Crosswalk for 2014 GED® High Impact Indicators for Mathematical Reasoning to College and Career Readiness Standards with Connections to KY Skills U Lesson Bank

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High Impact Indicator	College and Career Readiness Standard	Connection in Lesson Bank
Q.1 Apply number sense concepts, including ordering rational numbers, absolute value, multiples, factors, and exponents		
Q.1.a | Order fractions and decimals, including ordering on a number line.	4.NF.2 | Compare two fractions with different numerators and different denominators, e.g., by creating common denominators or numerators, or by comparing to a benchmark fraction such as 1/2. Recognize that comparisons are valid only when the two fractions refer to the same whole. Record the results of comparisons with symbols >, =, or <, and justify the conclusions, e.g., by using a visual fraction model. (Level C-Fractions) 6.NS.6 | Understand a rational number as a point on the number line. Extend number line diagrams and coordinate axes familiar from previous grades to represent points on the line and in the plane with negative number coordinates. (Level D-Number Systems) 6.NS.7 | Understand ordering and absolute value of rational numbers. (Level D-Number Systems)	**CCR Levels B-C/NRS Levels 2-3** • Equivalent Fractions **CCR Levels C-D/NRS Levels 3-4** • Locate Points in the Coordinate Plane • Location, Location, Location: Navigating in the Coordinate Plane **CCR Level D/NRS Level 4** • Absolutely • Add and Subtract Integers • Adding Integers • Checkbook Integers • Converting Fractions to Decimals and Decimals to Fractions • Grid and Battleship • Introduction to Signed Numbers • Mean, Median, Mode, Range • Oxygen Needs by the Numbers • Positive and Negative Numbers

Q.1.b | Apply number properties involving multiples and factors, such as using the least common multiple, greatest common factor, or distributive property to rewrite numeric expressions.	6.NS.4 | Find the greatest common factor of two whole numbers less than or equal to 100 and the least common multiple of two whole numbers less than or equal to 12. Use the distributive property to express a sum of two whole numbers 1–100 with a common factor as a multiple of a sum of two whole numbers with no common factor. (Level C-Number Base Ten)	
Q.1.c | Apply rules of exponents in numerical expressions with rational exponents to write equivalent expressions with rational exponents.	8.EE.A.1 | Know and apply the properties of integer exponents to generate equivalent numerical expressions. For example, $3^2 \times 3^{-5} = 3^{-3} = 1/3^3 = 1/27$. (Level D-Expressions and Equations)	**CCR Level D/NRS Level 4** • Exponents, Roots, and Scientific Notation
Q.1.d | Identify absolute value or a rational number as its distance from 0 on the number line and determine the distance between two rational numbers on the number line, including using the absolute value of their difference.	7.NS.1 | Apply and extend previous understandings of addition and subtraction to add and subtract rational numbers; represent addition and subtraction on a horizontal or vertical number line diagram. (Level D-Number Systems) 7.NS.2 | Apply and extend previous understandings of multiplication and division and of fractions to multiply and divide rational numbers. (Level D-Number Systems)	**CCR Level D/NRS Level 4** • Add and Subtract Integers • Adding Integers • Checkbook Integers • Combining Operations • Grid and Battleship • Introduction to Signed Numbers • Positive and Negative Numbers
Q.3 Calculate and use ratios, percents and scale factors		
Q.3.a | Compute unit rates. Examples include (but are not limited to): unit pricing, constant speed, people per square mile, BTUs per cubic foot.	6.RP.3 | Use ratio and rate reasoning to solve real-world and mathematical problems, e.g., by reasoning about tables of equivalent ratios, tape diagrams, double number line diagrams, or equations. (Level D-Ratio and Proportional Reasoning) 6.RP.1 | Understand the concept of a ratio and use ratio language to describe a ratio relationship between two quantities. (Level C-Fractions)	**CCR Level C/NRS Level 3** • Time Management **CCR Levels C-D/NRS Levels 3-4** • Ratio and Proportion • Ratio and Proportion – Using a Double Number Line • Three Views of a Ratio: Using Unit Rate • Understanding Ratios: Using Ratio Tables
Q.3.b | Use scale factors to determine the magnitude of a size change. Convert between actual drawings and scale drawings.	7.G.1 | Solve problems involving scale drawings of geometric figures, including computing actual lengths and areas from a scale drawing and reproducing a scale drawing at a different scale. (Level D-Geometry)	**CCR Levels C-D/NRS Levels 3-4** • Analyze Proportional Relationships (Scale Factors) • Using Parts, Percents, and Wholes

