Target Sampling Mathematics Grade 8						
Claim	Content Category	Assessment Targets	DOK	Items		Total Items
				CAT	PT	
1. Concepts and Procedures	Priority Cluster	**C. Understand the connections between proportional relationships, lines, and linear equations.** (Target Description) Tasks for this target will ask students to graph one or more proportional relationships and connect the unit rate(s) to the context of the problem. Other tasks will ask students to apply understanding of the relationship between similar triangles and slope. (Evidence Required) 1. The student graphs proportional relationships. 2. The student interprets the unit rate as the slope of the graph of a proportional relationship. 3. The student compares two different proportional relationships represented in different formats. 4. The student finds the equation $y = mx$ or $y = mx + b$ for a line. (Range ALDs) **Level 1** Students should be able to graph a proportional relationship on a coordinate plane. **Level 2** Students should be able to compare two different proportional relationships represented in different ways. They should also be able to calculate the slope of a line and identify the y-intercept of a line. **Level 3** Students should understand that slope is a unit rate of change in a proportional relationship, and convert proportional relationships to linear equations in slope-intercept form while also understanding when and why the y-intercept is zero. They should also be able to use repeated reasoning to observe that they can use any right triangle to find the slope of a line. **Level 4** Students should be able to use similar triangles to explain why the slope is the same between any two distinct points on a non-vertical line in a coordinate plane.	1, 2	5-6	0	17-20
		D. Analyze and solve linear equations and pairs of simultaneous linear equations. (Target Description) Tasks for this target will ask students to solve linear equations in one variable and recognize when one, infinite, or no solutions exist. Some problems will require students to apply the distributive property and collect like terms. Tasks for this target will also ask students to solve systems of two linear	1,2			

Target Sampling Mathematics Grade 8						
Claim	Content Category	Assessment Targets	DOK	Items		Total Items
				CAT	PT	
		equations in two variables algebraically and estimate solutions graphically. Some problems will ask students to recognize simple cases of two equations that represent the same line or that have no solution. This target may be combined with 8.F Target F to create problems where students determine a point of intersection given an initial value and rate of change, including cases where no solution exists. Real-world and mathematical problems that lead to two linear equations in two variables will be assessed in connection with targets from Claims 2 and 4. (Evidence Required) 1. The student identifies and writes examples of linear equations in one variable with one solution, infinitely many solutions, or no solutions. 2. The student solves linear equations in one variable with rational coefficients, including equations with solutions that require expanding expressions using the distributive property and collecting like terms. 3. The student estimates solutions by graphing systems of two linear equations in two variables. 4. The student recognizes when a system of two linear equations in two variables has one solution, no solution, or infinitely many solutions. 5. The student solves a system of two linear equations in two variables algebraically, or solves real-world and mathematical problems leading to two linear equations in two variables. (Range ALDs) **Level 1** Students should be able to solve linear equations in one variable with integer coefficients. **Level 2** Students should be able to analyze and solve systems of linear equations graphically by understanding that the solution of a system of linear equations in two variables corresponds to the point of intersection on a plane. They should be able to solve and produce examples of linear equations in one variable with rational coefficients with one solution, infinitely many solutions, or no solution. **Level 3** Students should be able to classify systems of linear equations as having graphs that are intersecting, collinear, or parallel; solve linear systems algebraically and estimate solutions using a variety of approaches; and show that a linear equation in one variable has one solution, no solution, or infinitely many solutions by successively transforming the given equation into				

