Checkpoint 3 Performance Level Descriptors: Mathematics (Grades 6-8)

The LEARN Performance Level Descriptors (PLDs) reflect the learning path for each standard based on students' natural progression of skills and levels of thinking for specific content. These learning progressions should be used to assess and teach students at various developmental levels. The ILEARN PLDs present learning progressions for each assessed standard. They are divided into four "buckets" in alignment with the ILEARN proficiency levels: Below Proficiency, Approaching Proficiency, At Proficiency, and Above Proficiency.

This PLD map represents the Checkpoint 3 standards assessed in grades six through eight, organized by domain and vertically aligned. Students may move through the learning progressions of each concept in various ways depending on the current knowledge they possess. Using the ILEARN Checkpoint student-level proficiency data for each reporting category alongside classroom assessments, educators can pinpoint where students are along the continuum of each standard's learning progression. Using high-quality teaching practices and materials, educators can support student growth horizontally across proficiency levels or vertically between grade levels. The ILEARN Item Specifications and 2023 Math Frameworks can assist educators in further defining each proficiency level and providing high-quality instruction.For more support using and interpreting PLDs, visit the PLD Guide.

Ratios and Proportions					
Standard	**Reporting Category: Subdomain**	**Below**	**Approaching**	**At**	**Above**
6.RP.2 Understand the concept of a unit rate and use terms related to rate in the context of a ratio relationship.	Working with Ratios	Identify a unit rate in a real-world context.	Determine the unit rate when given a ratio or a ratio relationship expressed as a model.	Calculate a rate using a given unit rate, or conversely, calculate a unit rate using a given rate within a real-world situation.	Apply knowledge of unit rates and rates to reason through, critique, and justify steps to solving a problem.
6.RP.4 Solve real-world and other mathematical problems involving rates and ratios using models and strategies such as reasoning about tables of equivalent ratios, tape diagrams, double number line diagrams, or equations. (E)	Solving Problems with Rates, Ratios, and Proportions	Identify a model that represents a real-world or mathematical ratio problem.	Solve a real-world or mathematical rate or ratio problem given a model.	Solve a real-world ratio problem using any ratio model or strategy; OR use ratios and ratio models to justify thinking.	Compare two or more ratios to solve a real-world problem.

Standard	Reporting Category: Subdomain	Below	Approaching	At	Above
7.RP.2 Use proportional relationships to solve ratio and percent problems with multiple operations (e.g., simple interest, tax, markups, markdowns, gratuities, conversions within and across measurement systems, and percent increase and decrease). (E) *(Checkpoint 2)*	Proportional Relationships	Use multiplication or addition to find missing ratio values in simple mathematical problems involving ratio or percent.	Analyze and apply proportional relationships to solve simple real-world and mathematical problems, including simple ration/percent problems.	Analyze and apply proportional relationships to solve more complex or multi-step real-world and mathematical problems.	Analyze and apply proportional relationships to solve complex real-world and mathematical problems, including working backwards problems to find the original cost/value.
Concept ends in grade seven.					

Standard	Reporting Category: Subdomain	Below	Approaching	At	Above
Concept directly aligns back to 5.CA.11.					
6.RP.3 Make tables of equivalent ratios relating quantities with whole-number measurements, find missing values in the tables, and plot the pairs of values on the coordinate plane.	Working with Rates and Ratios	Identify ratios in real-world context and determine if they represent part-to-part or part-to-whole; OR identify or write equivalent ratios.	Calculate the ratio represented in a table of values and determine missing values; OR plot pairs of values from a ratio table on a coordinate plane.	Solve mathematical or real-world problems using a table or graph that represents equivalent ratios; OR construct an equivalent table of ratios when given a ratio.	Analyze errors when creating a table of equivalent ratios or plotting ratios on a coordinate plane; OR compare and contrast ratios when given two or more different ratio tables.
7.RP.1 Identify the unit rate or constant of proportionality in tables, graphs, equations, and verbal descriptions of proportional relationships.	Proportional Relationships	Identify whether two quantities are in a proportional relationship.	Identify a unit rate or constant of proportionality given a verbal description, table or graph with the pair (1, r)	Calculate a unit rate or constant of proportionality given tables, graphs, equations, or verbal descriptions.	Interpret the unit rate or constant of proportionality given a table, graph, equation or a verbal description of a

(Checkpoint 2)			included as an entry in the table or point on the graph.		proportional relationship in context. Use the unit rate or constant of proportionality to solve problems or make predictions in context.
			Concept ends in grade seven.		

Standard	Reporting Category: Subdomain	Below	Approaching	At	Above
6.RP.5 Use variables to represent two quantities in a proportional relationship in a real-world problem; write an equation to express one quantity, the dependent variable, in terms of the other quantity, the independent variable. Analyze the relationship between the dependent and independent variables using graphs and tables, and relate these to the equation. (E)	Solving Problems with Rates, Ratios, and Proportions	Identify the independent and dependent variables in a real-world situation.	Complete a table of values to represent a proportional relationship in a real-world situation; OR analyze the relationship between the independent and dependent values in a table to identify an equation expressing the dependent variable in terms of the independent variable.	Analyze the relationship between the independent and dependent values of a real-world situation to write an equation and represent it graphically; OR solve real-world problems using the relationship between the independent and dependent variables.	Critique statements made about a proportional relationship.
7.AF.5 Define slope as vertical change for each unit of horizontal change, and apply that a constant rate of change or constant slope describes a linear function. Identify and describe situations with	Slope	Analyze and classify graphs or tables as representing a constant or variable rate of change without computation. Interpret the meaning of slope as the amount of	Analyze given situations to identify those that represent a constant rate of change modeled by a linear function or a varying rate of change.	Analyze situations in context to determine if they model constant or varying rates of change resulting in linear or nonlinear functions and use reasoning about	Analyze the rate of change from a given situation or graph, including zero change. Interpret, explain, and/or compare various situations to determine if

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constant or varying rates of change. *(Checkpoint 2)*		vertical change for each horizontal change.		slope, rates of change, and linear functions to justify responses.	they can be modeled by a linear function.
7.AF.6 Graph a line given its slope and a point on the line. Find the slope of a line given its graph. (E) *(Checkpoint 2)*	Slope	Determine if the slop of a given graph is positive, negative, 0, or undefined.	IFind the slope of a line given its graph.	Graph a line given its slope and a point on the line.	Determine the slope of a line in the context of a real-world situation. Identify additional points on a line when given the slope and one point.
8.AF.3 Understand that a function assigns to each x-value (independent variable) exactly one y-value (dependent variable), and that the graph of a function is the set of ordered pairs (x,y)**.** *(Checkpoint 2)*	Functions	Identify the independent and dependent variables given a table, graph, or set of ordered pairs.	Define the meaning of a function, OR Identify characteristics of a function using a set of ordered pairs.	Apply understanding of functions to determine if a relation is a function or nonfunction.	Explain whether a given representation of a relation in a real-world situation is a function or is not a function, OR Critique an explanation determining if a relation in any form is a function.
8.AF.4 Describe qualitatively the functional relationship between two quantities by analyzing a graph (e.g., where the function is increasing or decreasing, linear or nonlinear, has a maximum or minimum value). Sketch a graph that exhibits the qualitative features of a function that has been verbally described. (E) *(Checkpoint 2)*	Functions	Identify a qualitative description given a graph, or a graph given a qualitative description, with no context.	Identify a qualitative description given a graph, or a graph given a qualitative description, within a context.	Construct the graph of a function that matches a given qualitative description.	Use knowledge of qualitative descriptions to interpret and draw conclusions about given graphs within context, OR Sketch a graph of a function given qualitative data in the form of real-world data in context.
Concept continues in AI.NS.3, AI.NS.4, AI.L.2, AI.L.3, and AI.QE.5.					

Algebra and Functions					
Standard	**Reporting Category: Subdomain**	**Below**	**Approaching**	**At**	**Above**
6.NS.7 Apply the properties of operations (i.e., identity, inverse, commutative, associative, distributive properties) to create equivalent linear expressions and to justify whether two linear expressions are equivalent when the two expressions name the same number regardless of which value is substituted into them. (E) *(Checkpoint 2)*	Expressions and Data Analysis	Identify and name a variable, coefficient, constant, and term within a given algebraic expression. Combine like terms or decompose a term to write or identify equivalent expressions.	Apply the associative or commutative properties to identify or write equivalent expressions.	Apply the distributive property to create or identify equivalent expressions. Apply a combination of properties, combining like terms or decomposing terms to identify or write equivalent expressions. Justify whether two expressions are equivalent using substitution.	Apply properties of operations, combining like terms, or decomposing terms to write multiple equivalent equations.
7.AF.1 Apply the properties of operations (e.g., identity, inverse, commutative, associative, distributive properties) to create equivalent linear expressions, including situations that involve factoring out a common number (e.g., given 2x - 10, create an equivalent expression 2(x - 5)). Justify each step in the process. (E)	Expressions, Equations, and Inequalities	Apply properties of operations as strategies to find missing values of equivalent linear expressions using addition and subtraction. Identify the correct steps in the process or the property applied.	Apply properties of operations as strategies to identify equivalent linear expressions by factoring or applying the distributive property. Identify the correct steps in the process or the property applied.	Apply properties of operations as strategies to construct equivalent linear expressions by factoring, expansion, and/or addition and subtraction. Justify each step in the process.	Apply properties of operations as strategies to identify or create multiple equivalent linear expressions by factoring, expansion, or addition and subtraction. Justify each step in the process.
Concept ends in grade seven.					

Standard	Reporting Category: Subdomain	Below	Approaching	At	Above
Concept directly aligns back to 5.CA.3 - 10.					
6.NS.4 Solve real-world problems with positive fractions and decimals by using one or two operations. (E) *(Checkpoint 1)*	Operations with Positive Numbers	Compute fluently with positive fractions and decimals.	Solve one-step real-world problems with positive fractions or decimals and one operation.	Solve two-step real-world problems with positive fractions or decimals and two operations.	Evaluate the reasoning of or critique an argument involving the solution to a two-step real-world problem.
7.AF.2 Solve real-world problems with rational numbers by using one or two operations. (E)	Expression, Equations, and Inequalities	Identify expressions or steps to solving real-world problems with rational numbers using one or two operations.	Solve real-world problems with rational numbers using one operation.	Solve real-world problems with rational numbers using two operations.	Evaluate the reasoning or critique an argument involving generalizations and solutions to mathematical or real-world problems with rational numbers using two operations.
8.NS.4 Solve real-world problems with rational numbers by using multiple operations. (E) *(Checkpoint 1)*	Real Numbers	Identify expressions or steps to solving real-world problems with rational numbers and two or more steps.	Solve real-world problems that involve rational numbers and two steps.	Solve real-world problems that involve rational numbers and three or four steps.	Solve complex, real-world problems that involve several steps.
Concept continues in several Algebra I standards.					
Standard	Reporting Category: Subdomain	Below	Approaching	At	Above
6.AF.3 Solve equations of the form x + p = q, x - p = q, px = q, and x/p = q fluently for cases in	Equations and Inequalities	Represent a real-world problem using equations of the form x + p = q, x - p	Solve equations of the form x + p = q, x - p = q, px = q, and x/p = q	Solve a real-world problem using equations of the form x + p = q, x - p	Represent and solve a real-world problem using equations of the form x +

which p, q and x are all nonnegative rational numbers. Represent real-world problems using equations of these forms and solve such problems. (E) *(Checkpoint 2)*		= q, px = q, and x/p = q for cases in which p, q and x are all nonnegative rational numbers.	fluently for cases in which p, q and x are all nonnegative rational numbers.	= q, px = q, and x/p = q for cases in which p, q and x are all nonnegative rational numbers.	p = q, x - p = q, px = q, and x/p = q for cases in which p, q and x are all nonnegative rational numbers. Describe the solution in the context of the problem.
7.AF.3 Solve equations of the form px + q = r and p(x + q) = r fluently, where p, q, and r are specific rational numbers. Represent real-world problems using equations of these forms and solve such problems. (E)	Expressions, Equations, and Inequalities	Identify numbers as solutions to linear equations of the form px + q = r and p(x + q) = r, where p, q, and r are specific rational numbers.	Solve equations of the form px + q = r and p(x + q) = r fluently, where p, q, and r are specific rational numbers; OR identify linear equations that represent a real-world problem.	Represent and solve real-world problems leading to equations of the form px + q = r and p (x + q) = r where p, q, and r are rational numbers.	Represent a real-world problem using more than one equation that simplifies to the form px + q = r and p (x + q) = r where p, q and r are rational numbers. Explain whether a solution to a given problem is reasonable. Compare an algebraic solution to an arithmetic solution, analyzing the sequence of the operations used in each approach.
8.AF.1 Solve linear equations and inequalities with rational number coefficients fluently, including those whose solutions require expanding expressions using the distributive property and collecting like terms. Represent real-world problems using linear equations and inequalities in one variable and solve such problems. (E)	Linear Equations and Inequalities	Identify the solution to linear equations and inequalities in one variable and with rational number coefficients to solve mathematical or real-world problems.	Solve linear equations and inequalities in one variable with rational number coefficients. Create and solve linear equations or inequalities in one variable with rational number coefficients to model a real-world problem.	Create and solve linear equations and inequalities in one variable with rational number coefficients, including solutions that require expanding expressions using the distributive property and collecting like terms to solve mathematical and real-world problems.	Use complex linear equations and equalities to solve real-world problems and justify solutions.

(Checkpoint 1)					
8.AF.2 Generate linear equations in one variable with one solution, infinitely many solutions, or no solutions. Justify the classification given. *(Checkpoint 1)*	Linear Equations and Inequalities	Given the solution to a linear equation or a one-step linear equation, classify the equation as having one solution, infinitely many solutions, or no solutions.	Solve a simple multi-step linear equation and classify the equation as having one solution, infinitely many solutions, or no solutions.	Generate a linear equation that has one solution, infinitely many solutions, or no solutions. Solve complex multi-step linear equations and classify each equation as having one solution, infinitely many solutions, or no solutions.	Analyze and justify a claim about the number of solutions to a multi-step linear equation.

Concept continues in AI.L.1 and AI.L.2.

Standard	Reporting Category: Subdomain	Below	Approaching	At	Above
6.AF.4 Write an inequality of the form x > c, x ≥ c, x < c, or x ≤ c, where c is a rational number, to represent a constraint or condition in a real-world or other mathematical problem. Explain that inequalities have infinitely many solutions and how to represent solutions on a number line diagram. *(Checkpoint 2)*	Equations and Inequalities	Match an inequality of the form x > c, x ≥ c, x < c, or x ≤ c to a solution graphed on a number line.	Write inequalities of the form x > c, x ≥ c, x < c, or x ≤ c to represent a constraint in a mathematical problem.	Write inequalities of the form x > c, x ≥ c, x < c, or x ≤ c to represent a constraint or condition in a real-world or mathematical problem. Represent solutions of inequalities on a number line. Explain that inequalities have infinitely many solutions and how to represent solutions on a number line diagram.	Given two constraints or conditions within a real-world problem, identify or write a pair of inequalities to represent each. Explain each inequality within the context of the problem.
7.AF.4 Solve inequalities of the form px + q (> or ≥) r or px + q	Expressions, Equations,	Solve inequalities of the form px + q > r or px + q	Solve inequalities of the form px + q ≥ r or px + q	Solve real-world problems involving	Critique a solution to a real-world problem for

(< or ≤) r, where p, q, and r are specific rational numbers. Represent real-world problems using inequalities of these forms and solve such problems. Graph the solution set of the inequality and interpret it in the context of the problem.	and Inequalities	< r, where p, q, and r are specific rational numbers: OR identify the correct graph of the solution to a given inequality.	≤ r, where p, q, and r are specific rational numbers: OR construct the correct graph of the solution to a given inequality. Determine if given rational numbers are in the solution set of an inequality.	inequalities of the form px + q (> or ≥) r or px + q (< or ≤) r, where p, q, and r are rational numbers. Graph the solution set of the inequality and interpret it in the context of the problem.	accuracy or reasonableness and justify arguments by applying understanding of inequalities.
8.AF.1 Solve linear equations and inequalities with rational number coefficients fluently, including those whose solutions require expanding expressions using the distributive property and collecting like terms. Represent real-world problems using linear equations and inequalities in one variable and solve such problems. (E) *(Checkpoint 1)*	Linear Equations and Inequalities	Identify the solution to linear equations and inequalities in one variable and with rational number coefficients to solve mathematical or real-world problems.	Solve linear equations and inequalities in one variable with rational number coefficients. Create and solve linear equations or inequalities in one variable with rational number coefficients to model a real-world problem.	Create and solve linear equations and inequalities in one variable with rational number coefficients, including solutions that require expanding expressions using the distributive property and collecting like terms to solve mathematical and real-world problems.	Use complex linear equations and equalities to solve real-world problems and justify solutions.
Concept continues in AI.L.1.					

Geometry and Measurement					
Standard	**Reporting Category: Subdomain**	**Below**	**Approaching**	**At**	**Above**
Concept directly aligns back to 5.M.1.					
6.GM.1 Convert between	Working with	Identify an expression	Convert between different	Solve real-world	Solve multi-step, real

measurement systems (Customary to metric and metric to Customary) given the conversion factors, and use these conversions in solving real-world problems.	Rates and Ratios	that can be used to find an equivalent measure in a different measurement system.	measurement systems in a mathematical context.	problems involving converting units between measurement systems.	world problems involving unit conversions between measurement systems.
7.GM.1 Solve real-world and other mathematical problems involving scale drawings of geometric figures, including computing actual lengths and areas from a scale drawing. Create a scale drawing by using proportional reasoning. *(Checkpoint 2)*	Proportional Relationships	Identify the scale factor of a smaller figure to a larger figure when given scale drawings of geometric figures.	Solve problems using a scale drawing of a geometric figure given the scale factor.	Solve problems involving scale drawings of geometric figures, such as computing actual lengths and areas from a scale drawing and reproducing a scale drawing at a different scale. Justify scale drawings using proportional reasoning.	Solve problems that involve applying multiple scale factors and justify scale drawings using proportional reasoning.

Concept ends in grade seven.

Standard	Reporting Category: Subdomain	Below	Approaching	At	Above
		Concept directly aligns back to 5.M.2 and 5.M.3.			
6.GM.3 Find the area of complex shapes composed of polygons by composing or decomposing into simple shapes; apply this technique to solve real-world and other mathematical problems.	Solving Problems	*Summative Only*			
7.GM.2 Understand the	Geometry	Calculate the area or	Calculate the radius,	Apply the formulas for the	Apply knowledge of the

formulas for area and circumference of a circle and use them to solve real-world and other mathematical problems; give an informal derivation of the relationship between circumference and area of a circle.		circumference of a circle, given the radius or diameter.	diameter, or area of a circle when given the circumference; OR calculate the radius, diameter, or circumference of a circle when given the area of a circle in terms of π.	area and circumference of a circle to solve problems.	area and circumference of a circle or the informal derivation of the relationship between the two to solve complex problems.
Concept ends in grade seven.					

Standard	Reporting Category: Subdomain	Below	Approaching	At	Above
Concept directly aligns back to 5.M.4 and 5.M.5.					
6.GM.4 Find the volume of a right rectangular prism with fractional edge lengths using unit cubes of the appropriate unit fraction edge lengths (e.g., using technology or concrete materials) and show that the volume is the same as would be found by multiplying the edge lengths of the prism. Apply the formulas V = lwh and V = Bh to find volumes of right rectangular prisms with fractional edge lengths to solve real-world and other mathematical problems. (E)	Solving Problems	*Summative Only*			
7.GM.3 Solve real-world and	Geometry	Calculate the volume of	Calculate the height or	Solve real-world and	Solve real-world and

Standard	Reporting Category: Subdomain	Below	Approaching	At	Above
other mathematical problems involving volume of cylinders and three-dimensional objects composed of right rectangular prisms. (E)		cylinders and three-dimensional objects composed of right rectangular prisms in a mathematical problem.	radius of a cylinder when given the volume of the cylinder and one other measurement; OR calculate a missing side length of a three-dimensional object composed of right rectangular prisms.	other mathematical problems involving finding the volume of cylinders and three-dimensional objects composed of right rectangular prisms.	other mathematical problems involving calculating the height or or radius of a cylinder or calculating a missing side length of a three-dimensional object composed of right rectangular prisms.
8.GM.2 Solve real-world and other mathematical problems involving volume of cones, spheres, and pyramids and surface area of spheres. (E)	Geometry	Calculate the volume of cones, spheres, and pyramids and the surface area of spheres in a mathematical problem.	Calculate missing dimensions of cones, spheres or pyramids using the formulas for volume or surface area.	Solve real-world problems by applying the formulas for the volume of cones, spheres, or pyramids or the surface area of a sphere.	Apply the volume formulas of cones, spheres, and pyramids to solve real-world and mathematical problems in which the volume of one shape must be used to determine the volume of another shape. Apply the surface area formula of a sphere to find the volume of the sphere.

Concept continues in G.TS.4.

Standard	Reporting Category: Subdomain	Below	Approaching	At	Above
8.GM.1 Explore dilations, translations, rotations, and reflections on two-dimensional figures in the coordinate plane. (E)	Geometry	Identify the type of transformation used to create a similar figure on a given coordinate plane.	Identify the coordinates of a point or the specific transformation of an image after a transformation is	Perform a single transformation (dilation, translation, rotation, or reflection) on a coordinate plane using	Perform a multi-step transformation using a combination of dilations, translations, rotations, and reflections on a

			performed.	given information and determine the coordinates of the new figure.	coordinate plane; OR analyze the new figure to determine the effects of the transformation on the attributes of the figure.

Concept continues in G.TS.1 and G.TS.2

Standard	Reporting Category: Subdomain	Below	Approaching	At	Above
8.GM.3 Apply the Pythagorean Theorem to determine unknown side lengths in right triangles in real-world and other mathematical problems in two dimensions. (E)	Geometry	Identify or write the Pythagorean Theorem for a given triangle.	Apply the Pythagorean Theorem to find the hypotenuse of a right triangle in real-world or other mathematical problems in two dimensions.	Apply the Pythagorean Theorem to determine unknown side lengths of right triangles to solve real-world problems.	Apply the Pythagorean Theorem to solve real-world and mathematical problems involving two- and three-dimensional shapes composed of at least one right triangle.

Concept continues in G.T.5 and G.T.7.

Geometry and Measurement					
Standard	Reporting Category: Subdomain	Below	Approaching	At	Above
8.DSP.1 Construct and interpret scatter plots for bivariate measurement data to investigate patterns of association between two	Functions	Accurately identify positive, negative, or no association between two quantities using a scatter plot.	Identify more than one characteristic of a data set, such as outliers, positive or negative association, linear	Construct and interpret scatter plots for bivariate measurement data to investigate patterns of association between two	Analyze patterns of association between two quantities and use data to critique responses; OR create a scatter plot to

quantitative variables. Describe patterns such as clustering, outliers, positive or negative association, linear association, and nonlinear association.			association, and nonlinear association.	quantities, AND describe patterns such as clustering, outliers, positive or negative association, linear association, and nonlinear association.	represent given descriptors.
8.DSP.2 Write and use equations that model linear relationships to make predictions, including interpolation and extrapolation, in real-world situations involving bivariate measurement data. Interpret the slope and y-intercept in context. (E)	Functions	Interpret the slope and y-intercept of a line of best fit, with slope and/or intercept parameter identified, in terms of the context.	Interpret the slope and intercept of a modeling equation in terms of the context.	Solve problems about the slope and intercept of a line of best fit in terms of the context.	Justify the reasonableness of the predictions in the context of the bivariate measurement data.
Concepts continue in AI.DS.3 and AI.DS.4.					