numbers	Students will balance a checkbook, showing withdraws, deposits, and balances over a three month period	Sample checkbooks	Check final balance
7.NS.2a 7.NS.2 b 7.NS.2c 7.NS.2 d	What is the process of multiplying and dividing fractions?	Multiply and divide rational numbers	Students walk around the room and compute various problems		Answer key

7.NS.2c	What is a complex fraction?	Simplify a complex fraction	Using cookie recipes students will find $\frac{1}{2}$, $\frac{1}{3}$, $\frac{1}{4}$...ect, of the ingredients.	Cookie recipes	Group check in: Discuss how complex fractions can be represented in different ways.
7.NS.2 d 7.EE.3	How can you convert units of measurement?	Convert units of measure between derived unit to solve problem	Play "round the world" using excel sheets with problems.	Computers	Monitor game process

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Unit #5: Expressions

<p>Enduring Understandings:</p> <ul style="list-style-type: none"> Algebraic expressions are used to model real-life problems and represent quantitative relationships, so that the numbers and symbols can be manipulated to make sense of the relationship. 	<p>Essential Questions: :</p> <ul style="list-style-type: none"> How are properties of real numbers useful when simplifying expressions? What key words are looked for with converting verbal phrases to algebraic expressions? How do you evaluate algebraic expressions? How do you simplify algebraic expressions? When is it appropriate to combine terms? When is the distributive property applied and used?
<p>Interdisciplinary Connection</p> <p>Personal Financial Literacy 9.1.12.A.2 Differentiate between taxable and nontaxable income -Students will write expressions to represent their earnings from taxable and nontaxable income.</p>	

Guiding / Topical Questions with Specific Standards		Content, Themes, Concepts, and Skills	Teaching Strategies	Instructional Resources and Materials	Assessment Strategies
7.EE.1	What are math properties and how can we apply them in our application of math problems?	Identify Properties	Give students multiple choice cards. On projector show multiple choice property problems and have students raise cards	Multiple Choice Cards	Check cards, class discussion
7.EE.2	What is an algebraic expression? What is a variable? How can I translate words into mathematical symbols?	Write algebraic expressions from a verbal phrase and write a verbal phrase from an algebraic expression	Students make a chart of operational words. Students will create examples for each word showing verbal and algebraic expressions		Exit Ticket: Write an algebraic expression. The quotient of two times and number minus three and four.

7.EE.1	How do we use substitution to evaluate expressions?	Use substitution to evaluate algebraic expressions	Evaluating Scavenger Hunt: display papers around the room that have a number in bold at the top and a problem on the bottom half. Students will choose a problem to start on; when they evaluate and get their answer they will look for that bolded number around the room . Students will continue this process until they have completed all problems and are back at their original problem	Scavenger hunt papers	Correct order of questions
7.EE.4	How do I combine like terms? What are like terms, constants and coefficients?	Simplify algebraic expressions by combining like terms	Students will play a matching game (memory). Match expression cards with simplified expressions in pairs. Person with the most pairs wins.	Memory Cards	Winners play winners, non-winners play non-winners
7.EE.4	What is the distributive property and how can it be used in the real world?	Apply properties of operations to generate equivalent expressions	Using Illuminations Distributive Property Activity Sheet, students will find areas of various rectangles. They will then write expressions for different lengths, then combining the two write each area as a product of length x width and as a sum of the areas	Illuminations Distributive Property Activity Sheet	Exit Ticket: fill in the missing values to make the expressions equivalent $2(-) = 3x + 5 - 7 + x$
7.EE.4	How can I simplify expressions with like terms and the distributive property?	Add and subtract expressions	Using algebra tiles have students represent different expressions, then combine the tiles to show how to simplify the expression	Algebra tiles	Students solve problems and check answer sheet
7.EE.4	What does it mean to factor an expression?	Find the greatest common factor of two or more monomials and factor a linear expression (Accelerated Pre-Algebra Only)	Working with algebra tiles, students will be given a linear expression representing the area of a rectangle. They will manipulate the algebra tiles to find the length and width of the	Algebra tiles	Students create problem to give to the other student, both students need to solve problem

			rectangle.		
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Unit #6: Equations