Target Sampling Mathematics Grade 8						
Claim	Content Category	Assessment Targets	DOK	Items		Total Items
				CAT	PT	
		simpler forms until an equivalent equation of the form *x* = *a*, *a* = *a*, or *a* = *b* results (where *a* and *b* are different numbers). They should be able to solve and produce examples of linear equations in one variable, including equations whose solutions require expanding expressions using the distributive property and collecting like terms. **Level 4** Students should be able to analyze and solve problems leading to two linear equations in two variables in multiple representations.				
		B. Work with radicals and integer exponents. (Target Description) Tasks for this target will require students to select or produce equivalent numerical expressions based on properties of integer exponents. Other tasks will ask students to solve simple equations whose solutions can be expressed as square and cube roots, often expressing their answers approximately, using one of the approximations from 8.NS Target A. Other tasks will ask students to represent very large and very small quantities in scientific notation, and perform operations on numbers written in scientific notation. (Evidence Required) 1. The student generates equivalent numerical expressions by applying the properties of integer exponents. 2. The student represents solutions to equations of the form $x^2 = p$ using square root symbols. 3. The student represents solutions to equations of the form $x^3 = p$ using cube root symbols. 4. The student states how many times as large or as small one number, written as a single digit times a power of 10, is than another, to estimate very large or very small quantities. 5. The student performs operations with numbers expressed in scientific notation, including problems where both decimal and scientific notation are used. (Range ALDs) **Level 1** Students should be able to identify and calculate square roots of familiar perfect squares and calculate the square of integers. They should be able to translate between standard form and scientific notation.	1, 2	5-6		

Target Sampling Mathematics Grade 8						
Claim	Content Category	Assessment Targets	DOK	Items CAT	Items PT	Total Items
		Level 2 Students should be able to identify and calculate the cube root of familiar perfect cubes and calculate the cube of integers. They should be able to use appropriate tools (e.g., calculator, pencil and paper) to translate large or small numbers from scientific to standard notation. They should be able to work with and apply the properties of integer exponents of degree 2 or less in order to produce or identify equivalent numerical expressions. **Level 3** Students should be able to identify that the square root of 2 is irrational, calculate or approximate to an appropriate degree of precision the square or cube of a rational number, solve quadratic and cubic monomial equations, and represent the solution as a square or cube root, respectively. They should be able to work with and perform operations with scientific notation and work with and apply the properties of integer exponents in order to produce or identify equivalent numerical expressions. **Level 4** Students should be able to use scientific notation and choose units of appropriate size for realistic measurements, solve binomial quadratic and cubic equations, and represent the solution as a square or cube root, respectively.				
		E. Define, evaluate, and compare functions. (Target Description) Tasks associated with this target ask students to relate different representations of functions (equations, graphs, tables, or verbal descriptions). Some tasks for this target will ask students to produce or identify input and output pairs for a given function. Other tasks will ask students to compare properties of linear functions (e.g., rate of change or initial value). Other tasks should ask students to classify functions as linear or nonlinear when expressed in any of the representations listed above. Some of these may be connected to 8.SP Target J. (Evidence Required) 1. The student recognizes that a function is a rule that assigns to each input exactly one output. 2. The student identifies or produces input and output pairs for given functions. 3. The student recognizes the same function written in different functional forms (algebraic, graphic, tabular, or verbal). 4. The student compares properties of two functions, each represented in a	1, 2			

Target Sampling Mathematics Grade 8						
Claim	Content Category	Assessment Targets	DOK	Items		Total Items
				CAT	PT	
		different way (algebraic, graphic, tabular, or verbal). 5. The student recognizes and gives examples of functions that are not linear. (Range ALDs) **Level 1** Students should be able to identify whether or not a relationship that is represented graphically, in a table, or algebraically, is a function. They should be able to compare the properties of two linear functions represented in the same way (graphically or in a table). **Level 2** Students should be able to produce input and output pairs for a given function and identify whether an input/output pair satisfies a function. They should be able to compare properties of two functions represented in the same way (algebraic, graphic, tabular, or verbal). They should be able to classify functions as linear or nonlinear on the basis of their graph. **Level 3** Students should be able to classify functions as linear or nonlinear in different forms (e.g., graphical, algebraic, verbal description, and/or tabular) and should know linear equations of the form $y = mx + b$ are functions. They should also be able to define a function as a rule that assigns to each input exactly one output. They should be able to compare properties of two functions represented in different ways (algebraic, graphic, tabular, or verbal). **Level 4** Students should be able to give examples of functions that are not linear and be able to compare properties of two nonlinear functions represented in different ways (algebraic, graphic, tabular, or verbal).				
		G. Understand congruence and similarity using physical models, transparencies, or geometry software. (Target Description) Technology enhanced items will be used to allow students to "draw" lines, line segments, angles, and parallel lines after undergoing rotations, reflections, and translations. Similar technology enhanced items will ask students to produce a new figure or part of a figure after undergoing dilations, translations, rotations, and/or reflections. Other tasks will present students with two figures and ask students to describe a series of rotations, reflections, translations, and/or dilations to show that the figures are similar, congruent, or neither. Many of these tasks will contribute evidence for Claim 3, asking students to justify reasoning or give a critique of a sample reasoning.	1, 2			