Q.3.c | Solve multi-step real-world arithmetic problems using ratios or proportions including those that require converting units of measure.	6.RP.3 | Use ratio and rate reasoning to solve real-world and mathematical problems, e.g., by reasoning about tables of equivalent ratios, tape diagrams, double number line diagrams, or equations. (Level D-Ratio and Proportional Reasoning) 7.RP.1 | Compute unit rates associated with ratios of fractions, including ratios of lengths, areas and other quantities measured in like or different units. (Level D-Ratio and Proportional Reasoning) 7.RP.2 | Recognize and represent proportional relationships between quantities. (Level D-Ratio and Proportional Reasoning) 7.RP.3 | Use proportional relationships to solve multistep ratio and percent problems. Examples: simple interest, tax, markups and markdowns, gratuities and commissions, fees, percent increase and decrease, percent error. (Level D-Ratio and Proportional Reasoning)	**CCR Levels C-D/NRS Levels 3-4** • Percents and Pie Charts • Proportional Relationships • Ratio and Proportion – Using a Double Number Line • Rate • Real-Life Ratios and Rates • Types of Income • Understanding Ratios: Using Ratio Tables • What's Your Profit? **CCR Level D/NRS Level 4** • Budgeting with Math • Calculating Percent in Real-Life Situation • Education Pays • Math and Unit Conversions • Oxygen Needs by the Numbers • Proportional Relationships • Proportions for Trade Jobs • Real-Life Proportions
Q.3.d | Solve two-step real-world arithmetic problems involving percentages. Examples include (but are not limited to): simple interest, tax, markups and markdowns, gratuities and commissions, percent increase or decrease.	7.RP.3 | Use proportional relationships to solve multistep ratio and percent problems. Examples: simple interest, tax, markups and markdowns, gratuities and commissions, fees, percent increase and decrease, percent error. (Level D-Ratio and Proportional Reasoning)	**CCR Level D/NRS Level 4** • Calculating Percent in Real-Life Situations • Education Pays • Finding the Unknown Percent, Part, or Whole for Trade Jobs • Percent Applications
Q.4 Calculate dimensions, perimeter, circumference, and area of two-dimensional figures		
Q.4.a | Compute the area and perimeter of triangles and rectangles. Determine side lengths of triangles and rectangles when given area or perimeter.	7.G.6 | Solve real-world and mathematical problems involving area, volume and surface area of two- and three-dimensional objects composed of triangles, quadrilaterals, polygons, cubes, and right prisms. (Level D-Geometry)	**CCR Levels C-D/NRS Levels 3-4** • Calculating Perimeter and Area of a Rectangle • Circumference and Area of a Circle • Cover This (Finding Area) • Event Planning

Q.4.b	Compute the area and circumference of circles. Determine the radius or diameter when given area or circumference.	7.G.4	Know the formulas for the area and circumference of a circle and use them to solve problems; give an informal derivation of the relationship between the circumference and area of a circle. (Level D-Geometry)	**CCR Levels C-D/NRS Levels 3-4** • Circumference and Area of a Circle • Cover This (Finding Area) • Wrap It Up, Part 1 • Wrap It Up, Part 2 **CCR Level D/NRS Level 4** • Introduction to Circles **CCR Levels D-E/NRS Levels 5-6** • Divide and Conquer • Talking to the Problem: Questioning Techniques for Geometry
Q.4.c	Compute the perimeter of a polygon. Given a geometric formula, compute the area of a polygon. Determine side lengths of the figure when given the perimeter or area.	6.EE.2	Write, read, and evaluate expressions in which letters stand for numbers. (Level C-Operations and Algebraic Thinking) 7.G.6	Solve real-world and mathematical problems involving area, volume and surface area of two- and three-dimensional objects composed of triangles, quadrilaterals, polygons, cubes, and right prisms. (Level D-Geometry)	**CCR Levels C-D/NRS Levels 3-4** • Math Skills for Carpet & Tile Installation **CCR Level E/NRS Level 5** • Using Formulas in Real Life (including Geometry formulas)
Q.4.d	Compute perimeter and area of 2-D composite geometric figures, which could include circles, given geometric formulas as needed.	6.EE.2	Write, read, and evaluate expressions in which letters stand for numbers. (Level C-Operations and Algebraic Thinking) 7.G.6	Solve real-world and mathematical problems involving area, volume and surface area of two- and three-dimensional objects composed of triangles, quadrilaterals, polygons, cubes, and right prisms. (Level D-Geometry)	**CCR Levels D-E/NRS Levels 5-6** • Divide and Conquer