<p>Enduring Understandings:</p> <ul style="list-style-type: none"> Algebraic Equations are used to model real-life problems and represent quantitative relationships, so that the numbers and symbols can be manipulated to reach a solution. 	<p>Essential Questions: :</p> <ul style="list-style-type: none"> How are verbal models translated into algebraic equations? Are there different approaches to solve for a specific variable? How are inverse operations used to solve equations? Why does order matter when solving multi-step equations? What are the steps for solving multi-step equations? How are variables collected on one side of the equation? How can solving equations be applied to real life problem solving?
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Interdisciplinary Connection

MS-LS2-2. Construct an explanation that predicts patterns of interactions among organisms across multiple ecosystems. [Clarification Statement: Emphasis is on predicting consistent patterns of interactions in different ecosystems in terms of the relationships among and between organisms and abiotic components of ecosystems. Examples of types of interactions could include competitive, predatory, and mutually beneficial.]
 -Students will write equations to show patterns in multiple ecosystems.

Guiding / Topical Questions with Specific Standards		Content, Themes, Concepts, and Skills	Teaching Strategies	Instructional Resources and Materials	Assessment Strategies
7.EE.3	What are inverse operations? What does a solution to an equation look like?	Solve one-step equations	Students will respond to teacher-posed problems using communicators	Communicators	Communicator Check

7.EE.3	How do I solve two-step equations? What order do you complete the steps for solving the equation?	Solve two step equations	Students will “speed date”: each student will get an equation. They will become the masters of that equation (their digits). Set up desks so they are in a long row facing another set of desks. Students exchange digits and solve each other’s equation. The owners of the digits check work and provide help if needed. One row moves and the exchange digits again.	Index cards with equations	Students discuss and check each other's work, teacher observes
7.EE.4 a	What are different methods I can use to solve? Does it matter what step I do first?	Solve equations using the distributive property	Show solving in two different ways. Student will complete a gallery walk (10 sheets-3 problems on each sheet) Students choose one problem from each sheet. The must show work and explain which method they used and why they chose that method.	Gallery walk	Students gallery walk answer sheet
7.EE.3 7.EE.4 a	How do I solve multi-step equations?	Solving multi-step equations	Game of Risk: Students are shown 1 problem at a time. They complete work on the back of their recording sheet and write the answer on front with the amount of points they want to risk. Reveal answers, discuss it and calculate points	Risk game	Students turn in recording sheet
7.EE.3 7.EE.4 a 8.EE.7 b	How do you move variables from one side of an equation to the other side? Are there different ways to solve?	Solve equations with variables on both sides	Pass the problem – in groups of four each student takes one problem and performs only the first step. Then passes problem to the left and complete the next step. Continue passing and solving, when a solution is found the next person evaluates to check. If not correct pass until	Pass the problems sheets	Students discuss and check, teacher observes

			the error is found and continue solving		
8.EE.7	Why is making a key important when solving equations? What are consecutive integers?	Solve word problems including: consecutive integers, 2D geometric shapes, multiple unknowns that can be set up with a “key”	Students will make up problems for consecutive integers and geometric shapes. Have partners solve them.		All students create two word problems with answer keys. Best ones put on test.
8.EE.7	What are literal equations?	Solve a formula for a given variable (Accelerated Pre-Algebra Only)	Using the PARCC reference sheet, students will solve for different variables	NJSLAM Reference sheet	Solved problems

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Unit #7: Inequalities

<p>Enduring Understandings:</p> <ul style="list-style-type: none"> Students will build on and apply their knowledge of equations to writing and solving inequalities. Students will demonstrate that the solutions to a one-variable inequality is more than just one number and needs to be represented on a number line. 	<p>Essential Questions: :</p> <ul style="list-style-type: none"> How can you write an inequality for a real-life scenario given specific constraints? When would you use an open circle or closed circle to graph the solution of an inequality? How can we tell if a number was a solution to an inequality from looking at the graph of its solution? How can you solve an inequality and represent the inequality on a number line? What does the shading on the line represent? When do you reverse the inequality symbol when solving an inequality? How is solving an inequality different than solving an equation? How is solving an inequality the same as solving an equation?
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Interdisciplinary Connection

NJSLA Literacy R.7 Integrate and evaluate content presented in diverse media and formats, including visually and quantitatively, as well as in words
 -Students will write and solve inequalities resulting from content presented in various media and formats.