Target Sampling Mathematics Grade 8						
Claim	Content Category	Assessment Targets	DOK	Items		Total Items
				CAT	PT	
		(Evidence Required) 1. The student verifies that rigid transformations preserve distance and angle measures. 2. The student describes sequences of rotations, reflections, translations, and dilations that can verify whether two-dimensional figures are similar or congruent to each other. 3. The student constructs a new figure that is the result of dilating, rotating, reflecting, or translating the original figure. 4. The student describes the effect of dilations, translations, rotations, and reflections on two-dimensional figures using coordinates. (Range ALDs) **Level 1** Students should be able to identify reflections, rotations, and translations and show the result of these rigid motions on figures. **Level 2** Students should be able to construct reflections and translations of figures in a coordinate plane and identify dilations and the results of dilations on figures. **Level 3** Students should be able to understand and describe the impact of a transformation on a figure and its component parts with or without coordinates. They should be able to use or describe a sequence of transformations to determine or exhibit the congruence of two figures. They should also be able to construct rotations and dilations of figures in a coordinate plane. **Level 4** Students should be able to describe a sequence that exhibits the similarity between two shapes and understand that the angle measures are unchanged.				
		F. Use functions to model relationships between quantities. (Target Description) Tasks for this target will ask students to construct a function to model a linear relationship between two quantities and determine the rate of change or initial value of a linear function from given information. Other tasks will ask students to identify parts of a graph that fit a particular qualitative description (e.g., increasing or decreasing) or sketch a graph based on a qualitative description. (Evidence Required) 1. The student constructs a function to model a linear relationship between	1, 2	2-3		

Target Sampling Mathematics Grade 8						
Claim	Content Category	Assessment Targets	DOK	Items		Total Items
				CAT	PT	
		two quantities. 2. The student determines the rate of change and initial value of a function, either from a description of a relationship or from two (*x*, *y*) values, including reading the rate of change and/or the value of the function from a table or a graph. 3. The student interprets features of a linear function, such as rate of change and initial value, in terms of the situation it models, its graph, or a table of values. 4. The student qualitatively describes the functional relationship between two quantities by analyzing a graph (e.g., whether the function is increasing or decreasing, or whether the graph is linear or nonlinear). 5. The student draws a graph that exhibits the qualitative features of a function that has been described in writing. (Range ALDs) **Level 1** Students should be able to identify a function that models a linear relationship between two quantities. **Level 2** Students should be able to construct a graph or table to represent a linear relationship between two quantities, and should be able to find the rate of change in a linear relationship represented by a graph or table. They should be able to analyze and describe a graph of a linear function. **Level 3** Students should be able to construct a function to represent a linear relationship between two quantities and a graph to represent verbally-described qualitative features, and determine the rate of change and initial value of a function from a graph, a verbal description of a relationship, or from two sets of *x*, *y* values given as coordinate pairs or displayed in a table. They should be able to analyze a graph of a linear or nonlinear function to qualitatively describe it. **Level 4** Students should be able to 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.				
		H. Understand and apply the Pythagorean Theorem. (Target Description) Tasks associated with this target will ask students to use the Pythagorean Theorem to solve real–world and mathematical problems in two and three dimensions, including problems that ask students to find the distance between two points in a coordinate system.	1, 2			

