# 2023-2024

# Math 8
# Course Guide

## #224 Math 8
## #225A/225B MYP Math 8
## #222 Basic Math 8

**Math 8 Pacing** (Days in Q1-39, Q2-44, Q3-48, Q4-49)

| Module | Days | Module | Days |
|---|---|---|---|
| 1 – Real Numbers | 8 | 7 – Review Linear Equations | 11 |
| 2 – Exponents, Scientific Notation | 12 | 12 – Pythagorean Theorem | 12 |
| 3 – Proportional Relationships | 9 | 13 – Volume | 9 |
| Fall Break | | 8 – Solving Systems of Linear Equations | 9 |
| 4 – Nonproportional Relationships | 5 | Be here by 3/15 end of Q3 | |
| Be here by 10/13 end of Q1 | | 9 – Transformations & Congruence | 10 |
| 4 – Nonproportional Relationships | 5 | 10 – Transformations & Similarity | 8 |
| 5 – Writing Linear Equations | 10 | 11 – Angle Relationships | 8 |
| 6 – Functions | 10 | 14 – Scatter Plots | 6 |
| 7 – Solving Linear Equations | 12 | 15 – Two Way Tables | 6 |
| Be here by 12/21 end of Q2 | | Be here by 6/7 end of Q4 | |

# Math 8 – Go Math Resources and Standards

| Module 1 – Real Numbers | | |
|---|---|---|
| Resource | Topics (Standards) | Days |
| 1.1 | Rational and Irrational Numbers<br>Represent solutions using square root and cube root for<br>$x^2 = 12\ ,\ then\ x = \sqrt{12}\ and\ x^3 = 27\ , then\ x = \sqrt[3]{27}$<br>Evaluate small perfect square roots and small cube roots for $\sqrt{49} = 7\ and\ \sqrt[3]{8} = 2$<br>(8.NS.A.1, 8.NS.A.2, 8.EE.A.2) | 3 |
| 1.2 | Sets of Real Numbers (8.NS.A.1) | 1 |
| 1.3 | Ordering Real Numbers (8.NS.A.2) | 2 |
| | Review and Test | 2 |
| | (50 min periods) | Total = 8 |

| **Know that there are numbers that are not rational, and approximate them by rational numbers. (supporting cluster)** | |
|---|---|
| 8.NS.A.1 | Know that numbers that are not rational are called irrational. Understand informally that every number has a decimal expansion; rational numbers show that the decimal expansions repeats eventually, and convert a decimal expansion which repeats eventually into a rational number. |
| 8.NS.A.2 | Use rational approximations of irrational numbers to compare the size of irrational numbers, locate them approximately on a number line diagram, and estimate the value of expressions (e.g., $\pi^2$). For example, by truncating the decimal expansion of $\sqrt{2}$, show that $\sqrt{2}$ is between 1 and 2, then between 1.4 and 1.5, and explain how to continue on to get better approximations. |
| **Work with radicals and integer exponents. (major cluster)** | |
| 8.EE.A.2 | Use square root and cube root symbols to represent solutions to equations of the form $x^2 = p\ and\ x^3 = p$, where p is a positive rational number. Evaluate square roots of small perfect squares and cube roots of small perfect cubes. Know that $\sqrt{2}$ is irrational. |

# Math 8 – Go Math Resources and Standards

| Module 2 – Exponents and Scientific Notation | | |
|---|---|---|
| Resource | Topics (Standards) | Days |
| 2.1 | Integer Exponents (*8.EE.A.1) (numerical expressions) | 4 |
| 2.2 | Scientific Notation with Positive Powers of 10 (8.EE.A.3) | 1 |
| 2.3 | Scientific Notation with Negative Powers of 10 (8.EE.A.3) | 1 |
| 2.4 | Operations with Scientific Notation (8.EE.A.4) | 3 |
| | Review and Test | 2 |
| | Essential Standards Reteaching and Intervention | 1 |
| | (50 min periods) | Total = 12 |

