



Mathematics Assessment

Mathematics Grade 7 Threshold Achievement Level Descriptors (ALD)

With Claims, Targets and Standards

This document aligns the Oregon Mathematics Assessment claims and targets with the Oregon mathematics standards. The claims and targets can be used to design classroom lessons and district assessments. In addition, the document serves as a guide in understanding the Oregon Mathematics Assessment reports.

CLAIMS AND TARGETS: Content claims are summary statements about the knowledge and skills students are expected to demonstrate on the assessment related to a particular aspect of the standards. Within each claim area, assessment targets were developed to ensure inclusion of standards, learning progressions, and the Depth of Knowledge levels.

DEPTH OF KNOWLEDGE: The DOK level assigned should reflect the level of work students are most commonly required to perform in order for the response to be deemed acceptable. The DOK level should reflect the complexity of the cognitive processes demanded by the task, rather than its difficulty. Ultimately the DOK level describes the kind of thinking required by a task, not whether or not the task is “difficult”.

- **Level 1** requires students to receive or recite facts or to use simple skills or abilities.
- **Level 2** includes the engagement of some mental processing beyond recalling or reproducing a response. Includes conceptual understanding generally refers to the integration and application of concepts and other ideas within a content area. Procedural understanding denotes knowledge about skills and sequence of steps, when and how these should be used appropriately, and their efficient and accurate applications.
- **Level 3** requires strategic thinking. Students must be able to support their thinking. Includes, non-routine problem solving like in reading and determining author’s purpose.
- **Level 4** requires extended thinking. Usually requires work over a period of time. They may also be asked to develop hypotheses and perform complex analyses of the connections among texts.

Claim 1 Concepts and Procedures: Students can explain and apply mathematical concepts and interpret and carry out mathematical procedures with precision and fluency.

Targets		Content Standards	Threshold Achievement Level Descriptors (ALD) Students Entering Level (2, 3, or 4) will be able to...	Item Types	
				CAT	PT
PRIORITY CLUSTER	Target A Analyze proportional relationships and use them to solve real-world and mathematical problems. (DOK2)	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. For example, if a person walks $\frac{1}{2}$ mile in each $\frac{1}{4}$ hour, compute the unit rate as the complex fraction $\frac{1/2}{1/4}$ miles per hour, equivalently 2 miles per hour.	<ul style="list-style-type: none"> • 2 Identify proportional relationships presented in equation formats and find unit rates involving whole numbers. • 3 Represent proportional relationships in graphs and tables and solve one-step rate- related problems. • 4 Solve real-world problems involving proportional relationships that require one step with measurement conversions. 	8 - 9	0
		7.RP.2: Recognize and represent proportional relationships between quantities.			
		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.			
	7.EE.3 Solve multi-step real-life and mathematical problems posed with positive and negative rational numbers in any form (whole numbers, fractions, and decimals), using tools strategically. Apply properties of operations to calculate with numbers in any form; convert between forms as appropriate; and assess the reasonableness of answers using mental computation and estimation strategies. For example: If a woman making \$25 an hour gets a 10% raise, she will make an additional $\frac{1}{10}$ of her salary an hour, or \$2.50, for a new salary of \$27.50. If you want to place a towel bar $9\frac{3}{4}$ inches long in the center of a door that is $27\frac{1}{2}$ inches wide, you will need to place the bar about 9 inches from each edge; this estimate can be used as a check on the exact computation.	<ul style="list-style-type: none"> • 2 Apply properties of operations to expand linear expressions with integer coefficients. Solve multi-step problems with decimal numbers. Solve equations in the form of $px + q = r$, where p, q, and r are decimal numbers. • 3 Add, subtract, and factor linear expressions with decimal coefficients. Graph the solution set to a given inequality in the form of $x > p$ or $x < p$, where p is a rational number. Understand that rewriting an expression can shed light on how quantities are related in a familiar problem-solving context with a moderate degree of scaffolding. Use variables to reason with quantities in real-world and mathematical situations with a high degree of scaffolding. • 4 Construct inequalities with two variables to solve problems. 			
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.					

