Lavallette Elementary School	
Content Area: Mathematics **Course Title: Mathematics**	**Grade Level: Seventh Grade**
Unit Plan 1 Number System	September - October Ongoing
Unit Plan 2 Expressions and Equations	November - January Ongoing
Unit Plan 3 Ratios and Proportions	January - February Ongoing
Unit Plan 4 Statistics and Probability	March - April Ongoing
Unit Plan 5 Geometry	April - June Ongoing
Updated: August 2018 by Sharon Carroll	Board Approved: October 16, 2018

Standards for Mathematical Practice	
The following standards for mathematical practice should be incorporated in all units.	
MP.1 Make sense of problems and persevere in solving them.	Find meaning in problems Look for entry points Analyze, conjecture and plan solution pathways Monitor and adjust Verify answers Ask themselves the question: "Does this make sense?"

MP.2 Reason abstractly and quantitatively.	Make sense of quantities and their relationships in problems Learn to contextualize and decontextualize Create coherent representations of problems
MP.3 Construct viable arguments and critique the reasoning of others.	Understand and use information to construct arguments Make and explore the truth of conjectures Recognize and use counterexamples Justify conclusions and respond to arguments of others
MP 4 Model with mathematics.	Apply mathematics to problems in everyday life Make assumptions and approximations Identify quantities in a practical situation Interpret results in the context of the situation and reflect on whether results make sense
MP.5 Use appropriate tools strategically	Consider the available tools when solving problems Are familiar with tools appropriate for their grade or course (pencil and paper, concrete models, ruler, protractor, calculator, spreadsheet, computer programs, digital content located on a website and other technological tools) Make sound decisions of which of these tools might be helpful
MP.6 Attend to precision.	Communicate precisely to others Use clear definitions, state the meaning of symbols and are careful specifying units of measure and labeling axes Calculate accurately and efficiently
MP.7 Look for and make use of structure	Discern patterns and structures Can step back for an overview and shift perspective See complicated things as single objects or as being composed of several objects
MP.8 Look for and express regularity in repeated reasoning.	Notice if calculations are repeated and look for both general methods and shortcuts. In solving problems, maintain oversight of the process while attending to detail Evaluate the reasonableness of their immediate results

Content Area: Mathematics	**Grade Level:** Seventh Grade

Domain (Unit Title): The Number System

Cluster: 7.NS

Cluster Summary:
  ● Apply and extend previous understandings of operations with fractions to add, subtract, multiply, and divide rational numbers.

Primary Interdisciplinary Connections:

Science	measurement (distance, weight, and growth), data analysis and collection, experiments relating to **Energy, Earth and Human Activity** and **Engineering and Design.**
Social Studies	economics & money, weather patterns, geography & map skills, and graphing
Language Arts	math journals, word problem comprehension, math stories, open-ended math questions, multi-step problems, math literature
Technology	8.1- Educational Technology: use digital tools to access, manage, evaluate, and synthesize information in order to solve problems individually and collaborate and to create and communicate knowledge. interactive whiteboard lessons, independent centers, classroom websites, online resources and apps

21st Century Themes:

Global Awareness	Students work with word problems containing names of people

	and locations around the world to develop understanding of diverse cultures and lifestyles.
Communication and Collaboration	Students will use mathematical arguments to articulate thoughts and ideas with peers and teachers.

College and Career Readiness

Mathematics programs develops a deep understanding of mathematics by building a strong foundation of number sense at the elementary level before moving into more advanced content. Students will learn to make sense of problems and persevere in problem solving, reason abstractly and quantitatively, construct viable arguments and critique the reasoning of others, model with mathematics, use appropriate tools strategically, attend to precision, look for and make use of a structure, and look for and express regularity in repeated reasoning.

Learning Targets

Content Standards: NS

Number	Standard for Mastery
7.NS.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.1.A	Describe situations in which opposite quantities combine to make 0. *For example, a hydrogen atom has 0 charge because its two constituents are oppositely charged.*
7.NS.1.B	Understand $p + q$ as the number located a distance $|q|$ from p, in the positive or negative direction depending on whether q is positive or negative. Show that a number and its opposite have a sum of 0 (are additive inverses). Interpret sums of rational numbers by describing real-world contexts.
7.NS.1.C	Understand subtraction of rational numbers as adding the additive inverse, $p - q = p + (-q)$. Show that the distance between two rational numbers on the number line is the absolute value of their difference, and apply this principle in real-world contexts.
7.NS.1.D	Apply properties of operations as strategies to add and subtract rational numbers.
7.NS.2	Apply and extend previous understandings of multiplication and division and of fractions to multiply and divide rational numbers.

