

<p style="text-align: center;">MOTION AND THE TRANSPORTATION ENGINEER 7th Grade Math</p>	Code	Introduction	Momentum Activity 1: Bump-N-Run	Momentum Activity 2: Calculated Collisions	Momentum Activity 3: Design Your Own TMS	Impulse Activity 1: Stop That Truck!	
Numbers and Operations							
Understand derived quantities							
Solve problems involving derived quantities such as density, velocity, and weighted averages.*	N.MR.07.02						
Understand and solve problems involving rates, ratios, and proportions							
Calculate rates of change including speed.	N.FL.07.03						
Convert ratio quantities between different systems of units, such as feet per second to miles per hour.	N.MR.07.04						
Solve proportion problems using such methods as unit rate, scaling, finding equivalent fractions, and solving the proportion equation $a/b = c/d$; know how to see patterns about proportional situations in tables.*	N.FL.07.05						
Recognize irrational numbers							
Understand the concept of square root and cube root, and estimate using calculators	N.MR.07.06						

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<p>Compute with rational numbers</p>							
<p>Solve problems involving operations with integers.</p>	<p style="text-align: center;">N.FL.07.07</p>						
<p>Add, subtract, multiply, and divide positive and negative rational numbers fluently.*</p>	<p style="text-align: center;">N.FL.07.08</p>						
<p>Estimate results of computations with rational numbers.</p>	<p style="text-align: center;">N.FL.07.09</p>						
<p>ALGEBRA</p>							
<p>Understand and apply directly proportional relationships and relate to linear relationships</p>							
<p>Recognize when information given in a table, graph, or formula suggests a directly proportional or linear relationship.*</p>	<p style="text-align: center;">A.PA.07.01</p>						
<p>Represent directly proportional and linear relationships using verbal descriptions, tables, graphs, and formulas, and translate among these representations.</p>	<p style="text-align: center;">A.RP.07.02</p>						
<p>Given a directly proportional or other linear situation, graph and interpret the slope and intercept(s) in terms of the original situation; evaluate $y = mx + b$ for specific x values, e.g., weight vs. volume of water, base cost plus cost per unit.*</p>	<p style="text-align: center;">A.PA.07.03</p>						

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<p>For directly proportional or linear situations, solve applied problems using graphs and equations, e.g., the heights and volume of a container with uniform cross-section; height of water in a tank being filled at a constant rate; degrees Celsius and degrees Fahrenheit; distance and time under constant speed.</p>	<p style="text-align: center;">A.PA.07.04</p>						
<p>Recognize and use directly proportional relationships of the form $y = mx$, and distinguish from linear relationships of the form $y = mx + b$, b non-zero; understand that in a directly proportional relationship between two quantities one quantity is a constant multiple of the other quantity.*</p>	<p style="text-align: center;">A.PA.07.05</p>						
<p>Understand and represent linear functions</p>							
<p>Calculate the slope from the graph of a linear function as the ratio of “rise/run” for a pair of points on the graph, and express the answer as a fraction and a decimal; understand that linear functions have slope that is a constant rate of change.</p>	<p style="text-align: center;">A.PA.07.06</p>						
<p>Represent linear functions in the form $y = x + b$, $y = mx$, and $y = mx + b$, and graph, interpreting slope and y-intercept.</p>	<p style="text-align: center;">A.PA.07.07</p>						

Find and interpret the x and/or y intercepts of a linear equation or function. Know that the solution to a linear equation of the form $ax+b=0$ corresponds to the point at which the graph of $y=ax+b$ crosses the x axis.*	A.FO.07.08						
Understand and solve problems about inversely proportional relationships							
Recognize inversely proportional relationships in contextual situations; know that quantities are inversely proportional if their product is constant, e.g., the length and width of a rectangle with fixed area, and that an inversely proportional relationship is of the form $y = k/x$ where k is some non-zero number.	A.PA.07.09						
Know that the graph of $y = k/x$ is not a line, know its shape, and know that it crosses neither the x nor the y-axis.	A.RP.07.10						
Apply basic properties of real numbers in algebraic contexts							
Understand and use basic properties of real numbers: additive and multiplicative identities, additive and multiplicative inverses, commutativity, associativity, and the distributive property of multiplication over addition.	A.PA.07.11						
Combine algebraic expressions and solve equations							
Add, subtract, and multiply simple algebraic expressions of the first degree, e.g., $(92x + 8y) - 5x + y$, or $x(x+2)$ and justify using properties of real numbers.*	A.FO.07.12						
From applied situations, generate and solve linear equations of the form $ax + b = c$ and $ax + b = cx + d$, and interpret solutions.	A.FO.07.13						

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GEOMETRY							
Draw and construct geometric objects							
<p>Use a ruler and other tools to draw squares, rectangles, triangles, and parallelograms with specified dimensions.</p>	G.SR.07.01						
<p>Use compass and straightedge to perform basic geometric constructions: the perpendicular bisector of a segment, an equilateral triangle, and the bisector of an angle; understand informal justifications.</p>	G.SR.07.02						
Understand the concept of similar polygons, and solve related problems							
<p>Understand that in similar polygons, corresponding angles are congruent and the ratios of corresponding sides are equal; understand the concepts of similar figures and scale factor.</p>	G.TR.07.03						
<p>Solve problems about similar figures and scale drawings.</p>	G.TR.07.04						
<p>Show that two triangles are similar using the criteria: corresponding angles are congruent (AAA similarity); the ratios of two pairs of corresponding sides are equal and the included angles are congruent (SAS similarity); ratios of all pairs of corresponding sides are equal (SSS similarity); use these criteria to solve problems and to justify arguments.</p>	G.TR.07.05						

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<p>Understand and use the fact that when two triangles are similar with scale factor of r, their areas are related by a factor of r^2.</p>							
<p>DATA AND PROBABILITY</p>							
<p>Represent and interpret data</p>							
<p>Represent and interpret data using circle graphs, stem and leaf plots, histograms, and box-and-whisker plots, and select appropriate representation to address specific questions.</p>	<p style="text-align: center;">D.RE.07.01</p>						
<p>Create and interpret scatter plots and find line of best fit; use an estimated line of best fit to answer questions about the data.</p>	<p style="text-align: center;">D.AN.07.02</p>						
<p>Compute statistics about data sets</p>							
<p>Calculate and interpret relative frequencies and cumulative frequencies for given data sets.</p>	<p style="text-align: center;">D.AN.07.03</p>						
<p>Find and interpret the median, quartiles, and interquartile range of a given set of data.</p>	<p style="text-align: center;">D.AN.07.04</p>						

