7th Grade Exploratory Math

Course Description:
7th Grade Exploratory Math will implement 21st century skills in solving real-world applications. Students will apply 7th grade math standards to hands-on projects and assignments. Students will collaborate with peers to complete problem-based activities and lessons. This course parallels the students' 7th grade math class, linking math concepts to exploratory math activities and lessons.

Suggested Course Sequence:

Pre-Requisite: 6th Grade Math
Unit 1: *The Number System*
Unit 2: *Ratios and Proportional Relationships*
Unit 3: *Expressions and Equations*
Unit 4: *Geometry*
Unit 5: *Statistics and Probability*

7th Grade Exploratory Math	
Content Area: Math Exploratory	
Unit Title: Using 21st Century Skills in Solving Real-World Applications	
Grade Level: 7	
Unit Summary: This course is designed for students to solve real-world applications involving 7th grade math standards	
Interdisciplinary Connections: Currency, Better Buys, Proportion, Sales & Discounts, Perimeter & Area, Video Games, Scale Drawings, Perimeter & Area, Food, Coupons, Statistics & Probability	
21st Century Themes and Skills: Creativity and Innovation, Critical Thinking and Problem Solving, Communication and Collaboration, Information Literacy, Life and Career Skills, Media Literacy, Communication Literacy 9.1.8.A.6, 9.1.8.B.7, 9.1.8.D.1, 9.1.8.E.1, 9.1.8.E.4, 9.2.8.B.3,	
Learning Targets	
Standards (Math and Technology):	
CPI#:	**Statement:**
7.NS.A.1.	Apply and extend previous understandings of addition and subtraction to add and subtract rational numbers; represent addition and subtraction on a horizontal or vertical number line diagram.
7.NS.A.2.	Apply and extend previous understandings of multiplication and division of fractions to multiply and divide rational numbers.
7.NS.A.3.	Solve real-world and mathematical problems involving the four operations with rational numbers.
7.RP.A.1.	Compute unit rates associated with ratios of fractions, including ratios of lengths, areas and other quantities measured in like or different units.
7.RP.A.2.	Recognize and represent proportional relationships between quantities.
7.RP.A.3.	Use proportional relationships to solve multistep ratio and percent problems.
7.EE.A.1.	Apply properties of operations as strategies to add, subtract, factor, and expand linear expressions with rational coefficients.
7.EE.A.2.	Understand that rewriting an expression in different forms in a problem context can shed light on the problem and how the quantities are related.
7.EE.B.3.	Solve multi-step real-life and mathematical problems posed with positive and negative rational numbers in any form (whole numbers, fractions, and decimals), using tools strategically. Apply properties of operations to calculate with numbers in any form; convert between forms as appropriate; and assess the reasonableness of answers using mental computation and estimation strategies.
7.EE.B.4.	Use variables to represent quantities in a real-world or mathematical problem, and construct simple equations and inequalities to solve problems by reasoning about the quantities.
7.G.A.1.	Solve problems involving scale drawings of geometric figures, including computing actual lengths and areas from a scale drawing and reproducing a scale drawing at a different scale.
7.G.A.2.	Draw (freehand, with ruler and protractor, and with technology) geometric shapes with given conditions. Focus on constructing triangles from three measures of angles or sides, noticing when the conditions determine a unique triangle, more than one triangle, or no triangle.
7.G.A.3.	Describe the two-dimensional figures that result from slicing three-dimensional figures, as in plane section of right rectangular prisms and right rectangular pyramids.
7.G.B.4.	Know the formulas for the area and circumference of a circle and use them to solve problems; give an informal derivation of the relationship between the circumference

	and area of a circle.
7.G.B.5.	Use facts about supplementary, complementary, vertical, and adjacent angles in a multi-step problem to write and solve simple equations for an unknown angle in a figure.
7.G.B.6.	Solve real-world and mathematical problems involving area, volume, and surface area of two- and three-dimensional objects composed of triangles, quadrilaterals, polygons, cubes, and right prisms.
7.SP.A.1	Understand that statistics can be used to gain information about a population by examining a sample of the population; generalizations about a population from a sample are valid only if the sample is representative of that population. Understand that random sampling tends to produce representative samples and support valid inferences.
7.SP.A.2	Use data from a random sample to draw inferences about a population with an unknown characteristic of interest. Generate multiple samples (or simulated samples) of the same size to gauge the variation in estimates or predictions.
7.SP.B.3	Informally assess the degree of visual overlap of two numerical data distributions with similar variabilities, measuring the difference between the centers by expressing it as a multiple of a measure of variability.
7.SP.B.4	Use measures of center and measures of variability for numerical data from random samples to draw informal comparative inferences about two populations.
7.SP.C.5	Understand that the probability of a chance event is a number between 0 and 1 that expresses the likelihood of the event occurring. Larger numbers indicate greater likelihood. A probability near 0 indicates an unlikely event, a probability around 1/2 indicates an event that is neither unlikely nor likely, and a probability near 1 indicates a likely event.
7.SP.C.6	Approximate the probability of a chance event by collecting data on the chance process that produces it and observing its long-run relative frequency, and predict the approximate relative frequency given the probability.
7.SP.C.7	Develop a probability model and use it to find probabilities of events. Compare probabilities from a model to observed frequencies; if the agreement is not good, explain possible sources of the discrepancy.
7.SP.C.8	Find probabilities of compound events using organized lists, tables, tree diagrams, and simulation.
8.1.5.A.1	Select and use the appropriate digital tools and resources to accomplish a variety of tasks including solving problems.
8.1.5.A.3	Use a graphic organizer to organize information about problem or issue.
8.1.8.A.1	Demonstrate knowledge of a real world problem using digital tools.