Target Sampling Mathematics Grade 8						
Claim	Content Category	Assessment Targets	DOK	Items		Total Items
				CAT	PT	
		Some applications of the Pythagorean Theorem will be assessed at deeper levels in Claims 2 and 4. Understanding of the proofs of the Pythagorean Theorem would contribute evidence to Claim 3. (Evidence Required) 1. The student solves real–world and mathematical problems of right triangles in two and three dimensions by applying the Pythagorean Theorem and its converse. 2. The student finds the distance between two points in a coordinate system by applying the Pythagorean Theorem. (Range ALDs) **Level 1** Students should be able to identify the hypotenuse and the legs of a right triangle given the side lengths or an image of a right triangle. **Level 2** Students should be able to apply the converse of Pythagorean Theorem to determine whether or not a given triangle is a right triangle, given its side lengths. They should be able to find the distance between two points on a horizontal or vertical line in a two–dimensional coordinate system. **Level 3** Students should be able to apply the Pythagorean Theorem to determine the unknown side lengths of right triangles and to find the distance between two points in a coordinate system in two dimensions. **Level 4** Students should be able to apply the Pythagorean Theorem to find the distance between two points in a coordinate system in three dimensions.				
	Supporting Cluster	**A. Know that there are numbers that are not rational, and approximate them by rational numbers.** (Target Description) Tasks will ask students to approximate irrational numbers on a number line or as rational numbers with a certain degree of precision. This target may be combined with 8.EE Target B (e.g., by asking students to express the solution to a cube root equation as a point on the number line). (Evidence Required) 1. The student classifies real numbers as rational or irrational. 2. The student converts a repeating decimal into a fraction. 3. The student writes approximations of irrational numbers as rational numbers. 4. The student compares the sizes of irrational numbers by using rational	1 ,2	4-5		

Target Sampling Mathematics Grade 8						
Claim	Content Category	Assessment Targets	DOK	Items CAT	Items PT	Total Items
		approximations of irrational numbers. 5. The student approximates the locations of irrational numbers on the number line by using rational approximations of irrational numbers. (Range ALDs) **Level 1** Students should be able to identify square roots of numbers less than 100; identify pi as not rational; and understand that every rational number has a decimal expansion. **Level 2** Students should be able to identify approximate locations of familiar irrational numbers on a number line; identify numbers as rational or irrational; and convert between fractions and terminating decimals. **Level 3** Students should be able to use rational approximations of irrational numbers to locate them on a number line and to make numerical comparisons; convert between fractions and repeating decimals; and compare rational numbers. **Level 4** Students should be able to approximate irrational numbers to a specified level of precision and should be able to use the approximations to solve problems or estimate the value of an expression.				
		I. Solve real-world and mathematical problems involving volume of cylinders, cones, and spheres. (Target Description) Tasks for this target will ask students to apply the formulas for volume of cylinders, cones and spheres to solve problems. Many of these tasks will contribute evidence to Claims 2 and 4. (Evidence Required) 1. The student solves real-world problems by applying the formulas for the volumes of cylinders, cones, and spheres. 2. The student solves mathematical problems by applying the formulas for the volumes of cylinders, cones, and spheres. (Range ALDs) **Level 1** Students should be able to identify the key dimensions (i.e., radii, heights, circumferences, and diameters) of cones, cylinders, and spheres. **Level 2** Students should be able to identify the appropriate formula for the volumes of a cone, a cylinder, and a sphere and should be able to connect the key dimensions to the appropriate locations in the formula. **Level 3** Students should be able to calculate the volumes of cones, cylinders,	1, 2			