7.NS.2.A	Understand that multiplication is extended from fractions to rational numbers by requiring that operations continue to satisfy the properties of operations, particularly the distributive property, leading to products such as (-1)(-1) = 1 and the rules for multiplying signed numbers. Interpret products of rational numbers by describing real-world contexts..
7.NS.2.B	Understand that integers can be divided, provided that the divisor is not zero, and every quotient of integers (with non-zero divisor) is a rational number. If p and q are integers, then $-(p/q) = (-p)/q = p/(-q)$. Interpret quotients of rational numbers by describing real-world contexts.
7.NS.2.C	Apply properties of operations as strategies to multiply and divide rational numbers
7.NS.2.D	Convert a rational number to a decimal using long division; know that the decimal form of a rational number terminates in 0s or eventually repeats.
7.NS.3	Solve real-world and mathematical problems involving the four operations with rational numbers.
Number	**Standard for Introduction**
8.NS.1	Know that numbers that are not rational are called irrational. Understand informally that every number has a decimal expansion; for rational numbers show that the decimal expansion repeats eventually, and convert a decimal expansion which repeats eventually into a rational number.

Unit Essential Questions	Unit Enduring Understandings
- What are rational numbers? - How are fractions and decimals related? - How can the additive inverse be applied to solve problems involving rational numbers? - How can numbers be used to describe concepts such as sea level, losing yardage in a football game, or temperatures that drop below 0? - How can you determine if the sums,	*Students will understand that…* - Apply mathematical operations with rational numbers to real-world contexts. - Explain and interpret the rules for adding, subtracting, multiplying, and dividing with negative numbers.

differences, products, and quotients of rational numbers are either positive or negative?
● How can properties of rational numbers be applied to perform operations?

Unit Objectives
Students will know…

● How to apply operations with rational numbers.
● How to compare and order rational numbers.
● The concept of absolute value and its application to integers.
● How to use and justify the rules for adding, subtracting, multiplying, and dividing integers.

Unit Objectives
Students will be able to…
● Graph rational numbers by using a horizontal or vertical number line diagram.
● Use a horizontal or vertical number line diagram to represent addition and subtraction.
● Write fractions as terminating or repeating decimals.
● Write decimals as fractions.
● Compare and order rational numbers.
● Add and subtract fractions with like and unlike denominators.
● Add and subtract mixed numbers.
● Multiply and divide fractions and mixed numbers.
● Read and write integers, and find the absolute value of an integer.
● Add and subtract integers.
● Use commutative, associative, identity, and distributive properties to solve problems.

Content Area: Mathematics

Grade Level: Seventh Grade

Domain (Unit Title): Expressions and Equations

Cluster: 7.EE

Cluster Summary:
- Use properties of operations to generate equivalent expressions.
- Solve real-life and mathematical problems using numerical and algebraic expressions and equations.

Primary Interdisciplinary Connections:

Science	measurement (distance, weight, and growth), data analysis and collection
Social Studies	economics & money, weather patterns, geography & map skills, and graphing
Language Arts	math journals, word problem comprehension, math stories, open-ended math questions, multi-step problems, math literature
Technology	8.1- Educational Technology: use digital tools to access, manage, evaluate, and synthesize information in order to solve problems individually and collaborate and to create and communicate knowledge. interactive whiteboard lessons, independent centers, classroom websites, online resources and apps

21st Century Themes:

Global Awareness	Students work with word problems containing names of people and locations around the world.
Communication and Collaboration	Students use mathematical arguments to articulate thoughts and ideas with peers and teachers

Critical Thinking and Problem Solving	Students use various types of reasoning as appropriate to solve a mathematical problem.

College and Career Readiness

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Learning Targets

Content Standards: EE

Number	Standard for Mastery
7.EE.1	Apply properties of operations as strategies to add, subtract, factor, and expand linear expressions with rational coefficients.
7.EE.2	Understand that rewriting an expression in different forms in a problem context can shed light on the problem and how the quantities in it are related. *For example, a + 0.05a = 1.05a means that "increase by 5%" is the same as "multiply by 1.05."*
7.EE.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. *For example: If a woman making $25 an hour gets a 10% raise, she will make an additional 1/10 of her salary an hour, or $2.50, for a new salary of $27.50. If you want to place a towel bar 9 3/4 inches long in the center of a door that is 27 1/2 inches wide, you will need to place the bar about 9 inches from each edge; this estimate can be used as a check on the exact computation*.
7.EE.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.EE.4.A.	Solve word problems leading to equations of the form $px + q = r$ and $p(x + q) = r$, where p, q, and r are specific rational numbers. Solve equations of these forms fluently. Compare an algebraic solution to an arithmetic