| **Work with radicals and integer exponents. (major cluster)** | |
|---|---|
| *8.EE.A.1 | Know and apply the properties of integer exponents to generate equivalent numerical expressions. For example, $3^2 \times 3^{-5} = 3^{-3} = \frac{1}{3^3} = \frac{1}{27}$ |
| 8.EE.A.3 | Use numbers expressed in the form of a single digit times an integer power of 10 to estimate very large or very small quantities, and to express how many times as much one is than the other. For example, estimate the population of the United States as 3 × 10^8 and the population of the world as 7 × 10^9, and determine that the world population is more than 20 times larger. |
| 8.EE.A.4 | Perform operations with numbers expressed in scientific notation, including problems where both decimal and scientific notation are used. Use scientific notation and choose units of appropriate size for measurements of very large or very small quantities (e.g., use millimeters per year for seafloor spreading). Interpret scientific notation that has been generated by technology. |

| Module 3 – Proportional Relationships | | |
|---|---|---|
| Resource | Topics (Standards) | Days |
| 3.1 | Representing Proportional Relationships (*8.EE.B.5) | 2 |
| 3.2 | Rate of Change and Slope (*8.EE.B.5) | 2 |
| 3.3 | Interpreting the Unit Rate as Slope (*8.EE.B.5) | 2 |
| | Review and Test | 2 |
| | Essential Standards Reteaching and Intervention | 1 |
| | (50 min periods) | Total = 9 |

| **Understand the connections between proportional relationships, lines, and linear equations. (major cluster)** | |
|---|---|
| *8.EE.B.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. |

# Math 8 – Go Math Resources and Standards

| Module 4 – Nonproportional Relationships | | |
|---|---|---|
| Resource | Topics (Standards) | Days |
| 4.1 | Representing Linear Nonproportional Relationships (*8.EE.B.6) | 3 |
| 4.2 | Determining Slope and y-intercept (*8.EE.B.6) | 2 |
| | Fall Break | |
| 4.3 | Graphing Linear Nonporportional Relationships, Using Slope and y-intercept (*8.EE.B.6) | 2 |
| 4.4 | Proportional and Nonproportional Relationships (*8.EE.B.6) | 2 |
| | Quiz Module 4 (Test Module 4 & Module 5 after Module 5) | 1 |
| | (50 min periods) | Total = 10 |

| **Understand the connections between proportional relationships, lines, and linear equations. (major cluster)** | |
|---|---|
| *8.EE.B.6 | Use similar triangles to explain why the slope m is the same between any two distinct points on a non-vertical line in the coordinate plane; derive the equation y = mx for a line through the origin and the equation y = mx + b for a line intercepting the vertical axis at (0, b). |

End Of Quarter One

| Module 5 – Writing Linear Equations | | |
|---|---|---|
| Resource | Topics (Standards) | Days |
| 5.1 | Writing Linear Equations from Situations and Graphs (*8.F.B.4) | 3 |
| 5.2 | Writing Linear Equations from a Table (*8.F.B.4) | 3 |
| | Review and Test Module 4 & 5 | 2 |
| | Essential Standards Reteaching and Intervention | 2 |
| | (50 min periods) | Total = 10 |

| **Use functions to model relationships between quantities. (supporting cluster)** | |
|---|---|
| *8.F.B.4 | Construct a function to model a linear relationship between two quantities. Determine the rate of change and initial value of the function from a description of a relationship or from two (x, y) values, including reading these from a table or from a graph. Interpret the rate of change and initial value of a linear function in terms of the situation it models, and in terms of its graph or a table of values. |

# Math 8 – Go Math Resources and Standards

| Module 6 – Functions | | |
|---|---|---|
| Resource | Topics (Standards) | Days |
| 6.1 | Identifying and Representing Functions (8.F.A.1) | 2 |
| 6.2 | Describing Functions (8.F.A.1, *8.F.A.3) | 2 |
| 6.3 | Comparing Functions (8.F.A.2, *8.F.B.4) | 2 |
| 6.4 | Analyzing Graphs (8.F.A.5) | 1 |
| | Review and Test | 2 |
| | Essential Standards Reteaching and Intervention | 1 |
| | (50 min periods) | Total = 10 |