Target Sampling Mathematics Grade 8						
Claim	Content Category	Assessment Targets	DOK	Items		Total Items
				CAT	PT	
		and spheres in direct and familiar mathematical and real-world problems. **Level 4** Students should be able to solve unfamiliar or multi-step problems involving volumes of cones, cylinders, and spheres.				
		J. Investigate patterns of association in bivariate data. (Target Description) Tasks for this target will often be paired with 8.F Target F and ask students to determine the rate of change and initial value of a line suggested by examining bivariate data. Interpretations related to clustering, outliers, positive or negative association, linear and nonlinear association will primarily be presented in context by pairing this target with those from Claims 2 and 4. (Evidence Required) 1. The student interprets patterns of association between two quantities in a scatter plot (clustering in reference to the line of best fit, positive or negative association, linear association, nonlinear association, and the effect of outliers) and interprets the slope and *y*-intercept in terms of the context. 2. The student identifies the slope (rate of change) and intercept (initial value) of a line suggested by examining bivariate measurement data in a scatter plot. 3. The student constructs and interprets a two-way table summarizing data on two categorical variables collected from the same subjects. 4. The student uses relative frequencies calculated for rows or columns to describe possible association between the two variables. (Range ALDs) **Level 1** Students should be able to investigate a scatter plot for clustering between two quantities and construct a scatter plot from given data. They should be able to construct a two-way frequency table of given categorical data. **Level 2** Students should be able to investigate a scatter plot for positive, negative, and linear association and informally fit a line to data for a given a scatter plot that suggests a linear association. They should be able to calculate frequencies from categorical data in a two-way frequency table. **Level 3** Students should be able to investigate a scatter plot for patterns such as outliers and nonlinear association. They should be able to write an equation for the trend line or line of best fit for a given scatter plot with a linear association. They should also be able to interpret and use relative	1, 2			

Target Sampling Mathematics Grade 8						
Claim	Content Category	Assessment Targets	DOK	Items		Total Items
				CAT	PT	
		frequencies from a two way table to describe possible association between two variables. **Level 4** Students should be able to use scatter plots, trend lines, and associations between variables in two-way frequency tables to make predictions in real-world situations.				
2. Problem Solving 4. Modeling and Data Analysis	Problem Solving (drawn across content domains)	**A. Apply mathematics to solve well-posed problems arising in everyday life, society , and the workplace.** (General Task Model Expectations) 1. The student is asked to solve a well-posed problem arising in a mathematical context or a context from everyday life, society, or the workplace. 2. Mathematical information from the context is presented in a table, graph, or diagram, or is extracted from a verbal description or pictorial representation of the context. 3. Solving the problem requires, in Grades 6–7, understanding of and proficiency with ratios, rates and proportional relationships, the number system, or expressions and equations; in Grade 8, understanding of and proficiency with expressions and equations, functions, and geometry and geometric measurement. 4. Understandings from statistics, probability, and geometry may be needed to set up the problem, but are not the primary focus of the problem (except that geometry is a legitimate primary focus in Grade 8). Claim 4 is the proper place for problems whose primary focus is statistics or probability. 5. The task does not indicate by key words or other scaffolding which arithmetic and algebraic operations, and which geometry constructions or transformations, are to be performed or in what order. 6. Difficulty of the task may be varied by varying (a) the difficulty of extracting information from the context (b) the number of steps or (c) the complexity of the expressions, equations, functions, or geometric figures or measurements used.	2, 3	2	1-2	8-10
		B. Select and use appropriate tools strategically. (General Task Model Expectations) 1. Mathematical information from the context is presented in a table, graph, or diagram, or is extracted from a verbal description or pictorial representation of the context. 2. Tasks aligned to this task model focus on using tools to solve problems or making strategic choices about which tool to use or whether to use a tool to	1, 2, 3	1		

