The mission of the Chardon Local Schools is high achievement for all students where learning is our most important work.

Course of Study — MATH

Revised November 2021

8TH GRADE

CHARDON LOCAL SCHOOLS

#WeAreChardon

COS — MATH — *Revised November 2021*

8th Grade

Strand: The Number System

Learning Standard:

8.NS.1
Know that real numbers are either rational or irrational. Understand informally that every number has a decimal expansion which is repeating, terminating, or is non-repeating and non-terminating.

How Taught?

Teaching activities may include, but are not limited to:

- Direct Instruction
- Cooperative Groups
- Stations
- Data Driven Instruction
- Scaffolding

Materials:

- Calculator (Desmos, TI-30X IIS)
- Guided Notes (Student Copy)
- Board Adopted Materials

How Assessed?

Assessments may include, but are not limited to:

- Pre-Assessments (pre-tests, observation, anticipation guide, questioning, diagnostics)
- Formative Assessments (entry/exit slips, group work, reflections, discussions,, homework/classwork, self and peer evaluations, observations, conferences, rubrics)
- Summative Assessments (using rubrics; tests/exams, projects, creative assignments, presentations)

How Re-Taught?

Re-teaching activities may include, but are not limited to:

- breaking down concept into smaller components
- presenting the information again in a different way
- Universal Design for Learning principles offering students opportunities to experience and engage material in new and different way
- practice activities such as computer tutorials, games, hands-on activities
- review sessions

COS — MATH — *Revised November 2021*

8th Grade

Strand: The Number System

Learning Standard:

8.NS.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., π^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.

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COS — MATH — *Revised November 2021*

8th Grade

Strand: Expressions and Equations

Learning Standard:

8.EE.1
Understand, explain, and apply the properties of integer exponents to generate equivalent numerical expressions. For example, $3^2 \times 3^{-5} = 3^{-3} = 1/3^3 = 1/27$

How Taught?

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COS — MATH — *Revised November 2021*

8th Grade

Strand: Expressions and Equations

Learning Standard:

8.EE.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

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COS — MATH — ***Revised November 2021***

8th Grade

Strand: Expressions and Equations

Learning Standard:

8.EE.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 × 108; and the population of the world as 7 × 109; and determine that the world population is more than 20 times larger.

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Strand: Expressions and Equations

Learning Standard:

8.EE.4
Perform operations with numbers expressed in scientific notation, including problems where both decimal notation 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.

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Strand: Expressions and Equations

Learning Standard:

8.EE.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

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Strand: Expressions and Equations

Learning Standard:

8.EE.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 b.

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8th Grade

Strand: Expressions and Equations

Learning Standard:

8.EE.7
Solve linear equations in one variable.
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).
b. Solve linear equations with rational number coefficients, including equations whose solutions require expanding expressions using the distributive property and collecting like terms.

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COS — MATH — *Revised November 2021*

8th Grade

Strand: Expressions and Equations

Learning Standard:

8.EE.8
Analyze and solve pairs of simultaneous linear equations graphically.
a. Understand that the solution to a pair of linear equations in two variables corresponds to the point(s) of intersection of their graphs, because the point(s) of intersection satisfy both equations simultaneously.
b. Use graphs to find or estimate the solution to a pair of two simultaneous linear equations in two variables. Equations should include all three solution types: one solution, no solution, and infinitely many solutions. 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.
c. Solve real-world and mathematical problems leading to pairs of 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. (Limit solutions to those that can be addressed by graphing.)

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8th Grade

Strand: Functions

Learning Standard:

8.F.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.

How Taught?

Teaching activities may include, but are not limited to:

- Direct Instruction
- Cooperative Groups
- Stations
- Data Driven Instruction
- Scaffolding

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COS — MATH — *Revised November 2021*

8th Grade

Strand: Functions

Learning Standard:

8.F.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.

How Taught?

Teaching activities may include, but are not limited to:

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- Stations
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8th Grade

Strand: Functions

Learning Standard:

8.F.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 = s² 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.

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8th Grade

Strand: Functions

Learning Standard:

8.F.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.

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8th Grade

Strand: Functions

Learning Standard:

8.F.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

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COS — MATH — *Revised November 2021*

8th Grade

Strand: Geometry

Learning Standard:

8.G.1
Verify experimentally the properties of rotations, reflections, and translations (include examples both with and without coordinates).
a. Lines are taken to lines, and line segments are taken to line segments of the same length.
b. Angles are taken to angles of the same measure. c. Parallel lines are taken to parallel lines.

