2009-2010 8th Grade Math Curriculum Map

Topic: (01) Supporting Idea 6: Numbers and Operations		**Days:** 20
Subject: Math		**Grade:** 8
Key Learning: Students will be able to simplify real number expressions using the laws of exponents. Students will adapt their understanding of the Order of Operations to include exponents. Students will gain a thorough understanding of scientific notation and use it in real-life applications.		
Unit Essential Questions: How do we simplify expressions involving exponents? How do we convert into and out of scientific notation?		
Necessary Prior Knowledge: Order of Operations, Properties of Exponents (especially 10^x), Integers on a number line (positives and negatives), Integer Operations, Absolute Value		
Concept: **Simplify Exponent Expressions**	**Concept:** **Numerical Operations including Real World Problems**	**Concept:** **Scientific Notation**
MA.8.A.6.3	MA.8.A.6.4	MA.8.A.6.1
Lesson Essential Questions: How do we rewrite an expression using exponents? How do we simplify fractions that contain exponents such as: $\frac{2^3 3^4 5^6}{4^2 3^2}$? **Materials-** **Lessons –** 4.6, 4.7	**Lesson Essential Questions:** Where do exponents fit in the order of operations? Where does absolute value fit in the order of operations? How could we create a multi-step problem to solve a real world situation? How could we write an equation to solve a real world situation? **Lessons –** 1.2, 2.1, 12.4 Problem Solving Strategy	**Lesson Essential Questions:** How do we put a number into scientific notation? How do we turn a number from scientific notation to standard notation? How do we decide if a number is a good candidate to be written in scientific notation? **Lessons** – 4.8
Vocabulary: exponent, expression, simplify, power, base	**Vocabulary:** absolute value, order of operations, Integers, evaluate	**Vocabulary:** scientific notation, standard notation
Suggested Activities: For scientific notation you may want to make a class set of cards in scientific notation and have students practice ordering them.		
Resources: McDougall Littell Math 3, McDougall Littell Algebra 1 released FCAT question		

2009-2010 8th Grade Math Curriculum Map

Topic: (02) Solve literal equations for a specified variable and use this ability to convert measurements, including triangle proportions.		**Days:** 20
Subject: Math		**Grade:** 8
Key Learning: Students will be able to rewrite equations solving for specific variables. Students will be able to convert between measurement systems.		
Unit Essential Questions: How do I manipulate equations? How do I convert from one unit of measurement to another? How do I use unit analysis to determine the proper label for an answer? How can I use similar triangles to solve for missing sides?		
Necessary Prior Knowledge: Solving 1-Step Equations, Solving 2-Step Equations, Basic Knowledge of Geometry Formulas, Inverse Operations, Proportions, Ratio, Similar Shapes		
Concept: Solve and Isolate for Different Variables	**Concept:** Compare, Contrast, and Convert Units	**Concept:** Similar Triangles
MA.8.A.4.1	MA.8.G.5.1	MA.8.G.2.1
Lesson Essential Questions: How do I undo an equation to solve for a specified variable (ex: Solve A=bh for h)? **Lessons –** (Algebra Book 3.7), 1.6	**Lesson Essential Questions:** How do I convert from ___ to ___ (ex: Celsius to Fahrenheit, mph to feet per second)? How can unit analysis help me find the label of my answer? **Materials –** conversion tools such as charts and tables, sample rulers and thermometers. **Lessons –** (Algebra Book 1.1), 1.7,2.6, 7.1	**Lesson Essential Questions:** How can I correctly identify the corresponding parts of two triangles? How can I use corresponding parts to solve for a missing side? How can this be used in the real world? Does this concept only work with triangles? **Materials** – examples of similar shapes, **Lessons** – 7.2, 8.2, 8.8
Vocabulary: isolate, inverse, variable, 1-step equations, 2-step equations	**Vocabulary:** convert, unit analysis, US customary, metric, temperature, area, volume, proportions, ratio	**Vocabulary:** similar, triangles, proportions, corresponding, cross products, scale
Suggested Activities:		
Resources: McDougall Littell Math 3, McDougall Littell Algebra 1		