	solution, identifying the sequence of the operations used in each approach. *For example, the perimeter of a rectangle is 54 cm. Its length is 6 cm. What is its width?*
7.EE.4.B	Solve word problems leading to inequalities of the form *px + q > r* or *px + q < r*, where *p*, *q*, and *r* are specific rational numbers. Graph the solution set of the inequality and interpret it in the context of the problem. *For example: As a salesperson, you are paid $50 per week plus $3 per sale. This week you want your pay to be at least $100. Write an inequality for the number of sales you need to make, and describe the solutions.*
Number	**Standard for Introduction**
8.EE.7	Solve linear equations with rational number coefficients, including equations whose solutions require expanding expressions using the distributive property and collecting like terms.

Unit Essential Questions

- What is a mathematical expression and how is it useful?
- What do you know about the solution to an equation? An inequality?

Unit Enduring Understandings
Students will understand that…

- Write algebraic expressions and equations given real-world situations.
- Use inverse operations to solve multi-step equations

Unit Objectives
Students will know…

- How to write and solve inequalities from real- world contexts.
- How to translate word phrases into algebraic expressions and equations.
- Expressions are simplified by various means.
- Equations can be solved using the properties of equality and inverse operations.

Unit Objectives
Students will be able to…

- Evaluate expressions using the order of operations.
- Evaluate simple algebraic expressions.
- Describe the relationships and extend terms in arithmetic and geometric sequences.
- Find squares of numbers and square roots of perfect squares.
- Estimate square roots.

	● Solve one, two, and multi-step equations with rational coefficients. ● Solve one, two, and multi-step inequalities.

Lavallette School **MATHEMATICS CURRICULUM** **Unit Overview**

Content Area: Mathematics	**Grade Level:** Seventh Grade

Domain (Unit Title): Ratios and Proportional Relationships

Cluster: 7.RP

Cluster Summary: ● Analyze proportional relationships and use them to solve real-world and mathematical problems.

Primary Interdisciplinary Connections:

Science	measurement (distance, weight, and growth), data analysis and collection
Social Studies	economics & money, weather patterns, geography & map skills, and graphing
Language Arts	math journals, word problem comprehension, math stories, open-ended math questions, multi-step problems, math literature
Technology	8.1- Educational Technology: use digital tools to access, manage, evaluate, and synthesize information in order to solve problems individually and collaborate and to create and communicate knowledge. interactive whiteboard lessons, independent centers, classroom websites, online resources and apps

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Learning Targets

Content Standards: RP

Number	Standard for Mastery
7.RP.1	Compute unit rates associated with ratios of fractions, including ratios of lengths, areas and other quantities measured in like or different units. *For example, if a person walks 1/2 mile in each 1/4 hour, compute the unit rate as the complex fraction 1/2/1/4 miles per hour, equivalently 2 miles per hour.*
7.RP.2	Recognize and represent proportional relationships between quantities.
7.RP.2.A	Decide whether two quantities are in a proportional relationship, e.g., by testing for equivalent ratios in a table or graphing on a coordinate plane and observing whether the graph is a straight line through the origin.
7.RP.2.B	Identify the constant of proportionality (unit rate) in tables, graphs, equations, diagrams, and verbal descriptions of proportional relationships.
7.RP.2.C	Represent proportional relationships by equations. *For example, if total cost t is proportional to the number n of items purchased at a constant*

	price p, the relationship between the total cost and the number of items can be expressed as t = pn.
7.RP.2.D	Explain what a point (*x*, *y*) on the graph of a proportional relationship means in terms of the situation, with special attention to the points (0, 0) and (1, *r*) where r is the unit rate.
7.RP.3	Use proportional relationships to solve multistep ratio and percent problems. *Examples: simple interest, tax, markups and markdowns, gratuities and commissions, fees, percent increase and decrease, percent error.*
Number	**Standard for Introduction**
8.EE.5	Graph proportional relationships, interpreting the unit rate as the slope of the graph. Compare two different proportional relationships represented in different ways. For example, compare a distance-time graph to a distance-time equation to determine which of two moving objects has greater speed.

Unit Essential Questions	Unit Enduring Understandings *Students will understand that…*
● What are ratios, proportions and percents, and how do we use them in our daily lives? ● How can you determine if two quantities are proportional? ● When is it appropriate to reason proportionally? ● Can proportions be used to solve problems involving similar figures?	● Apply proportional reasoning and its applications to real-world contexts (ie: sales tax, discounts, tips). ● Recognize that proportional relationships exist between two quantities. ● Understand that in a proportion, the ratio for two quantities remains constant as the corresponding values of the quantities change.