Q.4.e | Use the Pythagorean theorem to determine unknown side lengths in a right triangle.	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. (Level D-Geometry)	**CCR Level D/NRS Level 4** • Introduction to Pythagorean Theorem • Task-Based Pythagoras
Q.5 Calculate dimensions, surface area, and volume of three-dimensional figures		
Q.5.a | When given geometric formulas, compute volume and surface area of regular prisms. Solve for side lengths or height, when given volume or surface area.	6.EE.2 | Write, read, and evaluate expressions in which letters stand for numbers. (Level C-Operations and Algebraic Thinking) 7.G.6 | Solve real-world and mathematical problems involving area, volume and surface area of two- and three-dimensional objects composed of triangles, quadrilaterals, polygons, cubes, and right prisms. (Level D-Geometry)	**CCR Levels C-D/NRS Levels 3-4** • Wrap It Up, Part 1 (Note: Part of this lesson covers regular prisms)
Q.5.b | When given geometric formulas, compute volume and surface area of cylinders. Solve for height, radius, or diameter when given volume or surface area.	6.EE.2 | Write, read, and evaluate expressions in which letters stand for numbers. (Level C-Operations and Algebraic Thinking) 7.G.6 | Solve real-world and mathematical problems involving area, volume and surface area of two- and three-dimensional objects composed of triangles, quadrilaterals, polygons, cubes, and right prisms. (Level D-Geometry)	**CCR Levels C-D/NRS Levels 3-4** • Talking to the Problem: Questioning Techniques for Geometry • Wrap It Up – Part 2 (Note: Part of this lesson covers surface area of cylinders)
Q.5.c | When given geometric formulas, compute volume and surface area of right prisms. Solve for side lengths or height, when given volume or surface area.	6.EE.2 | Write, read, and evaluate expressions in which letters stand for numbers. (Level C-Operations and Algebraic Thinking) 7.G.6 | Solve real-world and mathematical problems involving area, volume and surface area of two- and three-dimensional objects composed of triangles, quadrilaterals, polygons, cubes, and right prisms. (Level D-Geometry)	**CCR Levels C-D/NRS Levels 3-4** • Wrap It Up - Part 1 (Note: Part of this lesson covers volume of right prisms)