Target Sampling Mathematics Grade 8						
Claim	Content Category	Assessment Targets	DOK	Items		Total Items
				CAT	PT	
		solve a problem. 3. Difficulty of the task may be varied by varying (a) the difficulty of extracting information from the context, (b) the number of steps, (c) the complexity of the numbers used, or (d) the complexity of the interpretation required. **C. Interpret results in the context of a situation.** (General Task Model Expectations) 1. The student is asked to interpret the solution of a well-posed problem arising in a context from everyday life, society, or the workplace, and then to interpret the solution in terms of the context. 2. Possible interpretations include: giving the units of an answer and explaining their meaning, interpreting parts of an expression, and interpreting the solution to an equation. Problems involving interpreting data are more likely to fit into Claim 4C than Claim 2C. 3. Because the focus is on interpreting the solution, items in this task model will generally have lower cognitive demand in the problem solving aspects than items in task models for 2A and 2B. 4. Mathematical information from the context is presented in a table, graph, or diagram, or is extracted from a verbal description or pictorial representation of the context. 5. Solving the problem requires either using units, writing an expression in an equivalent form, setting up and solving an equation or system of equations, or calculating geometric measures. 6. Difficulty of the task may be varied by varying (a) the difficulty of extracting information from the context (b) the number of steps (c) the complexity of the numbers used or (d) the complexity of the interpretation required. **D. Identify important quantities in a practical situation and map their relationships (e.g., using diagrams, two-way tables, graphs, flow charts, or formulas).** (General Task Model Expectations) 1. Students are presented with a mathematical problem in a real-world context where the quantities of interest are not named explicitly, are named but represented in different ways, or the relationship between the quantities is not immediately clear. 2. The student is asked to solve a problem that may require the integration of concepts and skills from multiple domains. 3. Target 2D identifies a key step in the modeling cycle, and is thus frequently				

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Claim	Content Category	Assessment Targets	DOK	Items		Total Items
				CAT	PT	
		present in problems with real-world contexts. Note that Target 2D is rarely the primary target for an item, but is frequently a Secondary or Tertiary Target for an item with primary alignment to 2A, 2B, or 2C; see example items for many of the task models in those Targets.				
	Modeling and Data Analysis (drawn across content domains)	**A. Apply mathematics to solve problems arising in everyday life, society, and the workplace.** (General Task Model Expectations) 1. The student is asked to solve a problem arising in everyday life, society, or the workplace. 2. Information needed to solve the problem has a level of complexity that is not present in items within Claim 2 Target A. For example, the student must • distinguish between relevant and irrelevant information, or • identify information that is not given in the problem and request it, or • make a reasonable estimate for one or more quantities and use that estimate to solve the problem. 3. The student must select a mathematical model independently and is not directly told what arithmetic operation or geometric structure to use to solve the problem. 4. Tasks in this model often have secondary alignments to other Claim 4 targets, in particular Target 4B, constructing autonomous chains of reasoning, Target 4D, requiring the student to interpret results in the context of the problem, and Target 4F, requiring students to identify quantities and map relationships between them. 5. Problems in this model may have more than one possible solution. 6. The student is often required to draw upon knowledge from different domains, including knowledge from earlier grade-levels. **D. Interpret results in the context of a situation.** (General Task Model Expectations) 1. The student is presented with a problem situation in everyday life, society, or the workplace or a mathematical model of such a situation. The student interprets the solution to the problem in terms of the context, in terms of the model, or compares the results of the model with the real-world data it represents. • Item types with a primary alignment to 4D focus on interpreting results in terms of the model or comparing the results of the model with the real-world data it represents. • It is not necessary for a student to generate a complete solution for	2, 3	1	1-3	

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Claim	Content Category	Assessment Targets	DOK	Items CAT	Items PT	Total Items
		problems with a primary alignment to this target. 2. Tasks in Targets 4A, 4C, 4E, and 4F frequently have this target as a tertiary or quaternary alignment because students must interpret their results in terms of the context. 3. The student is often required to draw upon knowledge from different domains, including knowledge from earlier grade-levels.				
		B. Construct, autonomously, chains of reasoning to justify mathematical models used, interpretations made, and solutions proposed for a complex problem. (General Task Model Expectations) 1. The student is presented with a multi-step problem with little or no scaffolding, or 2. The student must make estimates or choose between different reasonable assumptions in order to solve the problem. 3. Note that Target 4B is never the primary target for an item, but is frequently a Tertiary or Quaternary Target for an item with primary alignment to other targets; see, for example, items in Task Models for 4A, 4C, and 4E. **E. Analyze the adequacy of and make improvements to an existing model or develop a mathematical model of a real phenomenon.** (General Task Model Expectations) 1. The student is presented with a problem arising in everyday life, society, or the workplace. The student either • chooses between competing mathematical models to solve the problem (which may depend on different interpretations of the problem) • evaluates a partial or complete (possibly incorrect) solution to the problem • constructs a mathematical model to solve the problem Note: It is not necessary that a student to generate a complete solution for problems in this target. 2. Tasks in this model can also assess Target 4B (Construct, autonomously, chains of reasoning to justify mathematical models used, interpretations made, and solutions proposed for a complex problem). Thus some tasks should plausibly entail a chain of reasoning to complete the task (not just a single step). For example, it might be necessary for the student to construct a two-step arithmetic expression to evaluate a model or solution, or to try out	2, 3, 4	1		

