MATH LESSON SPECTRUM

Key Skills and Concepts from Curriculum

- Applying ratios and proportional relationships, linear relationships, and non-linear relationships.
- Applying percentages and unit conversions, e.g., in the context of complicated measurement problems involving quantities with derived or compound units (such as mg/mL, kg/m3 , acre-feet, etc.).
- Applying basic function concepts, e.g., by interpreting the features of a graph in the context of an applied problem.
- Applying concepts and skills of geometric measurement e.g., when analyzing a diagram or schematic.
- Applying concepts and skills of basic statistics.
- Performing rational number arithmetic fluently.
- Work with radicals and integer exponents.
- Analyze and solve linear equations and pairs of simultaneous linear equations.
- Interpret the structure of equations and writing equivalent expressions

How to Use:

This is a Lesson Spectrum for all grade levels and groupings and includes all lessons and standards in the Breakthrough Curriculum. To plan objective maps for individual grade levels or groups, it is best to use the individual grade level unit plans and spectrums.

*Lessons highlighted in red are additional lessons added to the curriculum in 2018.
*Lessons highlighted in purple are additional lessons added to the curriculum in 2023

Establishing a Culture of Learning (2 lessons)
(Foundational Skills)

Unit	Topic	CCSS	Objective
Setting Expectations (2 lessons)	Classroom Routines and Expectations	N/A	Today you will help create a set of classroom expectations by brainstorming ways to create a positive learning environment.

	Word Problem Strategies	N/A	Today you will help generate a class set of word problem strategies by creating a poster that demonstrates one of the strategies.

Number Sense (11 lessons)

Unit	Topic	CCSS	Objective
Adding and Subtracting Rational Numbers (6 lessons)	Distances on a Number Line	6.NS.C.6 6.NS.C.7	Today you will compare, locate, and find distances of rational numbers on a number line.
	Adding Integers Using a Number Line	7.NS.A.1	Today you will add integers by using horizontal arrows on a number line.
	Adding Integers Using Absolute Value	7.NS.A.1	Today you will add integers by using addition rules based on absolute value.
	Subtracting Integers	7.NS.A.1	Today you will subtract integers by adding the additive inverse.
	Addition and Subtraction of Rational Numbers	7.NS.A.1	Today you will add and subtract rational numbers by using addition and subtraction rules based on absolute value.
	Real-World Application: Addition and Subtraction of Rational Numbers	7.NS.A.1	Today you will use apply what you know about adding and subtracting rational numbers to real-world situations involving money.
Multiplying and Dividing Rational Numbers (4 lessons)	Multiplication of Signed Numbers	7.NS.A.2	Today you will discover and apply the rules for multiplying integers by connecting multiplication to repeated addition.
	Division of Signed Numbers	7.NS.A.2	Today you will discover and apply the rules for dividing integers by recognizing that division is the reverse process of multiplication.
	Converting Between Fractions and Decimals	7.NS.A.2	Today you will convert between fractions and decimals by using equivalent fractions. ***Optional, advanced 7th grade***

	Converting Rational Numbers to Decimals Using Long Division	7.NS.A.2	Today you will represent rational numbers as either terminating or repeating decimals by using the long division algorithm.
Operations Involving Rational Numbers (1 lesson)	Order of Operations	7.NS.A.1 7.NS.A.2	Today you will evaluate rational expressions involving several operations by using the order of operations.

Ratios and Proportions (14 lessons)

Unit	Topic	CCSS	Objective
Ratios (4 lessons)	Introduction to ratios	6.RP.1	Today you will demonstrate your understanding of ratios by describing a ratio relationship between two quantities.
	Unit Rates	6.RP.2	Today you will evaluate unit rates by finding the ratio a/b (when b≠0) of several real-world ratios.
	Unit Pricing	6.RP.2	Today you will solve unit rate problems by creating and determining the cost of a pizza recipe.
	Unit Conversion	6.RP.3d	Today you will use convert measurements in one unit to measurements in another unit by using rates that connect the units of measure
Percents (6 lessons)	Introduction to Percents	6.RP.A.3	Today you will calculate basic percentages by using tape diagrams and grids.
	Part of a Whole as a Percent	6.RP.A.3	Today you will solve word problems involving percents by using expressions, equations, and numeric and visual models.
	Comparing Quantities with Percent	6.RP.A.3	Today you will compare two quantities using percents by computing the percent increase and decrease between the quantities.
	Markup and Markdowns Involving Percent	7.RP.A.3	Today you will solve multi-step problems involving markups and markdowns by using algebraic equations.

	Simple Interest	7.RP.A.3	Today you will solve simple interest problems by using an algebraic formula.
	Real-World Percent Problems	7.RP.A.3	Today you will solve real-world percent problems involving tax, gratuities, commission, and fees, by using equations, tables, and graphs.
Proportions (4 lessons)	Identifying Proportional Relationships (Tables)	7.RP.A.2	Today you will determine whether two quantities are in a proportional relationship by testing for constants of proportionality in tables.
	Coordinate Plane	6.G.A.3	Today you will graph and identify ordered pairs on a plane by using the horizontal and vertical coordinates of a point.
	Identifying Proportional Relationships (Graphs)	7.RP.A.2	Today you will determine whether two quantities are in a proportional relationship by testing for constants of proportionality in graphs.
	Representing Proportional Relationships with Equations	7.RP.A.2	Today you will write equations that represent proportional relationships by finding the constant of proportionality.
	Interpreting Graphs of Proportional Relationships	7.RP.A.2	Today you will interpret graphs of proportional relationships by analyzing what points on a graph of a proportional relationship mean in the context of the problem.