Guiding / Topical Questions with Specific Standards		Content, Themes, Concepts, and Skills	Teaching Strategies	Instructional Resources and Materials	Assessment Strategies
7.EE.3 7.EE.4 b	What is an inequality? How many solutions does an inequality have? How do you graph the solution? When do you use closed circles? Open circles?	Write and graph inequalities	Pose a question like: Allison spent less than \$50 on a pair of shoes. Have students come up with an amount she spent. Discuss in pairs and as a class. Show how we can represent this on a number line. Have the students come up with more examples to discuss.		Student discussion

7.EE.4 b	How do I get a variable by itself when there is an inequality symbols? What are the similarities and differences between solving equations and inequalities?	Solve inequalities by adding and subtracting	Students will respond to teacher-posed problems using communicators	Communicator	Communicator Check																					
7.EE.4 b	Why do you need to flip the inequality symbol when multiplying or dividing by a negative?	Solve inequalities by multiplying and dividing	<p>Working in pairs, have students complete the table and decide which graph represents the solution of the inequality.</p> <table border="1" data-bbox="1062 363 1465 911"> <tr> <td>X</td> <td>-4</td> <td>-3</td> <td>-2</td> <td>-1</td> <td>0</td> <td>1</td> </tr> <tr> <td>\square</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>\square</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> </table> <p>After a few examples have students write a set of rules and apply the rules when solving inequalities</p>	X	-4	-3	-2	-1	0	1	\square							\square							Copy of tables	Students filled out tables
X	-4	-3	-2	-1	0	1																				
\square																										
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7.EE.4 b	What order should we solve multi-step inequalities? What are common mistakes?	Solve multi-step inequalities	Students will "speed date": each student will get an equation. They will become the masters of that equation (their digits). Set up desks so they are in a long row facing another set of desks. Students	Index cards with inequalities	Students check work, teacher observes																					

			exchange digits and solve each other's equation. The owners of the digits check work and provide help if needed. One row moves and the exchange digits again.		
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Unit #8: Geometry

<p>Enduring Understandings:</p> <ul style="list-style-type: none"> Geometric principles can be used to solve real life and mathematical problems. Geometry is the mathematics of the properties and relationships of points, lines, planes, and surfaces in 1, 2 and 3 dimensions. 	<p>Essential Questions: :</p> <ul style="list-style-type: none"> How do we use equations to find missing angles? What are complementary/supplementary angles? To what measure do the three angles of a triangle always sum to? How can we use formulas to find missing dimensions? How is a net constructed and what does it represent? How can the volume of three-dimensional figures be determined? How can surface area of three dimensional figures be determined? How are nets related to surface area? Why are cross-sections of three-dimensional figures useful?
<p>Interdisciplinary Connection</p> <p>NJSLS Reading RI.6.4. Determine the meaning of words and phrases as they are used in a text, including figurative, connotative, and technical meanings. -Students will decode word problems and real-life scenarios involving geometry.</p>	

Guiding / Topical Questions with Specific Standards		Content, Themes, Concepts, and Skills	Teaching Strategies	Instructional Resources and Materials	Assessment Strategies
7.G.5	What is a complementary angle? Supplementary angle? Vertical angle? How can I find missing angles?	Finding missing angles in complementary, supplementary and vertical angles?	In stations around the room have drawing of angles, some in pairs to equal 90° and 180° and others set up as angles directly across from each other. Fill in one angle with an algebraic expression and have the students use protractors to measure the angles and then find the value of x.	Station material, Protractors	Check station record sheet. Discuss how human error can affect the outcome.
7.G.2 7.G.3	What is a polygon? how do you determine how many degrees are in an x-sided polygon?	Classifying polygons	Draw a triangle, quadrilateral and pentagon on the board with their degree measures. In pairs, students will work together to find a formula that will allow them to find the measure of degrees for any		Exit slip: Name a polygon that has 9 line segments and angles and determine how many degrees are in the polygon.

			size polygon.		
7.G.5	How do I find missing angles in a polygon?	Finding missing angles in polygons.	3-act railing reconstruction. Students will watch a video and ask questions to determine the missing angles in the railing.	video projector	group discussion
7.G.4	What is perimeter/circumference and how do you find it? What formulas do you have to know in order to find area of 2 dimensional figures?	Find area, perimeter and circumference of 2 dimensional figures	Given the area or perimeter/circumference of a 2-d figure and the base or height, have students determine the missing dimension of the figure.	Worksheet	Student answers
7.G.4	How do you deconstruct an irregular figure? Shaded area of a figure?	Area of irregular figures and shaded regions	Give students pictures of irregular figures and an assortment of smaller polygons. Using the polygons like tangrams have the students find the area of the larger irregular shape by breaking it into smaller shapes first.	Tangram peieces	Check final measurement and answers
7.G.6	What is a net? How do you use a net to help you find surface area? How do you find the volume of 3D figures?	Surface area and volume of 3 dimensional figures	Have students bring in three-dimensional figures. They will work in groups of 2-3 to measure the figures and find the surface area and volume of each figure.	Measuring tape, 3-D figures	Check work with group members