2009-2010 8th Grade Math Curriculum Map

Topic: (03) Analyze 2-Dimensional Figures using distances and angles.		**Days:** 15
Subject: Math		**Grade:** 8
Key Learning: Students will use square roots, the Pythagorean Theorem, and the sum of angle formula.		
Unit Essential Questions: How do square roots affect numbers? How can I utilize the Pythagorean Theorem to find a missing distance? How can my knowledge that a triangle's angles total 180 degrees help me find the angle totals for other polygons?		
Necessary Prior Knowledge: coordinate plane, square roots, exponents, order of operations, triangle classifications		
Concept: **Understanding Square Roots**	**Concept:** **Apply Pythagorean Theorem**	**Concept:** **Sum of Angle Formula**
MA.8.A.6.2, MA.8.A.6.4	MA.8.G.2.4	MA.8.G.2.3
Lesson Essential Questions: What does taking the square root of a number mean? How do we find and approximate square roots? How can we use square roots to solve radical expressions (solve for t, given an h in $t = \frac{\sqrt{h}}{4}$)? **Materials –** objects (see suggested activities), calculators with a square root button, square root approximation tables (pg 745) **Lessons** – 9.1	**Lesson Essential Questions:** How can you find the third side of a right triangle? How can I find the missing side of a right triangle on the coordinate plane? What type of real world problems can be solved using the Pythagorean Theorem? **Materials –** protractors, models of right triangles, graph paper, visual proof of Pyth. Thm. **Lessons –** 9.3, 9.4	**Lesson Essential Questions:** How can we prove the interior angles of a triangle total 180 degrees? How was the sum of angle formula derived (see suggested activities)? How can I use the sum of angle formula to find the total angle measurement of a polygon? **Materials –** triangles, graph paper, polygons **Lessons** – 8.4
Vocabulary: square root, radical, expression, perfect square, square numbers	**Vocabulary:** legs, hypotenuse, Pythagoras, theorem, converse, square root, radical	**Vocabulary:** angle, interior angle, polygon, common polygon names
Suggested Activities: To help students understand the concept of square roots: Give students a set of __(insert perfect square) objects. A) Students can realize that group can be split into x groups of x objects each. X is the square root of the number. B) Students can realize that they can make a 'filled in' square with that number of objects. The side is the square root of the number. To help students understand the sum of angle formula it may be useful to have them make a chart to organize different polygons and look for a pattern (how many sides does the shape have, how many triangles fit inside each shape, what is the total angle measurement of each shape).		
Resources: McDougal Littell Math 3, online Proof, released FCAT problem		

2009-2010 8th Grade Math Curriculum Map

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Topic: (04) Analyze 2-Dimensional Figures using angles.		**Days:** 10
Subject: Math		**Grade:** 8
Key Learning: Students will understand angle relationships.		
Unit Essential Questions: How are the angles of intersecting lines related? How do parallel lines affect angle relationships?		
Necessary Prior Knowledge: parallel lines, acute, obtuse, right and straight angles		
Concept: **Intersecting Lines and their angles**	**Concept:** **Parallel Lines with a Transversal and their angles**	**Concept:**
MA.8.G.2.2	MA.8.G.2.2.	MA.
Lesson Essential Questions: How are the angles opposite of each other related? How are the angles next to each other related? If you know one angle measurement in an intersection can you find the missing angle measurements? **Materials –** examples of intersecting lines **Lessons –** 8.1	**Lesson Essential Questions:** How are corresponding angles related to each other? Can you identify the parts of a diagram which has parallel lines and a transversal? Can you extrapolate this to a real world situation? **Materials –** diagrams of parallel lines with transversals, local area maps **Lessons –** 8.1	**Lesson Essential Questions:**
Vocabulary: complementary angles, supplementary angles, vertical angles, intersect lines	**Vocabulary:** corresponding angles, transversal, parallel	**Vocabulary:**
Suggested Activities: For real world situations of parallel lines and transversals: Use a map of the area and have students identify the various angle relationships formed.		
Resources: McDougal Littell Math 3		

2009-2010 8th Grade Math Curriculum Map

Topic: (05) Analyze and represent linear functions and data sets.	**Days:** 20
Subject: Math	**Grade:** 8

Key Learning: Students will be able to create scatter plots and lines of best fit. Students will find a variety of ways to analyze 2 variable linear equations. Students will understand domain, range, discrete and continuous data. Students will be able to convert linear equation data from one format to another.

Unit Essential Questions: How do we organize data using a scatter plot?
How can we analyze and represent data from linear equations?
How do different data set representations relate to each other?
How can we determine the best representation for a data set?