Target Sampling Mathematics Grade 8						
Claim	Content Category	Assessment Targets	DOK	Items CAT	Items PT	Total Items
		a geometric shape and then perform a calculation to see if it satisfies the requirements. 3. The student is often required to draw upon knowledge from different domains, including knowledge from earlier grade-levels.				
		C. State logical assumptions being used. (General Task Model Expectations) 1. The student is presented with a problem arising in everyday life, society, or the workplace. The student either • identifies information or assumptions needed to solve the problem, • researches to provide information needed to solve the problem, or • provides a reasoned estimate of a quantity needed to solve the problem. It is not necessary that a student constructs a complete solution to the problem for this target. 2. Tasks in this model generally have either more information than is needed solve the problem (and students must choose) or not enough information (and students must make a reasoned estimate). 3. The student is often required to draw upon knowledge from different domains, including knowledge from earlier grade-levels. 4. Tasks for this target may also assess Target 4F. **F. Identify important quantities in a practical situation and map their relationships (e.g., using diagrams, two-way tables, graphs, flow charts, or formulas).** (General Task Model Expectations) 1. Students are presented with a mathematical problem in a real-world context where the quantities of interest are not named explicitly, are named but represented in different ways, or the relationship between the quantities is not immediately clear. 2. The student is asked to solve a problem that may require the integration of concepts and skills from multiple domains.	1, 2, 3	1		
		G. Identify, analyze, and synthesize relevant external resources to pose or solve problems. (General Task Model Expectations) Measured in performance tasks only, students should have access to external resources to support their work in posing and solving problems (e.g., finding or constructing a set of data or information to answer a particular question or looking up measurements of a structure to increase precision in an estimate	3, 4	0		

Target Sampling Mathematics Grade 8						
Claim	Content Category	Assessment Targets	DOK	Items		Total Items
				CAT	PT	
		for a scale drawing). Constructed response items should incorporate “hyperlinked” information to provide additional detail (both relevant and extraneous).				
3. Communicating Reasoning	Communicating Reasoning (drawn across content domains)	**A. Test propositions or conjectures with specific examples.** (General Task Model Expectations) 1. Items for this target should focus on the core mathematical work that students are doing around ratios and proportional relationships, the rational number system, and equations and expressions in grades 6-7 and equations, functions, and geometry in grade 8. 2. In response to a claim or conjecture, the student should: • Find a counterexample if the claim is false, • Find examples and non-examples if the claim is sometimes true, or • Provide supporting examples for a claim that is always true without concluding that the examples establish that truth, unless there are only a finite number of cases and all of them are established one-by-one. The main role for using specific examples in this case is for students to develop a hypothesis that the conjecture or claim is true, setting students up for work described in Claim 3B. 3. False or partially true claims that students are asked to find counterexamples for should draw upon frequently held mathematical misconceptions whenever possible. 4. Note: When asking students for a single example, take care to avoid mathematical language that suggests a single example proves a conjecture. **D. Use the technique of breaking an argument into cases.** (General Task Model Expectations) 1. Items for this target should focus on the core mathematical work that students are doing around ratios and proportional relationships, the rational number system, and equations and expressions in grades 6-7 and equations, functions, and geometry in grade 8. 2. The student is given • a problem that has a finite number of possible solutions, some of which work and some of which don’t, or • a proposition that is true in some cases but not others. 3. Items for Claim 3 Target D should either present an exhaustive set of cases to consider or expect students to consider all possible cases in turn in order to distinguish it from items in other targets.	2, 3	3	0-2	8-10

Target Sampling Mathematics Grade 8						
Claim	Content Category	Assessment Targets	DOK	Items		Total Items
				CAT	PT	
		B. Construct, autonomously, chains of reasoning that will justify or refute propositions or conjectures. (General Task Model Expectations) 1. Items for this target should focus on the core mathematical work that students are doing around ratios and proportional relationships, the rational number system, and equations and expressions in grades 6-7 and equations, functions, and geometry in grade 8 with mathematical content from other domains playing a supporting role in setting up the reasoning contexts. 2. Items for this target can probe a key mathematical structure such as that found in expressions and equations, ratios and proportional relationships, and the rational number system. 3. Items for this target can require students to solve a multi-step, well-posed problem involving the application of mathematics to a real-world context. The difference between items for Claim 2A and Claim 3B is that the focus in 3B is on communicating the reasoning process in addition to getting the correct answer. 4. Note that in grades 6-8, items provide less structure than items for earlier grades to focus on justifying or refuting a proposition or conjecture. 5. Many machine-scorable items for these task models can be adapted to increase the autonomy of student's reasoning process but would require hand-scoring. **E. Distinguish correct logic or reasoning from that which is flawed, and—if there is a flaw in the argument—explain what it is.** (General Task Model Expectations) 1. Items for this target should focus on the core mathematical work that students are doing around ratios and proportional relationships, the rational number system, and equations and expressions in grades 6-7 and equations, functions, and geometry in grade 8. 2. The student is presented with valid or invalid reasoning and told it is flawed or asked to determine its validity. If the reasoning is flawed, the student identifies, explains, and/or corrects the error or flaw. 3. The error should be more than just a computational error or an error in counting, and should reflect an actual error in reasoning. 4. Analyzing faulty algorithms is acceptable so long as the algorithm is internally consistent and it isn't just a mechanical mistake executing a standard algorithm.	2, 3, 4	3		

Target Sampling Mathematics Grade 8						
Claim	Content Category	Assessment Targets	DOK	Items CAT	Items PT	Total Items
		C. State logical assumptions being used. (General Task Model Expectations) 1. Items for this target should focus on the core mathematical work that students are doing around ratios and proportional relationships, the rational number system, and equations and expressions in grades 6-7 and equations, functions, and geometry in grade 8. 2. For some items, the student must explicitly identify assumptions that • Make a problem well-posed, or • Make a particular solution method viable. 3. When possible, items in this target should focus on assumptions that are commonly made implicitly and can cause confusion when left implicit. 4. For some items, the student will be given a definition and be asked to reason from that definition. **F. Base arguments on concrete referents such as objects, drawings, diagrams, and actions.** (General Task Model Expectations) In earlier grades, the desired student response might be in the form of concrete referents. In later grades, concrete referents will often support generalizations as part of the justification rather than constituting the entire expected response. 1. The student uses concrete referents to help justify or refute an argument. 2. In grade 6, items in this task model should focus on the use of number lines. In grade 7, they should focus on number lines and graphs of proportional relationships. In grade 8, they should focus on graphs of linear equations and systems of linear equations and geometric contexts related to transformations of the plane or the Pythagorean Theorem. **G. At later grades, determine conditions under which an argument does and does not apply. (For example, area increases with perimeter for squares, but not for all plane figures.)** (General Task Model Expectations) Target 3G is a closely related extension of the expectations in Targets 3A, 3B, 3C, and 3D, and as with those targets, is often a tertiary alignment for items in those targets. Students often test propositions and conjectures with specific examples (as described in Target 3A) for the purpose of formulating conjectures about the conditions under which an argument does and does not apply. Students then must explicitly describe those conditions (as in	2, 3	2		

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		Target 3C). Expectations for Target 3D include determining conditions under which an argument is true given cases—the next step is articulating those cases autonomously.				