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Unit #9: Probability

<p>Enduring Understandings:</p> <ul style="list-style-type: none"> ● The rules of probability can lead to more valid and reliable predictions about the likelihood of an event occurring. Students will understand the importance of, and be able to differentiate between, both theoretical and experimental probability, and independent and dependent events. Students will solve real-world probability problems using data from tables and diagrams. 	<p>Essential Questions: :</p> <ul style="list-style-type: none"> ● How is probability used to make informed decisions about events? ● How can we predict the outcomes of future events? ● When should we sample and what makes a good sample? ● How can experimental and theoretical probabilities be used to make predictions or draw conclusions? ● Why is it important to understand whether an event is dependent or independent when calculating probability? ● How can the probability of two events occurring be determined?
<p>Interdisciplinary Connection</p> <p>8.1.8.A.3 Use and/or develop a simulation that provides an environment to solve real world problem or theory. -Use computers to generate a random sampling for experimental probability.</p>	

Guiding / Topical Questions with Specific Standards		Content, Themes, Concepts, and Skills	Teaching Strategies	Instructional Resources and Materials	Assessment Strategies
7.SP.5	What are outcomes, events, and complements of an event in probability? How do you find probability?	Find the probability and complement of an event	Students will walk around the room and complete various problems: find the probability of rolling a 2 on a number cube, or P(multiple of 3). Students will answer the questions, then we will review as a class	dice	student answers

7.SP.6	How do you find experimental probability? How does it relate to theoretical probability?	Find experimental probability and use simulations	Students roll two number cubes in pairs and record their answers for two minutes. Using their data discuss how many different ways they could get a number (show how we find sample space). Have them find the probability of rolling a six (in pairs, rows, then as a class). Ask how does it compare with theoretical probability? What happens as our experiment gets larger?	dice	Show class data as a whole and compare the results as individuals to the class. What happens as the sample gets larger?
7.SP.8b	What is a sample space? What is the counting principle?	Make and use sample spaces and the counting principle	Ask students what the probability of tossing two coins and getting 1 tail and 1 head? Discuss as a class different methods we can use to find sample spaces – tree, chart, counting principle and apply that to finding the probability of an event.		Exit slip: What is the sample space of flipping a coin and rolling a number cube?
7.SP.8	What is a compound event? When are two events independent or dependent? How do you find the probability of dependent events?	Find the probability of independent and dependent events	In a bag have 3 colored blocks, one red, two blue. Use a tree diagram to find the probability that both blocks are blue. Now if you return the first block after you pull it out of the bag, create a tree diagram to find the probability that both blocks are blue. Conduct an experiment for both situations.		Students will write in their own words the difference between independent and dependent events and provide a real-life example of each.
7.SP.8	What is a permutation? What is a combination? When do you use permutations and combinations?	Calculate permutations and combinations (Accelerated Pre-Algebra Only)	Choose 5 volunteers, using those students have the class determine how many different groups of students they could choose for a relay team (4). Then		Student and class discussion, focusing on the difference between permutations and

			tell them they need to determine how many possibilities there are if they have to put them in a specific order. How can they find this algebraically?		combinations
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Unit #10: An Introduction to Linear Functions (Accelerated only)

<p>Enduring Understandings:</p> <ul style="list-style-type: none"> ● A function is a relationship between variables in which each value of the input variable is associated with a unique value of the output variable. Functions can be represented in a variety of ways, such as graphs, tables, equations, or words. Linear functions represent situations involving a constant rate of change. A line on a graph can be represented by a linear function. 	<p>Essential Questions: :</p> <ul style="list-style-type: none"> ● What are the characteristics of a function? ● What makes a relationship linear? ● Where do we see variables in real life? ● How can we represent a pattern between x and y in a given situation? ● How can we show ordered pairs in a table? ● What does the slope of a line indicate about the line? ● What information does the equation of a line give you? ● How do we create a graph given a set of data? ● How are equations and graphs related?
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Interdisciplinary Connection

MS-PS3-1. Construct and interpret graphical displays of data to describe the relationships of kinetic energy to the mass of an object and the speed of an object.