| **Define, evaluate, and compare functions. (major clusters)** | |
|---|---|
| 8.F.A.1 | Understand that a function is a rule that assigns to each input exactly one output. The graph of a function is the set of ordered pairs consisting of an input and the corresponding output. (Function notation is not required in Grade 8.) |
| 8.F.A.2 | Compare properties of two functions each represented in a different way (algebraically, graphically, numerically in tables, or by verbal descriptions). For example, given a linear function represented by a table of values and a linear function represented by an algebraic expression, determine which function has the greater rate of change. |
| *8.F.A.3 | Interpret the equation y = mx + b as defining a linear function, whose graph is a straight line; give examples of functions that are not linear. For example, the function A = $s^2$ giving the area of a square as a function of its side length is not linear because its graph contains the points (1,1), (2,4) and (3,9), which are not on a straight line. |
| **Use functions to model relationships between quantities. (supporting cluster)** | |
| *8.F.B.4 | Construct a function to model a linear relationship between two quantities. Determine the rate of change and initial value of the function from a description of a relationship or from two (x, y) values, including reading these from a table or from a graph. Interpret the rate of change and initial value of a linear function in terms of the situation it models, and in terms of its graph or a table of values. |
| 8.F.B.5 | Describe qualitatively the functional relationship between two quantities by analyzing a graph (e.g., where the function is increasing or decreasing, linear or nonlinear). Sketch a graph that exhibits the qualitative features of a function that has been described verbally. |

# Math 8 – Go Math Resources and Standards

| Module 7 – Solving Linear Equations | | |
|---|---|---|
| Resource | Topics (Standards) | Days |
| 7.1 | Equations with Variable - Both Sides (*8.EE.C.7a, *8.EE.C.7b) | 3 |
| 7.2 | Equations with Rational Numbers (*8.EE.C.7a, *8.EE.C.7b) | 3 |
| 7.3 | Equations with the Distributive Property (*8.EE.C.7b) | 3 |
| | Review and Test | 2 |
| | Essential Standards Reteaching and Intervention | 1 |
| | (50 min periods) | Total = 12 |

| **Analyze and solve linear equations and pairs of simultaneous linear equations. (major cluster)** | |
|---|---|
| *8.EE.C.7 | Solve linear equations in one variable.<br>*a. Give examples of linear equations in one variable with one solution, infinitely many solutions, or no solutions. Show which of these possibilities is the case by successively transforming the given equation into simpler forms, until an equivalent equation of the form x = a, a = a, or a = b results (where a and b are different numbers).<br>*b. Solve linear equations with rational number coefficients, including equations whose solutions require expanding expressions using the distributive property and collecting like terms |

# End Of Quarter Two

# Math 8 – Go Math Resources and Standards

| Review Module 7 – Solving Linear Equations | | |
|---|---|---|
| Resource | Topics (Standards) | Days |
| | Essential Standard Reteaching and Intervention | |
| 7.1 | Equations with Variable - Both Sides (*8.EE.C.7a, *8.EE.C.7b) | 2 |
| 7.2 | Equations with Rational Numbers (*8.EE.C.7a, *8.EE.C.7b) | 2 |
| 7.3 | Equations with the Distributive Property (*8.EE.C.7b) | 2 |
| **7.4** | **Equations with Many Solutions or No Solutions (*8.EE.C.7a)** | **3** |
| | Review and Test | 1 |
| | (50 min periods) | Total = 11 |

| Module 12 – Pythagorean Theorem | | |
|---|---|---|
| Resource | Topics (Standards) | Days |
| 12.1 | The Pythagorean Theorem (*8.G.B.7, *8.G.B.6) | 4 |
| 12.2 | Converse of the Pythagorean Theorem (*8.G.B.6) | 2 |
| 12.3 | Distance Between Two Points is performed with Pythagorean Theorem (*8.G.B.8) --Do Not Teach Distance Formula to find Distance. | 3 |
| | Review and Test | 2 |
| | Essential Standards Reteaching and Intervention | 1 |
| | (50 min periods) | Total = 12 |

