

Correlations to Mathematics Common Core State Standards and NCTM's *Principles and Standards*

Chapter 1 Number and Operation

<p>Lesson 1 Equivalence: Many Names for Fractions</p>	<p>Common Core State Standards Ratios and Proportional Relationships 4.RP Understand ratio concepts and use ratio reasoning to solve problems. 1. Understand the concept of a ratio and use ratio language to describe a ratio relationship between two quantities. For example, "The ratio of wings to beaks in the bird house at the zoo was 2:1, because for every 2 wings there was 1 beak." "For every vote candidate A received, candidate B received nearly 3 votes."</p> <p>NCTM <i>Principles and Standards</i> Number and Operation Standard Understanding numbers, ways of representing numbers, relationships among numbers, and number systems. <i>Work flexibly with fractions, decimals, and percents to solve problems.</i> Understand meanings of operations and how they relate to one another. <i>Understand the meanings and effect of arithmetic operations with fractions, decimals, and integers.</i></p>
<p>Lesson 2 Sale, Sale, Sale!</p>	<p>Common Core State Standards Ratios and Proportional Relationships 6.RP Understand ratio concepts and use ratio reasoning to solve problems. 3. Use ratio and rate reasoning to solve real-world and mathematical problems, e.g., by reasoning about tables of equivalent ratios, tape diagrams, double number line diagrams, or equations. c. Find a percent of a quantity as a rate per 100 (e.g., 30% of a quantity means 30/100 times the quantity); solve problems involving finding the whole, given a part and the percent.</p> <p>Ratios and Proportional Relationships 7.RP Analyze proportional relationships and use them to solve real-world and mathematical problems. 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.</p> <p>NCTM <i>Principles and Standards</i> Number and Operation Standard Understand numbers, ways of representing numbers, relationships among numbers, and number systems. <i>Work flexibly with fractions, decimals, and percents to solve problems.</i> Understand and use ratios and proportions to represent quantitative relationships.</p>

<p>Lesson 3 Dividing Fractions</p>	<p>Common Core State Standards The Number System 6.NS Apply and extend previous understandings of multiplication and division to divide fractions by fractions.</p> <ol style="list-style-type: none"> 1. Interpret and compute quotients of fractions, and solve word problems involving division of fractions by fractions, e.g., by using visual fraction models and equations to represent the problem. For example, create a story context for $2/3 \div 3/4$ and use a visual fraction model to show the quotient; use the relationship between multiplication and division to explain that $2/3 \div 3/4 = 8/9$ because $3/4$ of $8/9$ is $2/3$. (In general, $a/b \div c/d = ad/bc$.) How much chocolate will each person get if 3 people share $1/2$ lb of chocolate equally? How many $3/4$-cup servings are in $2/3$ of a cup of yogurt? How wide is a rectangular strip of land with length $3/4$ mi and area $1/2$ square mi? <p>NCTM Principles and Standards Number and Operation Standard Understanding numbers, ways of representing numbers, relationships among numbers, and number systems. <i>Understand and use ratios and proportions to represent quantitative relationships.</i></p> <p>Understand meanings of operations and how they relate to one another. <i>Understand the meanings and effect of arithmetic operations with fractions, decimals, and integers.</i></p> <p>Compute fluently and make reasonable estimates. <i>Select appropriate methods and tools for computing with fractions, and decimals from among mental computation, estimation, calculators and computer, and paper in pencil, depending on the situation and apply the selected methods.</i></p> <p>Develop and analyze algorithms for computing with fractions, decimals, and integers and develop fluency in their use.</p>
<p>Lesson 4 Cookie Recipe</p>	<p>Common Core State Standards Ratios and Proportional Relationships 6.RP Understand ratio concepts and use ratio reasoning to solve problems.</p> <ol style="list-style-type: none"> 3. Use ratio and rate reasoning to solve real-world and mathematical problems, e.g., by reasoning about tables of equivalent ratios, tape diagrams, double number line diagrams, or equations. <ol style="list-style-type: none"> d. Use ratio reasoning to convert measurement units; manipulate and transform units appropriately when multiplying or dividing quantities. <p>Ratios and Proportional Relationships 7.RP Analyze proportional relationships and use them to solve real-world and mathematical problems.</p> <ol style="list-style-type: none"> 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. <p>NCTM Principles and Standards Number and Operation Standard Understanding numbers, ways of representing numbers, relationships among numbers, and number systems. <i>Work flexibly with fractions, decimals, and percents to solve problems. Understand and use ratios and proportions to represent quantitative relationships.</i></p> <p>Compute fluently and make reasonable estimates. <i>Develop, analyze, and explain methods for solving problems involving proportions, such as scaling and finding equivalent ratios.</i></p>