-Students will graph linear functions to show patterns in kinetic energy

Guiding / Topical Questions with Specific Standards		Content, Themes, Concepts, and Skills	Teaching Strategies	Instructional Resources and Materials	Assessment Strategies
8.F.1	What is a function? How can I write a function using function notation?	Determine whether a relation is a function and write a function using function notation	Show cartoon drawing of an input-output machine. Discuss how each input can have only one output. Make an analogy to birthdays-each person has only one birthday but two people can have the same birthday		Given 10 relations, students have to place them in the column of function or not function
8.F.2	What are different ways we can represent functions?	Represent linear functions with an equation, a graph, and a table	Students work in pairs to create a table from given word problems. They use the information to graph and write an equation of the function		Students will create their own real-world problems and then create a table, graph and equation to represent the function,

8.F.4	How do I write function rules from a table?	Write a function rule based on data given in chart form or verbal phrase	Given a word problem – phone company has a monthly rate plus overage charge. Students will write an equation after finding the rate of change and initial amount		Have students pick a standard unit of measurement, such as quart, and write a function rule that converts quart measurements into measurements using metric units, such as liters.
8.F.4	What is slope? How do you find slope?	Identify and find rate of change and slope from tables, graphs, and ordered pairs	Set up stations around the room. Station 1 – finding slope from ordered pairs, Stations 2 – finding slope from a table, Station 3 – finding slope from a graph. Students rotate through each station.	Stations	Students share and complete an exit ticket at each station
8.F.3 8.F.5	What is the y-intercept? How can we graph by using the y-intercept and slope?	Graph linear equations using slope and y-intercepts	Slope –Intercept Battleship – students will work in pairs and plot points on a coordinate plane. One student will be the even number and the other the odd numbers on the y-axis. Students must write and graph equations to hit the opponents ships	Coordinate plane boards, markers	Students check each other's work, teacher observes

General Differentiated Instruction Strategies

<ul style="list-style-type: none"> ● Leveled texts ● Chunking texts ● Choice board ● Socratic Seminar ● Tiered Instruction ● Small group instruction ● Guided Reading ● Sentence starters/frames ● Writing scaffolds ● Tangible items/pictures ● Adjust length of assignment 	<ul style="list-style-type: none"> ● Repeat, reword directions ● Brain breaks and movement breaks ● Brief and concrete directions ● Checklists for tasks ● Graphic organizers ● Assistive technology (spell check, voice to type) ● Study guides ● Tiered learning stations ● Tiered questioning ● Data-driven student partnerships ● Extra time
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Possible Additional Strategies for Special Education Students, 504 Students, At-Risk Students, and English Language Learners (ELLs)

Time/General	Processing	Comprehension	Recall
<ul style="list-style-type: none"> ● Extra time for assigned tasks ● Adjust length of assignment ● Timeline with due dates for reports and projects ● Communication system between home and school ● Provide lecture notes/outline 	<ul style="list-style-type: none"> ● Extra Response time ● Have students verbalize steps ● Repeat, clarify or reword directions ● Mini-breaks between tasks ● Provide a warning for transitions ● Reading partners 	<ul style="list-style-type: none"> ● Precise step-by-step directions ● Short manageable tasks ● Brief and concrete directions ● Provide immediate feedback ● Small group instruction ● Emphasize multi-sensory learning 	<ul style="list-style-type: none"> ● Teacher-made checklist ● Use visual graphic organizers ● Reference resources to promote independence ● Visual and verbal reminders ● Graphic organizers

Assistive Technology	Assessments and Grading	Behavior/Attention	Organization
<ul style="list-style-type: none"> ● Computer/whiteboard ● Tape recorder ● Spell-checker ● Audio-taped books 	<ul style="list-style-type: none"> ● Extended time ● Study guides ● Shortened tests ● Read directions aloud 	<ul style="list-style-type: none"> ● Consistent daily structured routine ● Simple and clear classroom rules ● Frequent feedback 	<ul style="list-style-type: none"> ● Individual daily planner ● Display a written agenda ● Note-taking assistance ● Color code materials

Enrichment

The goal of Enrichment is to provide learners with the opportunity to participate in extension activities that are differentiated and enhance the curriculum. All enrichment decisions will be based upon individual student needs.