| **Understand and apply the Pythagorean Theorem. (major cluster)** | |
|---|---|
| *8.G.B.6 | Explain a proof of the Pythagorean Theorem and its converse. |
| *8.G.B.7 | Apply the Pythagorean Theorem to determine unknown side lengths in right triangles in real-world and mathematical problems in two and three dimensions. Solve $x^2 = p$ for any $p$. |
| 8.G.B.8 | Apply the Pythagorean Theorem to find the distance between two points in a coordinate system. |

| Module 13 – Volume | | |
|---|---|---|
| Resource | Topics (Standards) | Days |
| 13.1 | Volume of Cylinders (*8.G.C.9) | 2 |
| 13.2 | Volume of Cones (*8.G.C.9) | 2 |
| 13.3 | Volume of Spheres (*8.G.C.9) | 2 |
| | Review and Test | 2 |
| | Essential Standards reteaching and Intervention | 1 |
| | (50 min periods) | Total = 9 |

| **Solve real world and mathematical problems involving of cylinders, cones and spheres. (additional cluster)** | |
|---|---|
| *8.G.C.9 | Know the formulas for the volume of cones, cylinders, and spheres and use them to solve real world and mathematical problems. Note: Make connections between shapes learned in $6^{th}$/$7^{th}$ grades and the new volumes in $8^{th}$. |

# Math 8 – Go Math Resources and Standards

| Module 8 – Solving Systems of Linear Equations | | |
|---|---|---|
| Resource | Topics (Standards) | Days |
| 8.1 | Solving Systems of Linear Equations by Graphing<br>*Examine the graph, the table of values on graph or equation graphed to find an answer to the system (8.EE.C.8a, 8.EE.C.8c) | 3 |
| 8.2 | Solve Systems by Substitution (8.EE.C.8a, 8.EE.C.8c)<br>*Set up equations in $y = mx + b$ and set the expressions of $mx + b$ equal to each other, solve. | 2 |
| 8.5 | Solving Special Systems, discuss systems that have infinite solutions and ones that have no solutions (8.EE.C.8b) | 2 |
| | Review and Test | 2 |
| | (50 min periods) | Total = 9 |

| **Analyze and solve linear equations and pairs of simultaneous linear equations. (major cluster)** | |
|---|---|
| 8.EE.C.8 | Analyze and solve pairs of simultaneous linear equations.<br>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.<br>b. Solve systems of two linear equations in two variables algebraically, and estimate solutions by graphing the equations. Solve simple cases by inspection. For example, 3x + 2y = 5 and 3x + 2y = 6 have no solution because 3x + 2y cannot simultaneously be 5 and 6.<br>c. Solve real-world and mathematical problems leading to two linear equations in two variables. For example, given coordinates for two pairs of points, determine whether the line through the first pair of points intersects the line through the second pair. |

End Of Quarter Three

# Math 8 – Go Math Resources and Standards

| Module 9 – Transformations and Congruence | | |
|---|---|---|
| Resource | Topics (Standards) | Days |
| 9.1 | Properties of Translations (8.G.A.1, 8.G.A.3) | 1 |
| 9.2 | Properties of Reflections (8.G.A.1, 8.G.A.3) | 1 |
| 9.3 | Properties of Rotations (8.G.A.1, 8.G.A.3) | 2 |
| 9.4 | Algebraic Representations of Transformations (8.G.A.3) | 2 |
| 9.5 | Congruent Figures (8.G.A.2) | 2 |
| | Review and Test | 2 |
| | (50 min periods) | Total = 10 |

| **Understand congruence and similarity using physical models, transparencies, or geometry software. (additional cluster)** | |
|---|---|
| 8.G.A.1 | Verify experimentally the properties of rotations, reflections, and translations:<br>a. Lines are taken to lines, and line segments to line segments of the same length.<br>b. Angles are taken to angles of the same measure.<br>c. Parallel lines are taken to parallel lines. |
| 8.G.A.2 | Understand that a two-dimensional figure is congruent to another if the second can be obtained from the first by a sequence of rotations, reflections, and translations; given two congruent figures, describe a sequence that exhibits the congruence between them. |
| 8.G.A.3 | Describe the effect of dilations, translations, rotations and reflections on two-dimensional figures using coordinates. |