Unit Objectives *Students will know…*	Unit Objectives *Students will be able to…*

● Proportions are comparisons between two quantities. ● How to use proportions to solve problems. ● Unit rates are the slopes of related linear functions.	● Determine unit rates. ● Identify proportional and nonproportional relationships. ● Use proportions to solve problems. ● Find the percent of a number. ● Estimate percents by using fractions and decimals. ● Solve problems using the percent proportion. ● Solve problems using the percent equation. ● Find the percent of the increase or decrease. ● Solve problems involving sales tax, tips, discounts, and interest. ● Solve problems involving scale drawings. ● Recognize and represent proportional relationships between quantities. ● Solve multistep problems using ratios and proportions. ● Use ratios to solve a wide variety of percent problems. ● Graph proportional relationships.

Content Area: Mathematics

Grade Level: Seventh Grade

Domain (Unit Title): Statistics and Probability

Cluster: 7.SP

Cluster Summary:
- Use random sampling to draw inferences about a population.
- Draw informal comparative inferences about two populations.
- Investigate chance processes and develop, use and evaluate probability models.

Primary Interdisciplinary Connections:

Science	measurement (distance, weight, and growth), data analysis and collection, experiments relating to **Waves**, **Earth's Place in the Universe** and **Earth's Systems.**
Social Studies	economics & money, weather patterns, geography & map skills, and graphing
Language Arts	math journals, word problem comprehension, math stories, open-ended math questions, multi-step problems, math literature
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Learning Targets

Content Standards: SP

Number	Standard for Mastery
7.SP.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.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. *For example, estimate the mean word length in a book by randomly sampling words from the book; predict the winner of a school election based on randomly sampled survey data. Gauge how far off the estimate or prediction might be*.
7.SP.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. *For example, the mean height of players on the basketball team is 10 cm greater than the mean height of players on the soccer team, about twice the variability (mean absolute deviation) on either team; on a dot plot, the separation between the two distributions of heights is noticeable*.
7.SP.4	Use measures of center and measures of variability for numerical data from random samples to draw informal comparative inferences about two populations. *For example, decide whether the words in a chapter of a*

	seventh-grade science book are generally longer than the words in a chapter of a fourth-grade science book.
7.SP.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.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. *For example, when rolling a number cube 600 times, predict that a 3 or 6 would be rolled roughly 200 times, but probably not exactly 200 times.*
7.SP.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.7.A	Develop a uniform probability model by assigning equal probability to all outcomes, and use the model to determine probabilities of events. *For example, if a student is selected at random from a class, find the probability that Jane will be selected and the probability that a girl will be selected.*
7.SP.7.B	Develop a probability model (which may not be uniform) by observing frequencies in data generated from a chance process. *For example, find the approximate probability that a spinning penny will land heads up or that a tossed paper cup will land open-end down. Do the outcomes for the spinning penny appear to be equally likely based on the observed frequencies?*
7.SP.8	Find probabilities of compound events using organized lists, tables, tree diagrams, and simulation.
7.SP.8.A	Understand that, just as with simple events, the probability of a compound event is the fraction of outcomes in the sample space for which the compound event occurs.
7.SP.8.B	Represent sample spaces for compound events using methods such as organized lists, tables and tree diagrams. For an event described in everyday language (e.g., "rolling double sixes"), identify the outcomes in the sample space which compose the event.
7.SP.8.C	Design and use a simulation to generate frequencies for compound events. *For example, use random digits as a simulation tool to*

	approximate the answer to the question: If 40% of donors have type A blood, what is the probability that it will take at least 4 donors to find one with type A blood?

Number	Standard for Introduction
8.SP.1	Construct and interpret scatter plots for bivariate measurement data to investigate patterns of association between two quantities. Describe patterns such as clustering, outliers, positive or negative association, linear association, and nonlinear association.

Unit Essential Questions

- What are some real-world situations in which you can use probability to make predictions?
- How can experimental and theoretical probabilities be used to make predictions or to draw conclusions?
- How can data samples inform us about a given population?

Unit Enduring Understandings
Students will understand that…

- Develop a sense of the application of probability and data to the surrounding world.
- Use random sampling to draw inferences about a population.

Unit Objectives
Students will know…

- Which graph most appropriately displays a given set of data.
- How to make predictions based on theoretical probability of independent or dependent events.
- How to determine the outcomes of an experiment and predict whether events are likely or unlikely and fair or unfair.
- Chance events have a probability between 0 and 1.

