A Correlation of

Connected Mathematics Project 3 (CMP3) ©2018

CMP3™

to the

Alabama Course of Study Mathematics 2019

Grade 8

Alabama Course of Study Mathematics 2019 Grade 8	Connected Mathematics Project 3 Grade 8 Investigations
Student Mathematical Practices	
1. Make sense of problems and persevere in solving them.	The Standards for Mathematical Practice can be met throughout the CMP3 program. For specific examples, please see: **Looking for Pythagoras:** Inv. 1, Inv. 2, Inv. 3 **Growing, Growing, Growing:** Inv. 1, Inv. 4 **Butterflies, Pinwheels, and Wallpaper:** Inv. 1, Inv. 3, Inv. 4 **Say It with Symbols:** Inv. 3, Inv. 4, Inv. 5 **It's in the System:** Inv. 1, Inv. 4
2. Reason abstractly and quantitatively.	The Standards for Mathematical Practice can be met throughout the CMP3 program. For specific examples, please see: **Thinking with Mathematical Models:** Inv. 1 **Looking for Pythagoras:** Inv. 5 **Growing, Growing, Growing:** Inv. 3 **Butterflies, Pinwheels, and Wallpaper:** Inv. 4 **Say It with Symbols:** Inv. 3 **It's in the System:** Inv. 2
3. Construct viable arguments and critique the reasoning of others.	The Standards for Mathematical Practice can be met throughout the CMP3 program. For specific examples, please see: **Thinking with Mathematical Models:** Inv. 4 **Growing, Growing, Growing:** Inv. 1, Inv. 4 **Butterflies, Pinwheels, and Wallpaper:** Inv. 1, Inv. 3, Inv. 4 **Say It with Symbols:** Inv. 1, Inv. 5 **It's in the System:** Inv. 1

ACE = Applications Connections – Extensions
INV. = Investigations
MR = Mathematical Reflections

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4. Model with mathematics.	The Standards for Mathematical Practice can be met throughout the CMP3 program. For specific examples, please see: **Thinking with Mathematical Models:** Inv. 4, Inv. 5 **Looking for Pythagoras:** Inv. 3, Inv. 5 **Growing, Growing, Growing:** Inv. 3 **Butterflies, Pinwheels, and Wallpaper:** Inv. 4 **Say It with Symbols:** Inv. 2
5. Use appropriate tools strategically.	The Standards for Mathematical Practice can be met throughout the CMP3 program. For specific examples, please see: **Thinking with Mathematical Models:** Inv. 2 **Looking for Pythagoras:** Inv. 1, Inv. 3, Inv. 5 **Growing, Growing, Growing:** Inv. 1, Inv. 3 Inv. 5 **Butterflies, Pinwheels, and Wallpaper:** Inv. 4 **It's in the System:** Inv. 3
6. Attend to precision.	The Standards for Mathematical Practice can be met throughout the CMP3 program. For specific examples, please see: **Thinking with Mathematical Models:** Inv. 2, Inv. 5 **Looking for Pythagoras:** Inv. 4 **Growing, Growing, Growing:** Inv. 1 **Say It with Symbols:** Inv. 4 **It's in the System:** Inv. 4

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7. Look for and make use of structure.	The Standards for Mathematical Practice can be met throughout the CMP3 program. For specific examples, please see: **Thinking with Mathematical Models:** Inv. 1, Inv. 3 **Looking for Pythagoras:** Inv. 4 **Growing, Growing, Growing:** Inv. 1, Inv. 2, Inv. 4, Inv. 5 **Butterflies, Pinwheels, and Wallpaper:** Inv. 3
8. Look for and express regularity in repeated reasoning.	The Standards for Mathematical Practice can be met throughout the CMP3 program. For specific examples, please see: **Thinking with Mathematical Models:** Inv. 3 **Looking for Pythagoras:** Inv. 2 **Growing, Growing, Growing:** Inv. 2 **Butterflies, Pinwheels, and Wallpaper:** Inv. 2, Inv. 3 **Say It with Symbols:** Inv. 2 **It's in the System:** Inv. 2
Number Systems and Operations	
Understand that the real number system is composed of rational and irrational numbers.	
1. Define the real number system as composed of rational and irrational numbers.	**Looking for Pythagoras:** Inv. 4, ACE, MR
a. Explain that every number has a decimal expansion; for rational numbers, the decimal expansion repeats or terminates.	**Looking for Pythagoras:** Inv. 2, ACE, MR, Inv. 4, ACE, MR
b. Convert a decimal expansion that repeats into a rational number.	This standard is outside the scope of Grade 8 Investigations Connected.
2. Locate rational approximations of irrational numbers on a number line, compare their size, and estimate the value of the irrational number.	**Looking for Pythagoras:** Inv. 2, ACE, MR, Inv. 4, ACE, MR

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Algebra and Functions	
Apply concepts of integer exponents and radicals.	
3. Develop and apply properties of integer exponents to generate equivalent numerical and algebraic expressions.	**Growing, Growing, Growing:** Inv. 5, ACE, MR
4. Use square root and cube root symbols to represent solutions to equations.	**Looking for Pythagoras:** Inv. 2, ACE, MR, Inv. 4, ACE, MR
a. Evaluate square roots of perfect squares (less than or equal to 225) and cube roots of perfect cubes (less than or equal to 1000).	**Looking for Pythagoras:** Inv. 2, ACE, MR, Inv. 4, ACE, MR **Growing, Growing, Growing:** Inv. 5, ACE, MR
b. Explain that the square root of a non-perfect square is irrational.	**Looking for Pythagoras:** Inv. 2, ACE, MR, Inv. 4, ACE, MR
5. Estimate and compare very large or very small numbers in scientific notation.	**Growing, Growing, Growing:** Inv. 1, ACE, MR, Inv. 5, ACE, MR
6. Perform operations with numbers expressed in scientific notation, including problems where both decimal and scientific notation are used.	**Growing, Growing, Growing:** Inv. 5, ACE, MR
a. Use scientific notation and choose units of appropriate size for measurements of very large or very small quantities.	**Growing, Growing, Growing:** Inv. 1, ACE, MR, Inv. 5, ACE, MR
b. Interpret scientific notation that has been generated by technology.	**Growing, Growing, Growing:** Inv. 1, ACE, MR, Inv. 5, ACE, MR
Analyze the relationship between proportional and non-proportional situations.	
7. Determine whether a relationship between two variables is proportional or non-proportional.	**Grade 7** **Moving Straight Ahead:** Inv. 1, ACE, MR, Inv. 2, ACE, MR **Grade 8** **Thinking with Mathematical Models:** Inv. 1, ACE, MR, Inv. 2, ACE, MR, Inv. 3, ACE, MR

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8. Graph proportional relationships.	**Grade 7** **Moving Straight Ahead:** Inv. 1, ACE, MR, Inv. 2, ACE, MR **Grade 8** **Thinking with Mathematical Models:** Inv. 2, ACE, MR
a. Interpret the unit rate of a proportional relationship, the constant of proportionality as the slope of the graph, which goes through the origin and has the equation $y = mx$ where m is the slope.	**Grade 7** **Moving Straight Ahead:** Inv. 1, ACE, MR, Inv. 2, ACE, MR, Inv. 4, ACE, MR **Grade 8** **Thinking with Mathematical Models:** Inv. 2, ACE, MR
9. Interpret $y = mx + b$ as defining a linear equation whose graph is a line with m as the slope and b as the y-intercept.	**Grade 7** **Moving Straight Ahead:** Inv. 1, ACE, MR, Inv. 2, ACE, MR , Inv. 4, ACE, MR **Grade 8** **Thinking with Mathematical Models:** Inv. 2, ACE, MR
a. Use similar triangles to explain why the slope m is the same between any two distinct points on a non-vertical line in a coordinate plane.	**Butterflies, Pinwheels, and Wallpaper** Inv. 4
b. Given two distinct points in a coordinate plane, find the slope of the line containing the two points and explain why it will be the same for any two distinct points on the line.	**Grade 7** **Moving Straight Ahead:** Inv. 1, ACE, MR, Inv. 4, ACE, MR **Grade 8** **Thinking with Mathematical Models:** Inv. 2, ACE, MR
c. Graph linear relationships, interpreting the slope as the rate of change of the graph and the y-intercept as the initial value.	**Grade 7** **Moving Straight Ahead:** Inv. 1, ACE, MR, Inv. 2, ACE, MR, Inv. 4, ACE, MR **Grade 8** **Thinking with Mathematical Models:** Inv. 2, ACE, MR

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d. Given that the slopes for two different sets of points are equal, demonstrate that the linear equations that include those two sets of points may have different *y*-intercepts.	**Grade 7** **Moving Straight Ahead:** Inv. 1, ACE, MR, Inv. 4, ACE, MR **Grade 8** **Thinking with Mathematical Models:** Inv. 2, ACE, MR **It's in the System:** Inv. 1, ACE, MR
10. Compare linear relationships, proportional and non-proportional, represented in different ways (algebraically, graphically, numerically in tables, or by verbal descriptions) to solve real-world problems.	**Grade 7** **Moving Straight Ahead:** Inv. 1, ACE, MR, Inv. 2, ACE, MR **Grade 8** **Thinking with Mathematical Models:** Inv. 2, ACE, MR
Analyze and solve linear equations and systems of two linear equations.	
11. Solve multi-step linear equations in one variable, including rational number coefficients, and equations that require using the distributive property and combining like terms.	**Thinking with Mathematical Models:** Inv. 2, ACE, MR **Say It with Symbols:** Inv. 1, ACE, MR, Inv. 2, ACE, MR, Inv. 3, ACE, MR, Inv. 4, ACE, MR
a. Determine whether linear equations in one variable have one solution, no solution, or infinitely many solutions of the form $x = a$, $a = a$, or $a = b$ (where a and b are different numbers).	**Looking for Pythagoras:** Inv. 4, ACE, MR **Say It with Symbols:** Inv. 3, ACE, MR
b. Represent and solve real-world and mathematical problems with equations and interpret the solution in the context of the problem.	**Thinking with Mathematical Models:** Inv. 2, ACE, MR **Say It with Symbols:** Inv. 1, ACE, MR, Inv. 2, ACE, MR, Inv. 3, ACE, MR, Inv. 4, ACE, MR, Inv. 5, ACE, MR
12. Solve systems of two linear equations in two variables by graphing and substitution.	**Say It with Symbols:** Inv. 3, ACE, MR **It's in the System:** Inv. 1, ACE, MR, Inv. 2, ACE, MR

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a. Explain that the solution(s) of systems of two linear equations in two variables corresponds to points of intersection on their graphs because points of intersection satisfy both equations simultaneously.	**Say It with Symbols:** Inv. 3, ACE, MR **It's in the System:** Inv. 1, ACE, MR, Inv. 2, ACE, MR, Inv. 3, ACE, MR
b. Interpret and justify the results of systems of two linear equations in two variables (one solution, no solution, or infinitely many solutions) when applied to real-world and mathematical problems.	**It's in the System:** Inv. 1, ACE, MR, Inv. 2, ACE, MR, Inv. 3, ACE, MR
Explain, evaluate, and compare functions.	
13. Determine whether a relation is a function, defining a function as a rule that assigns to each input (independent value) exactly one output (dependent value), and given a graph, table, mapping, or set of ordered pairs.	**Thinking with Mathematical Models:** Inv. 2, ACE, MR, Inv. 3, ACE, MR, Inv. 4, ACE, MR **Growing, Growing, Growing:** Inv. 1, ACE, MR, Inv. 2, ACE, MR Inv. 3, ACE, MR, Inv. 4, ACE, MR **Say It with Symbols:** Inv. 2, ACE, MR, Inv. 3, ACE, MR, Inv. 4, ACE, MR, Inv. 5, ACE, MR
14. Evaluate functions defined by a rule or an equation, given values for the independent variable.	**Thinking with Mathematical Models:** Inv. 2, ACE, MR, Inv. 3, ACE, MR **Growing, Growing, Growing:** Inv. 1, ACE, MR, Inv. 2, ACE, MR, Inv. 3, ACE, MR, Inv. 4, ACE, MR **Say It with Symbols:** Inv. 4, ACE, MR
15. Compare properties of functions represented algebraically, graphically, numerically in tables, or by verbal descriptions.	**Thinking with Mathematical Models:** Inv. 2, ACE, MR **Growing, Growing, Growing:** Inv. 3, ACE, MR, Inv. 4, ACE, MR **Say It with Symbols:** Inv. 2, ACE, MR, Inv. 5, ACE, MR
a. Distinguish between linear and non-linear functions.	**Thinking with Mathematical Models:** Inv. 2, ACE, MR, Inv. 3, ACE, MR **Growing, Growing, Growing:** Inv. 1, ACE, MR, Inv. 3, ACE, MR, Inv. 5, ACE, MR **Say It with Symbols:** Inv. 1, ACE, MR, Inv. 2, ACE, MR, Inv. 4, ACE, MR **It's in the System:** Inv. 1, ACE, MR

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Use functions to model relationships between quantities.	
16. Construct a function to model a linear relationship between two variables.	**Thinking with Mathematical Models:** Inv. 2, ACE, MR **Say It with Symbols:** Inv. 4, ACE, MR
a. Interpret the rate of change (slope) and initial value of the linear function from a description of a relationship or from two points in a table or graph.	**Thinking with Mathematical Models:** Inv. 2, ACE, MR **Say It with Symbols:** Inv. 4, ACE, MR
17. Analyze the relationship (increasing or decreasing, linear or non-linear) between two quantities represented in a graph.	**Thinking with Mathematical Models:** Inv. 2, ACE, MR, Inv. 4, ACE, MR **Growing, Growing, Growing:** Inv. 1, ACE, MR **Say It with Symbols:** Inv. 4, ACE, MR, Inv. 5, ACE, MR
Data Analysis, Statistics, and Probability	
Investigate patterns of association in bivariate data.	
18. Construct and interpret scatter plots for bivariate measurement data to investigate patterns of association between two quantities, describing patterns in terms of positive, negative, or no association, linear and non-linear association, clustering, and outliers.	**Thinking with Mathematical Models:** Inv. 1, ACE, MR, Inv. 2, ACE, MR, Inv. 3, ACE, MR, Inv. 4, ACE, MR
19. Given a scatter plot that suggests a linear association, informally draw a line to fit the data, and assess the model fit by judging the closeness of the data points to the line.	**Thinking with Mathematical Models:** Inv. 2, ACE, MR, Inv. 4, ACE, MR
20. Use a linear model of a real-world situation to solve problems and make predictions.	**Thinking with Mathematical Models:** Inv. 2, ACE, MR, Inv. 4, ACE, MR
a. Describe the rate of change and *y*-intercept in the context of a problem using a linear model of a real-world situation.	**Thinking with Mathematical Models:** Inv. 2, ACE, MR **Say It with Symbols:** Inv. 4, ACE, MR

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21. Construct and interpret a two-way table summarizing data on two categorical variables collected from the same subjects, using relative frequencies calculated for rows or columns to describe possible associations between the two variables.	**Thinking with Mathematical Models:** Inv. 5, ACE, MR
Geometry and Measurement	
Understand congruence and similarity using physical models or technology.	
22. Verify experimentally the properties of rigid motions (rotations, reflections, and translations): lines are taken to lines, and line segments are taken to line segments of the same length; angles are taken to angles of the same measure; and parallel lines are taken to parallel lines.	**Butterflies, Pinwheels, and Wallpaper:** Inv. 2, ACE, MR, Inv. 3, ACE, MR
a. Given a pair of two-dimensional figures, determine if a series of rigid motions maps one figure onto the other, recognizing that if such a sequence exists the figures are congruent; describe the transformation sequence that verifies a congruence relationship.	**Butterflies, Pinwheels, and Wallpaper:** Inv. 2, ACE, MR
23. Use coordinates to describe the effect of transformations (dilations, translations, rotations, and reflections) on two-dimensional figures.	**Butterflies, Pinwheels, and Wallpaper:** Inv. 3, ACE, MR, Inv. 4, ACE, MR
24. Given a pair of two-dimensional figures, determine if a series of dilations and rigid motions maps one figure onto the other, recognizing that if such a sequence exists the figures are similar; describe the transformation sequence that exhibits the similarity between them.	**Butterflies, Pinwheels, and Wallpaper:** Inv. 4, ACE, MR
Analyze parallel lines cut by a transversal.	
25. Analyze and apply properties of parallel lines cut by a transversal to determine missing angle measures.	**Butterflies, Pinwheels, and Wallpaper:** Inv. 3, ACE, MR
a. Use informal arguments to establish that the sum of the interior angles of a triangle is 180 degrees.	**Butterflies, Pinwheels, and Wallpaper:** Inv. 3, ACE, MR, Inv. 4, ACE, MR

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Understand and apply the Pythagorean Theorem.	
26. Informally justify the Pythagorean Theorem and its converse.	**Looking for Pythagoras:** Inv. 3, ACE, MR
27. Apply the Pythagorean Theorem to find the distance between two points in a coordinate plane.	**Looking for Pythagoras:** Inv. 1, ACE, MR, Inv. 3, ACE, MR, Inv. 5, ACE, MR
28. Apply the Pythagorean Theorem to determine unknown side lengths of right triangles, including real-world applications.	**Looking for Pythagoras:** Inv. 3, ACE, MR, Inv. 4, ACE, MR, Inv. 5, ACE, MR
Solve real-world and mathematical problems involving volume of cylinders, cones, and spheres.	
29. Informally derive the formulas for the volume of cones and spheres by experimentally comparing the volumes of cones and spheres with the same radius and height to a cylinder with the same dimensions.	**Say It with Symbols:** Inv. 2 , ACE, MR
30. Use formulas to calculate the volumes of three-dimensional figures (cylinders, cones and spheres) to solve real-world problems.	**Say It with Symbols:** Inv. 2 , ACE, MR