<p>Lesson 5 The State Fair</p>	<p>Common Core State Standards Ratios and Proportional Relationships 6.RP Understand ratio concepts and use ratio reasoning to solve problems. 2. Understand the concept of a unit rate a/b associated with a ratio $a:b$ with $b \neq 0$, and use rate language in the context of a ratio relationship. 3. Use ratio and rate reasoning to solve real-world and mathematical problems, a. Make tables of equivalent ratios relating quantities with whole-number measurements, find missing values in the tables, and plot the pairs of values on the coordinate plane. Use tables to compare ratios. b. Solve unit rate problems including those involving unit pricing and constant speed. For example, if it took 7 hours to mow 4 lawns, then at that rate, how many lawns could be mowed in 35 hours? At what rate were lawns being mowed?</p> <p>Ratios and Proportional Relationships 7.RP Analyze proportional relationships and use them to solve real-world and mathematical problems. 2. Recognize and represent proportional relationships between quantities.</p> <p>NCTM Principles and Standards Number and Operation Standard Compute fluently and make reasonable estimates. <i>Select appropriate methods and tools for computing with fractions, and decimals from among mental computation, estimation, calculators and computer, and paper and pencil, depending on the situation and apply the selected methods. Develop, analyze, and explain methods for solving problems involving proportions, such as scaling and finding equivalent ratios.</i></p> <p>Algebra Understand patterns, relations, and functions. <i>Represent, analyze, and generalize a variety of patterns with tables, graphs, words, and when possible, symbolic rules.</i></p>
<p>Chapter 2 Algebraic Reasoning</p>	
<p>Lesson 1 Walking Trip</p>	<p>Common Core State Standards Expressions and Equations 6.EE Reason about and solve one-variable equations and inequalities. 5. Understand solving an equation or inequality as a process of answer a question. Use substitution to determine whether a given number in a specified set makes an equation or inequality true. 7. Solve real-world and mathematical problems by writing and solving equations of the form $x + p = q$ and $px = q$ for cases in which p, q, and x are all nonnegative rational numbers. Represent and analyze quantitative relationships between dependent and independent variables. 9. Use variables to represent two quantities in a real-world problem that change in relationship to one another; write an equation to express one quantity. Analyze the relationship between the dependent and independent variables using graphs and tables, and relate these to the equation.</p> <p>NCTM Principles and Standards Algebra Understand patterns, relations, and functions. <i>Represent, analyze, and generalize a variety of patterns with tables, graphs, words, and when possible symbolic rules.</i> Represent and analyze mathematical situations and structures using algebraic symbols. <i>Use symbolic algebra to represent situations and to solve problems, especially those that involve linear relationships.</i></p>

<p>Lesson 2 Zapping Zombies</p>	<p>Common Core State Standards Expressions and Equations 7.EE Solve real-life and mathematical problems using numerical and algebraic expressions and equations. 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.</p> <p>NCTM Principles and Standards Numbers and Operations Compute fluently and make reasonable estimates. <i>Develop, analyze, and explain methods for solving problems involving proportions, such as scaling and finding equivalent ratios.</i></p> <p>Algebra Use mathematical models to represent and understand quantitative relationships. <i>Model and solve contextualized problems using various representations, such as graphs, tables, and equations.</i> Analyze change in various contexts. <i>Use graphs to analyze the nature of changes in quantities in linear relationships.</i></p>
<p>Lesson 3 Downloading Music</p>	<p>Common Core State Standards Expressions and Equations 8.EE Analyze and solve linear equations and pairs of simultaneous linear equations. a. Understand that solutions to a system of two linear equations in two variables correspond to points of intersection of their graphs, because points of intersection satisfy both equations simultaneously.</p> <p>NCTM Principles and Standards Algebra Represent and analyze mathematical situations and structures using algebraic symbols. <i>Explore relationships between symbolic expressions and graphs of lines, paying particular attention to the meaning of intercept and slope.</i> <i>Use symbolic algebra to represent situations and to solve problems, especially those that involve linear relationships.</i> Use mathematical models to represent and understand quantitative relationships. <i>Model and solve contextualized problems using various representations, such as graphs, tables, and equations.</i> Analyze change in various contexts. <i>Use graphs to analyze the nature of changes in quantities in linear relationships.</i></p>
<p>Chapter 3 Geometry</p>	
<p>Lesson 1 What's My Size?</p>	<p>Common Core State Standards Geometry 7.G Draw, construct, and describe geometrical figures and describe the relationships between them. 1. Solve problems involving scale drawings of geometric figures, including computing actual lengths and areas from scale drawings and reproducing a scale drawing at a different scale.</p> <p>NCTM Principles and Standards Geometry Analyze characteristics and properties of two- and three-dimensional geometric shapes and develop mathematical arguments about geometric relationships. <i>Understand relationships among the angles, side lengths, perimeters, areas, and volumes of similar objects.</i></p>

<p>Lesson 2 Candy Boxes</p>	<p>Common Core State Standards Geometry 7.RP Analyze proportional relationships and use them to solve real-world and mathematical problems. 2. Recognize and represent proportional relationships between quantities. a. Decide whether two quantities are in a proportional relationship, e.g., by testing for equivalent ratios in tables or graphing on a coordinate plane and observing whether the graph is a straight line through the origin.</p> <p>Geometry 7.G Draw, construct, and describe geometrical figures and describe the relationships between them. 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.</p> <p>NCTM Principles and Standards Geometry Analyze characteristics and properties of two- and three-dimensional geometric shapes and develop mathematical arguments about geometric relationships. <i>Understand relationships among the angles, side lengths, perimeters, areas, and volumes of similar objects.</i> Use visualization, spatial reasoning, and geometric modeling to solve problems. <i>Use two-dimensional representations of three-dimensional objects to visualize and solve problems such as those involving surface area and volume.</i></p>
<p>Lesson 3 Designing Figures</p>	<p>Common Core State Standards Geometry 8.G Understand congruence and similarity using physical models, transparencies, or geometry software. 3. Describe the effect of dilations, translations, rotations, and reflections on two-dimensional figures using coordinates.</p> <p>NCTM Principles and Standards Geometry Apply transformations and use symmetry to analyze mathematical situations. <i>Describe sizes, positions, and orientations of shapes under informal transformations such as flips, turns, slides, and scaling.</i></p>

Chapter 4 Measurement

<p>Lesson 1 Centimeters to Inches</p>	<p>Common Core State Standards Ratios and Proportional Relationships 6.RP Use ratio concepts and use ratio reasoning to solve problems. 3. Understand ratio and rate reasoning to solve real-world and mathematical problems, e.g., by reasoning about tables of equivalent ratios, tape diagrams, double number line diagrams, or equations. d. Use ratio reasoning to convert measurement units; manipulate and transform units appropriately when multiplying or dividing quantities.</p> <p>Ratios and Proportional Relationships 7.RP Analyze proportional relationships and use them to solve real-world and mathematical problems. 2. Recognize and represent proportional relationships between quantities. 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. b. Identify the constant of proportionality (unit rate) in tables, graphs, equations, diagrams, and verbal descriptions of proportional reasoning.</p> <p>NCTM Principles and Standards Measurement Understand measurable attributes of objects and units, systems, and processes of measurement. <i>Understand both metric and customary systems of measurement.</i></p>
<p>Lesson 2 How Tall?</p>	<p>Common Core State Standards Geometry 7.G Draw, construct, and describe geometric figures and describe the relationships between them. 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.</p> <p>NCTM Principles and Standards Geometry Use visualization, spatial reasoning, and geometric modeling to solve problems. <i>Recognize and apply geometric ideas and relationships in areas outside the mathematics classroom, such as art, science, and everyday life.</i></p> <p>Measurement Understand measurable attributes of objects and the units, systems, and processes of measurements. <i>Understand both metric and customary systems of measurement.</i> Apply appropriate techniques, tools, and formulas to determine measurements. <i>Select and apply techniques and tools to accurately find length, area, volume, and angle measures to appropriate levels of precision.</i></p>

<p>Lesson 3 Park</p>	<p>Common Core State Standards Ratios and Proportional Relationships 7.RP Analyze proportional relationships and use them to solve real-world and mathematical problems. 2. Recognize and represent proportional relationships between quantities. Geometry 7.G Draw, construct, and describe geometrical figures and describe the relationships between them. 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. 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.</p> <p>NCTM Principles and Standards Geometry Use visualization, spatial reasoning, and geometric modeling to solve problems. <i>Draw geometric objects with specified properties, such as side lengths or angle measures.</i> Measurement Apply appropriate techniques, tools, and formulas to determine measurements. <i>Select and apply techniques and tools to accurately find length, area, volume, and angle measures to appropriate levels of precision.</i> <i>Solve problems involving scale factors, using ratio and proportion.</i></p>
<p>Chapter 5 Probability and Statistics</p>	
<p>Lesson 1 Winner Every Time</p>	<p>Common Core State Standards Statistics and Probability 7.SP Investigate chance processes and develop, use, and evaluate probability models. 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 probability not exactly 200 times.</p> <p>NCTM Principles and Standards Data Analysis and Probability Understand and apply basic concepts of probability. <i>Use proportionality and a basic understanding of probability to make and test conjectures about the results of experiments and simulations.</i> <i>Compute probabilities for simple, compound events, using such methods as organized lists, tree diagrams, and area models.</i></p>

<p>Lesson 2 Fair or Not?</p>	<p>Common Core State Standards Statistics and Probability 7.SP Investigate chance processes and develop, use, and evaluate probability models.</p> <p>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.</p> <p>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 cut will land open-end down. Do the outcomes for the spinning penny appear to be equally likely based on the observed frequencies?</p> <p>NCTM Principles and Standards Data Analysis and Probability Understand and apply basic concepts of probability. <i>Use proportionality and a basic understanding of probability to make and test conjectures about the results of experiments and simulations.</i> <i>Compute probabilities for simple compound events, using such methods as organized lists, tree diagrams, and area models.</i></p>
<p>Lesson 3 Typical Me</p>	<p>Common Core State Standards Statistics and Probability 7.SP Use random sampling to draw inferences about a population.</p> <p>1. Understand that statistics can be used to gain information about a population by examining a sample of that 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.</p> <p>NCTM Principles and Standards Data Analysis and Probability Formulate questions that can be addressed with data and collect, organize, and display relevant data to answer them. <i>Formulate questions, design studies, and collect data about a characteristic shared by two populations or different characteristics within one population.</i></p>
<p>Lesson 4 Arms and Feet</p>	<p>Common Core State Standards Statistics and Probability 8.SP Investigate patterns of association in bivariate data.</p> <p>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.</p> <p>NCTM Principles and Standards Data Analysis and Probability Select and use appropriate statistical methods to analyze data. <i>Discuss and understand the correspondence between data sets and their graphical representations, especially histograms, stem-and-leaf plots, box plots, and scatter plots.</i></p>