Necessary Prior Knowledge: coordinate plane, graphing points

Concept: Scatter Plots and Lines of Best Fit	**Concept: Understanding how to Represent and Solve Linear Equations**	**Concept: Translating Different Representations of Linear Functions**
MA.8.S.3.1	MA.8.A.1.1	MA.8.A.1.5
Lesson Essential Questions: How do we find the relationship of a scatter plot? Can you find real world situations to match each type of correlation? How do I find the line of best fit of a scatter plot? **Materials –** graph paper, rulers, graphing calculators **Lessons –** 11.2	**Lesson Essential Questions:** How can we set up a table to represent a function? How con we find the function rule from a table? How does a graph show the solutions of a linear equation? How do we differentiate between discrete and continuous functions? **Materials –** graph paper, real world applications, graphing calculator, grapher (on mac) **Lessons –** 11.1, 11.3, 11.4	**Lesson Essential Questions:** How do we create a table of values and then write its equation? How do we determine which representation of the data is most appropriate? **Materials –** graph paper, real world applications, graphing calculator, grapher (on mac) **Lessons –** 11.1, 11.3
Vocabulary: scatter plot, positive correlation, negative correlation, no correlation, line of best fit	**Vocabulary:** linear, function, relation, input, output, domain, range, x-y table, discrete, continuous	**Vocabulary:** linear, function, relation, input, output, domain, range, x-y table,

Suggested Activities:

Resources: McDougal Littell Math 3, Mac computers

2009-2010 8th Grade Math Curriculum Map

Topic: (06) Analyze and graph linear and non-linear functions.		**Days:** 20
Subject: Math		**Grade:** 8
Key Learning: Students will be able to interpret slope, x and y intercepts when looking at graphs. Students will compare graphs of linear and non-linear functions. Students will look at real-world applications of this knowledge.		
Unit Essential Questions: What do the different slopes look like? How do we interpret the slope of a line? What are the differences between linear and non-linear functions? Can you sketch various slopes and functions? How can we use these concepts in the real world?		
Necessary Prior Knowledge: coordinate plane, graphing points, a basic knowledge of slope, functions		
Concept: **Interpret slopes, x and y intercepts**	**Concept:** **Compare graphs of linear and non-linear functions**	**Concept:**
MA.8.A.1.2	MA.8.A.1.6	
Lesson Essential Questions: Can you graph y = 5w + 25? In that graph what is the slope, and how do you know (what part of the formula is it)? Where will that graph cross the y-axis, and how do you know (what part of the formula is it)? What is the difference between the x-intercept and y-intercept? How do you solve for the x and y-intercepts? Can you look at a graph and find its slope and intercepts? Can you analyze a graph that is based off of real-world data? **Materials –** graph paper, real world problems, grapher (on mac) **Lessons –** 11.3 (real world problems), 11.5, 11.6, (Algebra book 4.3, 4.5 investigating slope activity)	**Lesson Essential Questions:** Can you make a table and graph to represent real world, situations? Can you look at a graph and determine if it is linear or non-linear? **Materials –** graphing paper, real world problems, calculators, grapher (on mac) **Lessons** – 11.4, 13.5	**Lesson Essential Questions:** **Materials –** **Lessons -**
Vocabulary: linear, slope, m, rise, run, uphill, downhill, horizontal, vertical, undefined, intercept, non--	**Vocabulary:** linear, non-linear, function, vertical line test,	**Vocabulary:**

2009-2010 8th Grade Math Curriculum Map

vertical		
Suggested Activities: For Concept 1: Create a ramp or and find its slope. Extension: create a roller coaster and find its slope (note: uphill or downhill) – this is a potential science connection.		
Resources: McDougal Littell Math 3, McDougal Littell Algebra 1, Mac computers		