Unit Objectives
Students will be able to…

- Find the probability of a simple event.
- Find the probability of compound events.
- Find the probability of chance events.
- Find sample spaces and probabilities.
- Use multiplication to count outcomes and find probabilities.
- Find the probability of independent and dependent

	events.
	• Find and compare experimental and theoretical probabilities.
	• Use experimental and theoretical probabilities to decide whether a game is fair or unfair (likely or unlikely).
	• Predict actions of a larger group by using a sample.

Lavallette School
MATHEMATICS CURRICULUM
Unit Overview

Content Area: Mathematics	**Grade Level:** Seventh Grade

Domain (Unit Title): Geometry

Cluster: 7G

Cluster Summary:
- Draw, construct, and describe geometrical figures and describe the relationships between them
- Solve real-life and mathematical problems involving angle measure, area, surface area, and volume

Primary Interdisciplinary Connections:

Science	measurement (distance, weight, and growth), data analysis and collection, experiments relating to **Molecules to Organisms.**
Social Studies	economics & money, weather patterns, geography & map skills, and graphing
Language Arts	math journals, word problem comprehension, math stories, open-ended math questions, multi-step problems, math literature
Technology	8.1- Educational Technology: use digital tools to access, manage, evaluate, and synthesize information in order to solve problems individually and collaborate and to create and communicate

	knowledge. interactive whiteboard lessons, independent centers, classroom websites, online resources and apps

21st Century Themes:

Global Awareness	Students work with word problems containing names of people and locations around the world to develop understanding of diverse cultures and lifestyles.
Communication	Students use mathematical arguments to articulate thoughts and ideas with peers and teachers
Civic Literacy	Students understand the skills of mapping, gridding, and compass directions

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Learning Targets

Content Standards: G

Number	Standard for Mastery
7.G.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.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.3	Describe the two-dimensional figures that result from slicing three-dimensional figures, as in plane sections of right rectangular prisms and right rectangular pyramids.
7.G.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.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.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.
Number	**Standard for Introduction**
8.G.7	Apply the Pythagorean Theorem to determine unknown side lengths in right triangles in real-world and mathematical problems in two and three dimensions.

Unit Essential Questions	Unit Enduring Understandings *Students will understand that…*
● How is geometry used in the real-world? ● How is finding the volume of a composite figure different than finding the surface area of a composite figure? How is it similar? ● How are scales used to reproduce scale drawings?	● Solve real-life and mathematical problems involving angle measure, area, perimeter, surface area, and volume. ● Realize that scale drawings have corresponding quantities that vary proportionally.

Unit Objectives *Students will know…*	Unit Objectives *Students will be able to…*
● The formulas used to find area, surface area, and volume of figures	Find the volume of rectangular and triangular prisms.

and circumference of circles. ● How to find unknown measures and the sum of angles in polygons. ● Fundamental angle relationships. ● Changes in dimensions affect area and volume. ● Proportional relationships by using scale drawings.	● Find the volume of cylinders, cones, and pyramids. ● Find the surface area of prisms, cylinders, and pyramids. ● Find the volume and surface area of composite figures. ● Classify and identify angles and find missing measures. ● Classify and identify triangles and find missing measures. ● Classify quadrilaterals and find missing angle measures. ● Solve problems involving scale drawings of geometric figures.

Evidence of Learning

Suggested Formative Assessments:
- Teacher Observation
- Performance Assessment
- Exit Slips/Slate Assessment
- Portfolios/Journals
- Pre-Assessment

· Games
· Anecdotal Records
· Oral Assessment/Conferencing
· Daily Classwork

Suggested Summative Assessments:
- Tests
- Quizzes
- National/State/District Assessments

Suggested Modifications (ELLs, Special Education, Gifted and Talented):

Low Level Strategies:
- Modified classroom and homework assignments
- Teacher tutoring
- Parent - teacher communication
- Anchor charts and visual aids

- ● Flexible grouping
- ● Teacher - student goal setting
- ● Technology integration
- ● Centers
- ● Response to intervention

High Level Strategies
- ● Multi-step and higher level math problems
- ● Enrich problems
- ● Extend activities
- ● Centers
- ● Student driven activities
- ● Student choice activities
- ● Peer tutoring

Suggested activities for lesson plans:

- ● www.purplemath.com
- ● www.Kutasoftware.com
- ● www.Khanacademy.com
- ● www.mathworksheetsite.com
- ● www.studyisland.com
- ● www.brightstorm.com
- ● www.funbrain.com
- ● www.coolmath.com

Teacher Notes: