

Exploratory 8 Math

Course Description

Exploratory math is designed to use key curriculum topics from the Mathematics 8 CP/CPC curriculum in order to complete problem-based projects and activities that infused technology in the classroom. This course will involve many cross-curricular subjects, like technology, science, history, English and more. Students will complete projects, both individual as well as group, based on provided rubrics and templates to enrich their knowledge of middle school mathematics. This course is designed for the Exploratories courses, which run one marking period each.

Suggested Course Sequence

Numerical Expressions: 10 days

Linear Relationships: 7 days

Linear Equations and Systems: 6 days

Transformations (Geometry): 6 days

Shapes and Forms (Geometry): 11 days

Bivariate Data: 13 days

Patterns and Formulas: 5 days

Prerequisites:

Math 7

Exploratory Math & Technology

Content Area:		Exploratory Math		
Unit Title:		Using Math in a 21 st Century World		
Grade Level: 8				
Unit Summary: This course is designed to use middle school math concepts to solve real world problems, using technology to foster deeper understanding.				
Interdisciplinary Connections: Government, Sports, Science (scientific notation, astronomy), Statistics, Engineering & Construction, Digital Design				
21st Century Themes and Skills:		9.1.8.A.1, 2	9.1.8.E.2	9.1.8.E
		9.1.8.C.1, 2	9.1.8.D	
Standards (Math and Technology):				
CPI#:		Statement:		
8.1.8.A.1		Demonstrate knowledge of a real world problem using digital tools.		
8.1.8.A.4		Graph and calculate data within a spreadsheet and present a summary of the results		
8.1.5.A.4		Graph data using a spreadsheet, analyze and produce a report that explains the analysis of the data.		
8.NS.A.1		Compare rational and irrational numbers to demonstrate that the decimal expansion of irrational numbers do not repeat; show that every rational number has a decimal expansion which eventually repeats and covert such decimals into rational numbers.		
8.EE.A.1,3,4		Apply the properties of integer exponents to simplify and write equivalent numerical expressions Apply the properties of integer exponents to simplify and write equivalent numerical expressions Apply the properties of integer exponents to simplify and write equivalent numerical expressions		
8.EE.B.5		Graph and analyze the different representations of proportional relationships and interpret the unit rate as the slope of the graph which indicates the rate of change.		
8.EE.C.7		Solve linear equations in one variable with rational number coefficients that might require expanding expressions using the distributive property and/or combining like terms, including examples with one solution, infinite solutions, or no solution.		

<p>8.F.B.4, 5</p>	<p>Apply the properties of integer exponents to simplify and write equivalent numerical expressions Sketch a graph of a function from a qualitative description and give a qualitative description of a graph of a function.</p>
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<p>Unit Essential Question(s):</p> <ul style="list-style-type: none"> • How can we use equations to solve real world problems? • How can basic shapes and objects be used to help us solve real world situations? • How can math help up understand or interpret sports and music statistics? • Does Scientific Notation really have any real world significance, and if so, where would I use it in a real scenario? • Where do linear relationships play a big role in solving real world problems? 	<p>Unit Enduring Understandings:</p> <ul style="list-style-type: none"> • How can writing an equation help us solve for an unknown value in an efficient way? • How can we use geometric properties and shapes to help us make sense of the world around us? • How can we accurately calculate and interpret real life statistics that interest us? • What significance does scientific notation really have and why is it more useful than standard notation? • How can interpreting and comparing linear relationships help solve real problems?
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<p>Unit Learning Targets/Objectives: <i>Students will...</i></p> <ul style="list-style-type: none"> • Apply and interpret linear relationships in multiple problem-based projects and tasks to make real connections to popular topics • Explore and understand how scientific notation is used in the real world and why it’s so significant in the Science world. • Explore and interpret multiple geometric shapes and transformations in real life situations and how a deeper understanding of their properties can help solve real world problems • Understand and interpret systems of linear equations and how writing and graphing systems can help us answer important real life questions, like income/expense graphs and being a smart entrepreneur
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Evidence of Learning

<p>Formative Assessments: -Teacher observational data, teacher-made rubrics, student activity sheets, follow up discussion questions and connections, shared technology projects on Google drive.</p> <p>Summative/Benchmark Assessment(s): completion & handing in of project elements to be graded, class discussion/participation evaluations</p> <p>Resources/Materials</p> <p>https://docs.google.com/document/d/1uM3pZuKUJugPiGKTLbQXvJAPt_qod2PYicWIKkUapM8/edit#</p>

<p>Modifications:</p> <ul style="list-style-type: none"> • Special Education Students • At-Risk Students <p>1. Allow errors</p> <p>1. Provide extended time to complete</p>
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| <ol style="list-style-type: none"> 2. Rephrase questions, directions, and explanations 3. Allow extended time to answer questions, and permit drawing, as an explanation 4. Accept participation at any level, even one word 5. Consult with Case Managers and follow IEP accommodations/modifications <ul style="list-style-type: none"> • English Language Learners 1. Assign a buddy, same language or English speaking 2. Allow errors in speaking 3. Rephrase questions, directions, and explanations 4. Allow extended time to answer questions, and permit drawing, as an explanation 5. Accept participation at any level, even one word | <p>tasks</p> <ol style="list-style-type: none"> 2. Consult with Guidance Counselors and follow I&RS procedures/action plans 3. Consult with classroom teacher(s) for specific behavior interventions 4. Provide rewards as necessary <p>Gifted and Talented Students</p> <ol style="list-style-type: none"> 1. Provide extension activities 2. Build on students' intrinsic motivations 3. Consult with parents to accommodate students' interests in completing tasks at their level of engagement |
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Lesson Plans

Lesson Name/Topic	Lesson Objective(s)	Time frame (day(s) to complete)
<p>8.1 Numerical Expressions : Always, Sometimes, Never Square Roots go Rational/Repeating Decimals Cost of Super Bowl Commercials How many stars in the Universe? The Perfect Bracket</p>	<p>Compare rational and irrational numbers to demonstrate that the decimal expansion of irrational numbers do not repeat; show that every rational number has a decimal expansion which eventually repeats and covert such decimals into rational numbers.</p>	<p>About 10 days</p>
<p>8.2 Linear Relationships: The Domino Effect Rise and Run Triangles Staircases & Steepness Bike Ride Journey Cheesy Goldfish</p>	<p>Graph and analyze the different representations of proportional relationships and interpret the unit rate as the slope of the graph which indicates the rate of change.</p>	<p>About 7 days</p>
<p>8.3 Linear Equations and Systems: Solving for Y with Cups and Kisses</p>	<p>Solve systems of linear equations</p>	<p>About 6 days</p>

<p>Ditch Diggers DVR Dilemma Playing Catch Up</p>	<p>in two variables by inspection, algebraically, and/or graphically (estimate solutions) to demonstrate solutions correspond to points of intersection of their graphs, because points of intersection satisfy both equations simultaneously.</p>	
<p>8.4 Transformations Aaron’s Design Representing and Combining Transformations How did they make Mrs. Pac-man?</p>	<p>Utilize the properties of rotation, reflection, and translation to model and relate pre-images of lines, line segments, and angles to their resultant image through physical representations and/or Geometry software.</p>	<p>About 6 days</p>
<p>8.5 Shape and Form Jane’s TV The Pythagorean Theorem: Square Areas Volume of Cone Discovery Largest Cup of Coffee Ever Amazing Watermelons Spaceballs and Megamaid</p>	<p>Know and apply the appropriate formula for the volume of a cone, a cylinder, or a sphere to solve real-world and mathematical problems.</p>	<p>About 11 days</p>
<p>8.6 Bivariate Data Opening Day Hand Span and Height Birds Eggs Texting and Grades U.S. Airports Music and Sports</p>	<p>Construct and interpret scatter plots for bivariate measurement data and identify and interpret data patterns</p>	<p>About 13 days</p>

<p>What's your favorite subject?</p>	<p>(clustering, outliers, positive or negative association, possible lines of best fit, and nonlinear association).</p>	
<p>8.7 Patterns and Formulas How sharp is the iPhone retina? A Lunch-in Affair Do you notice Sum-thing?</p>	<p>Define linear functions as a rule that assigns one output to each input and determine if data represented as a graph or in a table is a function.</p>	<p>About 5 days</p>
<p>Teacher Notes: Technology will be used frequently in this course, so access to computers will be essential. Teacher will need to prepare & secure materials for projects based on class size and make-up.</p>		
<p>Additional Resources Click links below to access additional resources used to design this unit:</p>		