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8th Grade

Strand: Geometry

Learning Standard:

8.G.2
Understand that a two-dimensional figure is congruentG 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. (Include examples both with and without coordinates.)

How Taught?

Teaching activities may include, but are not limited to:

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8th Grade

Strand: Geometry

Learning Standard:

8.G.3
Describe the effect of dilationsG, translations, rotations, and reflections on two-dimensional figures using coordinates.

How Taught?

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Strand: Geometry

Learning Standard:

8.G.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. (Include examples both with and without coordinates.)

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Strand: Geometry

Learning Standard:

8.G.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 sum of the three angles appears to form a line, and give an argument in terms of transversals why this is so.

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8th Grade

Strand: Geometry

Learning Standard:

8.G.6
Analyze and justify an informal proof of the Pythagorean Theorem and its converse.
8.G.7
Apply the Pythagorean Theorem to determine unknown side lengths in right triangles in real-world and mathematical problems in two and three dimensions.
8.G.8
Apply the Pythagorean Theorem to find the distance between two points in a coordinate system.

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How Re-Taught?

Re-teaching activities may include, but are not limited to:

- breaking down concept into smaller components
- presenting the information again in a different way
- Universal Design for Learning principles offering students opportunities to experience and engage material in new and different way
- practice activities such as computer tutorials, games, hands-on activities
- review sessions

COS — MATH — *Revised November 2021*

8th Grade

Strand: Geometry

Learning Standard:

8.G.9
Solve real-world and mathematical problems involving volumes of cones, cylinders, and spheres.

How Taught?

Teaching activities may include, but are not limited to:

- Direct Instruction
- Cooperative Groups
- Stations
- Data Driven Instruction
- Scaffolding

Materials:

- Calculator (Desmos, TI-30X IIS)
- Guided Notes (Student Copy)
- Board Adopted Materials

How Assessed?

Assessments may include, but are not limited to:

- Pre-Assessments (pre-tests, observation, anticipation guide, questioning, diagnostics)
- Formative Assessments (entry/exit slips, group work, reflections, discussions, homework/classwork, self and peer evaluations, observations, conferences, rubrics)
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COS — MATH — *Revised November 2021*

8th Grade

Strand: Statistics and Probability

Learning Standard:

8.SP.1
Construct and interpret scatter plots for bivariateG measurement data to investigate patterns of association between two quantities. Describe patterns such as clustering; outliers; positive, negative, or no association; and linear association and nonlinear association. (GAISE Model, steps 3 and 4)

How Taught?

Teaching activities may include, but are not limited to:

- Direct Instruction
- Cooperative Groups
- Stations
- Data Driven Instruction
- Scaffolding

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- Guided Notes (Student Copy)
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COS — MATH — *Revised November 2021*

8th Grade

Strand: Statistics and Probability

Learning Standard:

8.SP.2
Understand 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. (GAISE Model, steps 3 and 4)

How Taught?

Teaching activities may include, but are not limited to:

- Direct Instruction
- Cooperative Groups
- Stations
- Data Driven Instruction
- Scaffolding

Materials:

- Calculator (Desmos, TI-30X IIS)
- Guided Notes (Student Copy)
- Board Adopted Materials

How Assessed?

Assessments may include, but are not limited to:

- Pre-Assessments (pre-tests, observation, anticipation guide, questioning, diagnostics)
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COS — MATH — *Revised November 2021*

8th Grade

Strand: Statistics and Probability

Learning Standard:

8.SP.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. (GAISE Model, steps 3 and 4)

How Taught?

Teaching activities may include, but are not limited to:

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- Stations
- Data Driven Instruction
- Scaffolding

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COS — MATH — *Revised November 2021*

8th Grade

Strand: Statistics and Probability

Learning Standard:

8.SP.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?

How Taught?

Teaching activities may include, but are not limited to:

- Direct Instruction
- Cooperative Groups
- Stations
- Data Driven Instruction
- Scaffolding

Materials:

- Calculator (Desmos, TI-30X IIS)
- Guided Notes (Student Copy)
- Board Adopted Materials

How Assessed?

Assessments may include, but are not limited to:

- Pre-Assessments (pre-tests, observation, anticipation guide, questioning, diagnostics)
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