Q.5.d | When given geometric formulas, compute volume and surface area of right pyramids and cones. Solve for side lengths, height, radius, or diameter when given volume or surface area.	6.EE.2 | Write, read, and evaluate expressions in which letters stand for numbers. (Level C-Operations and Algebraic Thinking) 7.G.6 | Solve real-world and mathematical problems involving area, volume and surface area of two- and three-dimensional objects composed of triangles, quadrilaterals, polygons, cubes, and right prisms. (Level D-Geometry)	**CCR Levels C-D/NRS Levels 3-4** • Talking to the Problem: Questioning Techniques for Geometry • Wrap It Up – Part 1 (Note: Part of this lesson covers surface area of pyramids) • Wrap It Up – Part 2 (Note: Part of this lesson covers surface area of cones)
Q.5.e | When given geometric formulas, compute volume and surface area of spheres. Solve for radius or diameter when given the surface area.	6.EE.2 | Write, read, and evaluate expressions in which letters stand for numbers. (Level C-Operations and Algebraic Thinking) G.GMD.3 | Know the formulas for the volumes of cones, cylinders, and spheres and use them to solve real-world and mathematical problems. (Level E-Geometry)	**CCR Levels C-D/NRS Levels 3-4** • Wrap It Up – Part 1 (Note: Part of this lesson covers volume of spheres) • Wrap It Up – Part 2 (Note: Part of this lesson covers surface area of spheres)
Q.5.f | Compute surface area and volume of composite 3-D geometric figures, given geometric formulas as needed.	6.EE.2 | Write, read, and evaluate expressions in which letters stand for numbers. (Level C-Operations and Algebraic Thinking) G.GMD.3 | Know the formulas for the volumes of cones, cylinders, and spheres and use them to solve real-world and mathematical problems. (Level E-Geometry)	**CCR Levels D-E/NRS Levels 4-5** • Divide and Conquer
A.3 Write, manipulate, solve, and graph linear inequalities		
A.3.a | Solve linear inequalities in one variable with rational number coefficients.	A-REI.3 | Solve linear equations and inequalities in one variable, including equations with coefficients represented by letters. (Level E-Algebra)	
A.3.b | Identify or graph the solution to a one variable linear inequality on a number line.	8.EE.6 | Use similar triangles to explain why the slope m is the same between any two distinct points on a nonvertical 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. (Level E-Algebra) A-REI.C.6 | Solve systems of linear equations exactly and approximately (e.g., with graphs), focusing on pairs of linear equations in two variables. (Level E-Algebra)	

A.3.c | Solve real-world problems involving inequalities.	7.EE.4 | Use variables to represent quantities in a real-world or mathematical problem, and construct simple equations and inequalities to solve problems by reasoning about the quantities. (Level D-Expressions and Equations)	
A.3.d | Write linear inequalities in one variable to represent context.	6.EE.6 | Use variables to represent numbers and write expressions when solving a real-world or mathematical problem; understand that a variable can represent an unknown number, or, depending on the purpose at hand, any number in a specified set. (Level C-Operations and Algebraic Thinking) A-CED.1 | Create equations and inequalities in one variable and use them to solve problems. Include equations arising from linear and quadratic functions, and simple rational and exponential functions. (Level E-Algebra) A-CED.2 | Create equations in two or more variables to represent relationships between quantities; graph equations on coordinate axes with labels and scales. (Level E-Algebra)	
A.7 Compare, represent, and evaluate functions		
A.7.a | Compare two different proportional relationships represented in different ways. Examples include but are not limited to: compare a distance-time graph to a distance-time equation to determine which of two moving objects has a greater speed.	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. (Level D-Expressions and Equations)	**CCR Levels C-D/NRS Levels 3-4** • Three Views of a Ratio: Using Unit Rate **CCR Level D/NRS Level 4** • Real-Life Proportions **CCR Levels D-E/NRS Levels 4-5** • How Steep Is It?

A.7.b | Represent or identify a function in a table or graph as having exactly one output (one element in the range) for each input (each element in the domain).	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. (Level D-Functions) F-IF.1 | Understand that a function from one set (called the domain) to another set (called the range) assigns to each element of the domain exactly one element of the range. If f is a function and x is an element of its domain, then f(x) denotes the output of f corresponding to the input x. The graph of f is the graph of the equation y = f(x). (Level E-Functions)	**CCR Levels B-C/NRS Levels 2-3** • Funky Functions **CCR Level D/NRS Level 4** • Funky Equations of the Line • Funky Patterns **CCR Levels D-E/NRS Levels 4-5** • Funky Town Festival • Y=MX + B (Just how FUNKY IS THAT?)
A.7.c | Evaluate linear and quadratic functions for values in their domain when represented using function notation.	F-IF.2 | Use function notation, evaluate functions for inputs in their domains, and interpret statements that use function notation in terms of a context. (Level E-Functions)	
A.7.d | Compare properties of two linear or quadratic functions each represented in a different way (algebraically, numerically in tables, graphically or by verbal descriptions). Examples include but are not limited to: 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.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. (Level E-Functions) F-IF.9 | Compare properties of two functions each represented in a different way (algebraically, graphically, numerically in tables, or by verbal descriptions). For example, given a graph of one quadratic function and an algebraic expression for another, say which has the larger maximum. (Level E-Functions)	**CCR Levels D-E/NRS Levels 4-5** • How Steep Is It?