Expressions and Equations (28 lessons)

Unit	Topic	CCSS	Objective
Expressions (7 lessons)	Translating Expressions	6.EE.2	Today you will translate algebraic expressions by translating 6 written and verbal expressions.
	Evaluating Expressions	6.EE.2	Today you will evaluate expressions by calculating expressions at specific variable values.
	Combining Like Terms	7.EE.1	Today you will simplify expressions by combining like terms of algebraic expressions.

	The Distributive Property	7.EE.1	Today you will expand expressions by applying the distributive property on several expressions.
	Factoring Using the GCF	7.EE.1	Today you will factor expressions by finding and using the greatest common factor.
	Equivalent Expressions	7.EE.1	Today you will identify equivalent expressions by combining like terms, using the distributive property, and factoring using the GCF.
	Seeing Structure in Expressions	HSA.SSE.A	Today you will identify equivalent expressions by using the structure of expressions.
Solving Linear Equations (5 lessons)	One-step Equations	8.EE.7b HSA.REI.A	Today you will solve one-step equations by using inverse operations to isolate the variable.
	Two-step Equations	8.EE.7b HSA.REI.A	Today you will solve two-step equations by using inverse operations.
	Multi-step Equations	8.EE.7b HSA.REI.A	Today you will solve multi-step equations by combining like terms and using the distributive property.
	Equations with Variables on Both Sides	8.EE.7b	Today you will solve multi-step equations with variables on both sides by using the additive inverse of the variable coefficients.
	Solving Multi-Step Equations (Applications)	8.EE.7b	Today you will analyze cell phone plans by writing and solving equations that model their monthly cost.
Systems of Equations (5 lessons)	Solving Systems of Equations by Graphing	8.EE.8b HSA.REI.C	Today you will determine how many solutions a system of equations has by comparing the slope and y-intercept of lines.
	Solving Systems of Equations by Elimination	8.EE.8b HSA.REI.C	Today you will solve systems of equations by using addition and subtraction to eliminate a variable.
	Solving Systems of Equations Using Multiplicative Elimination	8.EE.8b HSA.REI.C	Today you will solve systems of equations by using multiplication to eliminate a variable.

	Solving Systems of Equations Using Substitution	8.EE.8b HSA.REI.C	Today you will solve a system of equations by substituting expressions.
	Applications Involving Solve Systems of Equations	8.EE.8c HSA.REI.C	Today you will solve linear systems applications by translating word problems into equations.
Exponential Expressions and Equations (7 lessons)	Scientific Notation	8.EE.4	Today you will express large and small numbers in scientific notation by using the powers of 10.
	Properties of Integer Exponents (Multiplication Properties)	8.EE.1	Today you will generate equivalent expressions by applying the multiplication and power properties of exponents.
	Properties of Integer Exponents (Division, Negative, and Zero Properties)	8.EE.1	Today you will rewrite expressions by applying the division, negative, and zero properties of integer exponents.
	Properties of Rational Exponents (Radicals)	HSN. RN. A. 2	Today you will rewrite expressions involving radicals and rational exponents using the properties of exponents.
	Operations on Numbers in Scientific Notation	8.EE.1 8.EE.4	Today you will solve real-world problems involving numbers by performing operations on numbers in scientific notation.
	Linear versus Exponential Models	HSF.LEA.1	Today you will distinguish between situations that can be modeled with linear functions and exponential functions.
	Exponential Growth and Decay	HS.F.LE.A	Today you will solve real-world problems involving exponential growth and decay by translating real-world scenarios into exponential equations.
Inequalities (4 lessons)	Solve Linear Inequalities	HS.A.REI.3	Today you will solve linear inequalities by finding and visually representing a solution set for a variable.
	Graph Linear Inequalities	HS.A.REI.11	Today you will graph the solution to a linear inequality by finding the half-plane that represents a solution set.
	Solving Systems of Inequalities	HS.A.REI.12	Today you will graph the solution to a system of linear inequalities by finding the half-plane intersection of each inequality.

	Applications of Linear Inequalities	HS.A.REI.12	Today you will represent real-world scenarios using inequalities by creating and solving inequality application problems.