| Module 10 – Transformations and Similarity | | |
|---|---|---|
| Resource | Topics (Standards) | Days |
| 10.1 | Properties of Dilations (8.G.A.3, 8.G.A.4) | 2 |
| 10.2 | Algebraic Representations of Dilations (8.G.A.3) | 2 |
| 10.3 | Similar Figures (8.G.A.4) | 2 |
| | Review and Test | 2 |
| | (50 min periods) | Total = 8 |

| **Understand congruence and similarity using physical models, transparencies, or geometry software. (additional cluster)** | |
|---|---|
| 8.G.A.3 | Describe the effect of dilations, translations, rotations and reflections on two-dimensional figures using coordinates. |
| 8.G.A.4 | Understand that a two-dimensional figure is similar to another if the second can be obtained from the first by a sequence of rotations, reflections, translations, and dilations; given two similar two-dimensional figures, describe a sequence that exhibits the similarity between them. |

# Math 8 – Go Math Resources and Standards

| Module 11 – Angle Relationships in Parallel Lines & Triangles | | |
|---|---|---|
| Resource | Topics (Standards) | Days |
| 11.1 | Parallel Lines Cut by Transversal (8.G.A.5) | 2 |
| 11.2 | Angle Theorems for Triangles (8.G.A.5) | 2 |
| 11.3 | Angle-Angle Similarity (8.G.A.5) | 2 |
| | Review and Test | 2 |
| | (50 min periods) | Total = 8 |

| **Understand congruence and similarity using physical models, transparencies, or geometry software. (major cluster)** | |
|---|---|
| 8.G.A.5 | Use informal arguments to establish facts about the angle sum and exterior angle of triangles, about the angles created when parallel lines are cut by a transversal, and the angle-angle criterion for similarity of triangles. For example, arrange three copies of the same triangle so that the three angles appear to form a line, and give an argument in terms of transversals why this is so. |

| Module 14 – Scatter Plots | | |
|---|---|---|
| Resource | Topics (Standards) | Days |
| 14.1 | Scatter Plots and Association (8.SP.A.1) | 2 |
| 14.2 | Trend Lines and Predictions (8.SP.A.1, 8.SP.A.2, 8.SP.A.3) | 2 |
| | Review and Test | 2 |
| | (50 min periods) | Total = 6 |

| **Investigate patterns of association in bivariate data. (supporting cluster)** | |
|---|---|
| 8.SP.A.1 | Construct and interpret scatter plots for bivariate measurement data to inate patterns of association between two quantities. Describe patterns such as clustering, outliers, positive or negative association, linear association, and nonlinear association. |
| 8.SP.A.2 | Know that straight lines are widely used to model relationships between two quantitative variables. For scatter plots that suggest a linear association, informally fit a straight line, and informally assess the model fit by judging the closeness of the data points to the line. |
| 8.SP.A.3 | Use the equation of a linear model to solve problems in the context of bivariate measurement data, interpreting the slope and intercept. For example, in a linear model for a biology experiment, interpret a slope of 1.5 cm/hr as meaning that an additional hour of sunlight each day is associated with an additional 1.5 cm in mature plant height. |

# Math 8 – Go Math Resources and Standards

| Module 15 – Two-Way Tables | | |
|---|---|---|
| Resources | Topics (Standards) | Days |
| 15.1 | Two-Way Frequency Tables (8.SP.A.4) | 2 |
| 15.2 | Two-Way Relative Frequency Tables (8.SP.A.4) | 2 |
| | Review and Test | 2 |
| | (50 min periods) | Total = 6 |

| **Investigate patterns of association in bivariate data. (supporting cluster)** | |
|---|---|
| 8.SP.A.4 | Understand that patterns of association can also be seen in bivariate categorical data by displaying frequencies and relative frequencies in a two-way table. Construct and interpret a two-way table summarizing data on two categorical variables collected from the same subjects. Use relative frequencies calculated for rows or columns to describe possible association between the two variables. For example, collect data from students in your class on whether or not they have a curfew on school nights and whether or not they have assigned chores at home. Is there evidence that those who have a curfew also tend to have chores? |

# End Of Quarter Four