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<table>
<tr><td colspan="2">Topic: (07) Working with systems of linear equations</td><td>Days: 25</td></tr>
<tr><td colspan="2">Subject: Math</td><td>Grade: 8</td></tr>
<tr><td colspan="3">Key Learning: Students will be able to graphically find the solution to a system of linear equations.</td></tr>
<tr><td colspan="3">Unit Essential Questions: How do we solve a system of linear equations graphically?</td></tr>
<tr><td colspan="3">Necessary Prior Knowledge: coordinate planes, graphing lines, writing equations based on real-world situations, parallel lines, intersecting lines</td></tr>
<tr><td>Concept:
Solving Systems of Equations</td><td>Concept:
Looking at Systems of Linear Equations in Various Contexts</td><td>Concept:</td></tr>
<tr><td>MA.8.A.1.4</td><td>MA..8.A.1.3</td><td></td></tr>
<tr><td>Lesson Essential Questions: How many solutions are there when lines are intersecting? How do I find them?
How many solutions are there when lines are parallel?
How many solutions are there when lines are coincidental? What will this graph look like?
Materials – graph paper, rulers, grapher (on mac)
Lessons – Chapter 11 special topic, (Algebra book 7.1)</td><td>Lesson Essential Questions: Can you create and solve a system of linear equations based on a real-world problem? You should be able to do this graphically, and with a table.
Do you see the relations between the graphic, and tabular representations?
Materials – graph paper, rulers, real world problems, graphing calculators, grapher (on mac)
Lessons – Chapter 11 special topic, (Algebra book 7.1)</td><td>Lesson Essential Questions:
Materials –
Lessons -</td></tr>
<tr><td>Vocabulary: parallel, coincidental, intersect, point of intersection, system of linear equations, solution</td><td>Vocabulary: system of linear equations, point of intersection</td><td>Vocabulary:</td></tr>
<tr><td colspan="3">Suggested Activities:</td></tr>
<tr><td colspan="3">Resources: McDougal Littell Math 3, McDougal Littell Algebra 1, Mac computers</td></tr>
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2009-2010 8th Grade Math Curriculum Map

<table>
<tr><td colspan="2">Topic: (08) Measures of Central Tendency and Box and Whisker Plots</td><td>Days: 10</td></tr>
<tr><td colspan="2">Subject: Math</td><td>Grade: 8</td></tr>
<tr><td colspan="3">Key Learning: Students should be able to explain how the removal or addition of data affects the mean, median, mode, and range.</td></tr>
<tr><td colspan="3">Unit Essential Questions: How does changing the data impact the measures of central tendency?</td></tr>
<tr><td colspan="3">Necessary Prior Knowledge: mean, median, mode, range</td></tr>
<tr><td>Concept:
Impacting Measures of Central Tendency</td><td>Concept:
Box and Whisker Plots</td><td>Concept:</td></tr>
<tr><td>MA.8.S.3.2</td><td>MA.8.S.3.1</td><td></td></tr>
<tr><td>Lesson Essential Questions: What is an outlier and how do I identify one?
If I add or subtract a number from a data list, how will the mean, median, mode, and range be impacted?
Materials – real world problems, calculators
Lessons – 5.8</td><td>Lesson Essential Questions: How do I make a box and whisker plot of data?
What are the various parts of the box and whisker plot?
Materials – Graph paper, rulers
Lessons – 12.2</td><td>Lesson Essential Questions:
Materials –
Lessons -</td></tr>
<tr><td>Vocabulary: measures of central tendency, outlier, mean, median, mode, range, representative average,</td><td>Vocabulary: box and whisker plot, lower quartile, upper quartile, lower extreme, upper extreme, outlier, median</td><td>Vocabulary:</td></tr>
<tr><td colspan="3">Suggested Activities:
For Concept 1: Discuss how the outlier has a greater impact on the mean and range than on the median and mode.
For Concept 1: Special Activity section 5.8</td></tr>
<tr><td colspan="3">Resources: McDougal Littell Math 3</td></tr>
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2009-2010 8th Grade Math Curriculum Map

Topic: (09) One Variable Inequalities		**Days:** 20
Subject: Math		**Grade:** 8
Key Learning: Students should be able to solve one and two step inequalities with one variable. Students should be able to graph their solutions on a number line.		
Unit Essential Questions: How do we solve one and two step inequalities with one variable. How do we graph these solutions?		
Necessary Prior Knowledge: Solving 1 and 2 step equations, Graphing points on the number line, Inequality symbols, Inverse Operations, Order of Operations		
Concept: **1 and 2 Step Inequalities**	**Concept:**	**Concept:**
MA.8.A.4.2		
Lesson Essential Questions: How do we solve 1 and 2 step inequalities? How do we graph the solution set of an inequality? **Materials –** Number lines **Lessons –** 3.6, 3.7, 6.5 (2 step only – example 1)	**Lesson Essential Questions:** **Materials –** **Lessons -**	**Lesson Essential Questions:** **Materials –** **Lessons -**
Vocabulary: isolate, inequality, the inequality symbols	**Vocabulary:**	**Vocabulary:**
Suggested Activities:		
Resources:		