Functions (15 lessons)

Unit	Topic	CCSS	Objective
Introduction to Functions (7 lessons)	Introduction to Relations	8.F.1	Today you will interpret relations in tables, graphs, and mappings by finding the ordered pairs, the domain/range, and the inverse of a relation.
	Introduction to Functions	8.F.1	Today you will determine if a relation is a function by analyzing the input and outputs of coordinates, graphs, tables, and mappings.
	Identifying Functions	8.F.1	Today you identify functions by determining if a relation in a graph or a table is a function.
	Graphing Functions	8.F.4	Today you will graph a linear function by making a table of input/output values and graphing the coordinates.
	Writing Function Rules from Graphs	8.F.4 HSF.BF.1	Today you will find function rules on a graph by finding the slope and the y-intercept of linear data.
	Modeling Real-World Functions	8.F.4 HS.ID.C.7	Today you will model real-world data by writing and graphing function rules. Interpreting the slope (rate of change) and the intercept (constant term) of a linear model in the context of data.
Interpreting and Building Functions (6 lessons)	Function Notation	HS.F.IF.A.2	Today you will use function notation to evaluate specific input and output values of functions.
	Composition of Functions	HS.F.BF.A.1	Today you will find the composition of two functions by using the output of one function as the input of the other.
	Functions as Sequences	HS.F.BF.A.2	Today you will write recursive and explicit formulas for arithmetic sequences by finding their starting values and common difference.

	Introduction to Interpreting Functions	HS.F.IF.B.4	Today you will interpret key features of graphs by determining the intervals where the function is increasing, decreasing, constant, positive or negative.
	Introduction to Function Transformations	HS.F.BF.B.3	Today you will transform functions by describing the effects on the graph when replacing f(x) by f(x)+k, k(f(x), f(kx), and f(x+k) for specific values of k (both positive and negative).
	Introduction to Function Transformations with Algebra	HS.F.BF.B.3	Today you will transform functions algebraically by using function composition.
End of Unit Project (2 lessons)	Linear Equations Art Day 1	HS.F.BF.B.3	Today you will demonstrate your understanding of key features and transformation of linear functions by constructing a unique image made up of Linear Equations on Desmos
	Linear Equations Art Day 2	HS.F.BF.B.3	Today you will demonstrate your understanding of key features and transformation of linear functions by constructing a unique image made up of Linear Equations on Desmos

Geometry (19 lessons)

Unit	Topic	CCSS	Objective
Congruence/ Similarity (8 lessons)	Introduce to Congruency	8.G.2 8.G.3	Today you will apply the definition of congruent polygons by finding missing side/angle measures on congruent polygons.
	Transformations- Translations	8.G.2 8.G.3	Today you will translate points on a coordinate plane by using ordered pair rules to translate a polygon.
	Transformations- Reflections	8.G.2 8.G.3	Today you will reflect points on a coordinate plane by using ordered pair rules to reflect a polygon.
	Transformations- Rotations	8.G.2 8.G.3	Today you will rotate points on a coordinate plane by using ordered pair rules to rotate a polygon about the origin.
	Similar Polygons	8.G.4 HSG.SRT	Today you will apply the definition of similar polygons by finding missing side and angle measures on similar polygons.

	Dilations and Scale Factor	7.G.1 8.G.4	Today you will use the scale factor of dilations to solve application problems involving similar figures or objects.
	Similarity, Congruence, Transformations	8.G.A HSG.SRT.B HSG.CO.A	Today you will determine if shapes are similar or congruent using your knowledge of transformations and their properties.
Angles and Lines (3 lessons)	Unknown Angles	7.G.B.5	Today you will use facts about supplementary, complementary, and adjacent angles in a multi-step problem to write and solve simple equations for an unknown angle in a figure.
	Prove Theorems about lines and angles	HSG.CO.C 7.G.B.5	Today you will prove theorems about lines and angles (including vertical angles, alternate interior angles, and corresponding angles)
	Prove Theorems about Triangles	HSG.CO.C	Today you will prove theorems about triangles (including measures of interior angles of a triangle and base angles of isosceles triangles).
Pythagorean Theorem (5 lessons)	The Pythagorean Theorem	8.G.6	Today you will apply the Pythagorean Theorem by finding missing side lengths of right triangles and using a diagram to justify the relationship between the sides of a right triangle.
	Converse of the Pythagorean Theorem	8.G.6	Today you will apply the converse of the Pythagorean Theorem by determining if triangles with known side lengths are right triangles.
	Pythagorean Theorem Word Problems	8.G.7	Today you will apply the Pythagorean Theorem to solve real-world problems by creating and solving your own word problems.
	The Distance Formula	8.G.8	Today you will derive and use the distance formula to find the distance between points on the coordinate plane by generalizing the Pythagorean Theorem to form a right triangle between two points.
	Equation of a Circle	8.G.8	Today you will derive and apply the equation of a circle by generalizing the Pythagorean Theorem to form a right triangle between the center of a circle and a point on the circle *advanced.
Trigonometry (4 lessons)	Trigonometric Ratios	HS.G.SRT.6	Today you will apply trigonometric ratios of right triangles by defining and finding the sine, cosine, and tangent ratios of right triangles.

	Using Trigonometric Ratios to Find Missing Measures	HS.G.SRT.8	Today you will find missing sides of right triangles by setting up and solving trigonometric equations.
	Applications of Trigonometric Ratios	HS.G.SRT.8	Today you will find the height of objects in application problems by using trigonometric ratios and the angle of elevation and depression.
	Indirect Measurement	HS.G.SRT.8	Today you will indirectly find the height of tall objects by setting up and solving trigonometric equations.