Unit Essential Question(s):	Unit Enduring Understandings:
- How can I use algebraic expressions and equations to solve real-world problems? - What is the distributive property and how is it used? - How can you make predictions based on data? - How can proportions be used to solve relationships? - How can I use unit rates to determine better buys?	- Students will understand the difference between fractions, repeating decimals, and terminating decimals. - Students will understand how to create equations from patterns. - Students will discover how to use proportions to solve real-world applications. - Students will see how the distributive property helps them more efficiently solve problems. - Students will see how statistics and probability

	are used in real-world applications.

Unit Learning Targets/Objectives:
Students will…
- Solve real-world applications using 21st century skills.

Evidence of Learning

Formative Assessments:
Teacher observation, group activity projects (based off of given rubric), individual projects (based off of given rubric)

Summative/Benchmark Assessment(s):
Teacher observation, anticipatory sets, exit tickets

Resources/Materials (copy hyperlinks for digital resources)**:**
https://docs.google.com/document/d/1KYgtd2q5x2clpDTwtJwpDeAoZw_M_O0R9Au5bkKXHsE/edit

Modifications:
- Special Education Students
  - Extra Time
  - Modified Assignments
  - Repeated Directions
- English Language Learners
  - Repeated Directions
  - Rephrased Directions
  - Partner
- At-Risk Students
  - Behavior Chart
  - Rewarded Behavior
- Gifted and Talented Students
  - Project Extensions
  - Buddy Up to Help Low-Achieving Students

Lesson Plans

Lesson Name/Topic	Lesson Objective(s)	Time Frame (day(s) to complete)
7-1 The Number System 1. A Day Out 2. Division 3. A Billion Nickels 4. Visual Patterns	1. Students compare the costs of three class trips. Based on the preferred trip of the students and the cost of each trip, students select which class trip is most cost-efficient. 2. Students analyze different real-world applications using $100 \div 6$ and determine which scenarios require fractions, repeating decimals, or neither. 3. Students watch an opening video, and determine how many nickels are in $1000. They then determine the	9-10 days

	weight of the nickels, and how much space they would occupy. 4. Students look at different patterns and determine the equation of the pattern.	

7-2 Ratios and Proportional Relationships
  1. Proportion and Non-Proportion Situations
  2. Developing a Sense of Scale
  3. Ice Cream Sale
	1. Students identify when two quantities vary in direct proportion. They will solve problems involving proportions.
	2. Students use guess and check to answer some proportion problems. Students will get into groups and share answers before students will learn and practice with others how to mathematically solve proportions.
	3. Students use proportions to determine how much ice cream is needed for an ice cream sale and how much profit will be made.
		9-10 days

7-3 Expressions and Equations
  1. Guess My Number
  2. Fencing
  3. Video Game Download
  4. Steps to Solving Equations
	1. Students use classmates' clues and create expressions to guess classmates' numbers.
	2. Students are given the price of two fence purchases. Students will figure out using proportions how much each panel will cost. Students will use this to predict the cost of a new fence purchase.
	3. Students will watch a video about downloading Wii games. Students will predict the time needed based off an informational video to download a new game.
	4. Students solve real-world applications involving equations using the distributive property.
		9-10 days

7-4 Geometry 1. Floor Plan	1. Students use a scale drawing to determine the	9-10 days

2. Measuring the Area of a Circle 3. Pizza Doubler 4. Eight Circles	size (area) of her living room. 2. Students find the area of a circle and determine the possible error in measuring the circle. 3. Students use their knowledge of sector angles and radii to determine the better coupon deal of a local pizza place. Students will also determine if the coupon is best for all numbers of slices or just for some. 4. Students find the area of a larger circle and the area of a shaded segment. The figure is 8 small circles inscribed in one large circle.	
7-5 Statistics and Probability 1. Counting Trees 2. Spinner Bingo **3. Card Game**	1. Students use prediction and probability to determine how many old trees and young trees are in a forest diagram. 2. Students analyze a Bingo game and make their own Bingo card that predicts their best chance of winning. Students will compare cards with their classmates and play the game. 3. Students play a card game as a class that has the students predict if the next card flipped will be higher or lower than the previous hard (they will make predictions using probability).	9-10 days

Teacher Notes: Teacher can modify assignments as appropriate for class or individual students.

Additional Resources:
Click links below to access additional resources used to design this unit:

http://www.corestandards.org/Math/Content/7/introduction/