- Show a high degree of intellectual, creative and/or artistic ability and demonstrate this ability in multiple ways.
- Pose questions and exhibit sincere curiosity about principles and how things work.
- The ability to grasp concepts and make real world and cross-curricular connections.
- Generate theories and hypotheses and pursue methods of inquiry.
- Produce products that express insight, creativity, and excellence.
- Possess exceptional leadership skills.
- Evaluate vocabulary
- Elevate Text Complexity
- Inquiry based assignments and projects
- Independent student options
- Tiered/Multi-level activities
- Purposeful Learning Center
- Open-ended activities and projects
- Form and build on learning communities
- Providing pupils with experiences outside the ‘regular’ curriculum
- Altering the pace the student uses to cover regular curriculum in order to explore topics of interest in greater depth/breadth within their own grade level
- A higher quality of work than the norm for the given age group.
- The promotion of a higher level of thinking and making connections.
- The inclusion of additional subject areas and/or activities (cross-curricular).
- Using supplementary materials in addition to the normal range of resources.

English Language Learner (ELL) Resources

- Learning style quiz for students- <http://www.educationplanner.org/students/self-assessments/learning-styles-quiz.shtml>
- “Word clouds” from text that you provide-<http://www.wordle.net/>
- Bilingual website for students, parents and educators: <http://www.colorincolorado.org/>
- Learn a language for FREE-www.Duolingo.com
- Time on task for students-<http://www.online-stopwatch.com/>
- Differentiation activities for students based on their Lexile-www.Mobymax.com
- WIDA-<http://www.wida.us/>
- Everything ESL - <http://www.everythingESL.net>
- ELL Tool Box Suggestion Site [Http://www.wallwisher.com/wall/ell toolbox](http://www.wallwisher.com/wall/ell_toolbox)
- Hope4Education - <http://www.hope4education.com>
- Learning the Language <http://blogs.edweek.org/edweek/learning-the-language/>
- FLENJ (Foreign Language Educators of NJ) 'E-Verse' wiki: <http://www.flenj.org/Publications/?page=135>
- OELA - <http://www.ed.gov/offices/OBEMLA>
- New Jersey Department of Education- Bilingual Education information <http://www.state.nj.us/education/bilingual/>

Special Education Resources

- Animoto -Animoto provides tools for making videos by using animation to pull together a series of images and combining with audio. Animoto videos or presentations are easy to publish and share. <https://animoto.com>
- Bookbuilder -Use this site to create, share, publish, and read digital books that engage and support diverse learners according to their individual needs, interests, and skills. <http://bookbuilder.cast.org/>
- CAST -CAST is a non-profit research and development organization dedicated to Universal Design for Learning (UDL). UDL research demonstrates that the challenge of diversity can and must be met by making curriculum flexible and responsive to learner differences. <http://www.cast.org>
- CoSketch -CoSketch is a multi-user online whiteboard designed to give you the ability to quickly visualize and share your ideas as images. <http://www.cosketch.com/>
- Crayon -The Crayon.net site offers an electronic template for students to create their own newspapers. The site allows you to bring multiple sources together, thus creating an individualized and customized newspaper. <http://crayon.net/> Education Oasis -Education Oasis offers a collection of graphic organizers to help students organize and retain knowledge – cause and effect, character and story, compare and

contrast, and more! <http://www.educationoasis.com/printables/graphic-organizers/>

- Edutopia -A comprehensive website and online community that increases knowledge, sharing, and adoption of what works in K-12 education. We emphasize core strategies: project-based learning, comprehensive assessment, integrated studies, social and emotional learning, educational leadership and teacher development, and technology integration. <http://www.edutopia.org/>
- Glogster -Glogster allows you to create "interactive posters" to communicate ideas. Students can embed media links, sound, and video, and then share their posters with friends. <http://edu.glogster.com/?ref=personal>
- Interactives – Elements of a Story -This interactive breaks down the important elements of a story. Students go through the series of steps for constructing a story including: Setting, Characters, Sequence, Exposition, Conflict, Climax, and Resolution. <http://www.learner.org/interactives/story/index.html>
- National Writing Project (NWP) -Unique in breadth and scale, the NWP is a network of sites anchored at colleges and universities and serving teachers across disciplines and at all levels, early childhood through university. We provide professional development, develop resources, generate research, and act on knowledge to improve the teaching of writing and learning in schools and communities. <http://www.nwp.org>
- Pacedcar -Vocab Ahead offers videos that give an active demonstration of vocabulary with audio repeating the pronunciation, definition, various uses, and synonyms. Students can also go through flash cards which give a written definition and visual representation of the word. <http://pacedcar.missingmethod.com/>