<p>Target B Apply and extend previous understanding of operations with fractions to add, subtract, multiply and divide rational numbers. (DOK 1, 2)</p>	<p>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.</p>	<ul style="list-style-type: none"> • 2 Convert between familiar fractions and decimals. • 3 Solve mathematical problems using addition, subtraction, and multiplication on rational numbers. Understand that $(-1)(-1) = 1$. • Convert common fractions and fractions with denominators that are a factor of a power of 10 to decimals. • 4 Solve real-world problems with integers and proper fractions, using addition, multiplication, subtraction, and division. 		
<p>7.NS.2: Apply and extend previous understandings of multiplication and division and of fractions to multiply and divide rational numbers.</p>				
<p>7.NS.3: Solve real-world and mathematical problems involving the four operations with rational numbers.</p>				
<p>Target C Use properties of operations to generate equivalent expressions. (DOK 1, 2)</p>	<p>7.EE.1: Apply properties of operations as strategies to add, subtract, factor, and expand linear expressions with rational coefficients.</p>	<ul style="list-style-type: none"> • 2 Apply properties of operations to expand linear expressions with integer coefficients. Solve multi-step problems with decimal numbers. Solve equations in the form of $px + q = r$, where p, q, and r are decimal numbers. • 3 Add, subtract, and factor linear expressions with decimal coefficients. Graph the solution set to a given inequality in the form of $x > p$ or $x < p$, where p is a rational number. Understand that rewriting an expression can shed light on how quantities are related in a familiar problem-solving context with a moderate degree of scaffolding. Use variables to reason with quantities in real-world and mathematical situations with a high degree of scaffolding. • 4 Construct inequalities with two variables to solve problems. 	5 - 6	0
	<p>7.EE.2: Understand that rewriting an expression in different forms in a problem context can shed light on the problem and how the quantities in it are related. For example, $a + 0.05a = 1.05a$ means that “increase by 5%” is the same as “multiply by 1.05.”</p>			

Supporting Cluster	Target E Draw, construct, and describe geometrical figures and describe the relationship between them. (DOK 1, 2)	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.	<ul style="list-style-type: none"> • 2 Describe geometric shapes with given conditions. Use vertical angles expressed as numerical measurements to solve problems. Calculate the area of a circle when the formula is provided and the area of quadrilaterals. • 3 Create a scale drawing of a given figure when a scale factor is given. Determine the surface area of a right prism. Use vertical angles expressed as variables to solve two-step problems. • 4 Describe the two-dimensional figures that result from slicing spheres and cones. 	2 - 3	0	
		7.G.2: Draw (freehand, with ruler and protractor, and with technology) geometric shapes with given conditions. Focus on constructing triangles from three measures of angles or sides, noticing when the conditions determine a unique triangle, more than one triangle, or no triangle.				
		7.G.3: Describe the two-dimensional figures that result from slicing three-dimensional figures, as in plane sections of right rectangular prisms and right rectangular pyramids.				
	Target F Solve real-life and mathematical problems involving angle measure, area, surface area, and volume. (DOK 1, 2)	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.				
		7.G.5: Use facts about supplementary, complementary, vertical, and adjacent angles in a multi-step problem to write and solve simple equations for an unknown angle in a figure.				
		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.				
	Target G Use random sampling to draw inferences about a population. (DOK 1, 2)	7.SP.1: Understand that statistics can be used to gain information about a population by examining a sample of the population; generalizations about a population from a sample are valid only if the sample is representative of that population. Understand that random sampling tends to produce representative samples and support valid		<ul style="list-style-type: none"> • 2 Determine whether or not a sample is random. Find the range of a set of data about a given population. Approximate the probability of a chance event by collecting data. • 3 Use random sampling to draw inferences about a population in familiar contexts. Informally assess the degree of visual overlap of two numerical data distributions. Calculate the theoretical probability of a compound event. • 4 Generate multiple samples (or simulated samples) of the same size. Determine which measures of variability should be used to draw informal comparative inferences about two populations. Construct a simulation experiment and generate frequencies for compound events. 		1 - 2
		7.SP.2 Use data from a random sample to draw inferences about a population with an unknown characteristic of interest. Generate multiple samples (or simulated samples) of the same size to gauge the variation in estimates or predictions. For example, estimate the mean word length in a book by randomly sampling words from the book; predict the winner of a school election based on randomly sampled survey data. Gauge how far off the estimate or				
	Target H Draw informal comparative inferences about two populations. (DOK 2)	7.SP.3: Informally assess the degree of visual overlap of two numerical data distributions with similar variabilities, measuring the difference between the centers by expressing it as a multiple of a measure of variability. For example, the mean height of players on the basketball team is 10 cm greater than the mean height of players on the soccer team, about twice the variability (mean absolute deviation) on either team; on a dot plot, the separation between the two distributions of heights is noticeable.				
		7.SP.4: Use measures of center and measures of variability for numerical data from random samples to draw informal comparative inferences about two populations. For example, decide whether the words in a chapter of a seventh-grade science book are generally longer than the words in a chapter of a fourth-grade science				
Target I Investigate chance processes and develop, use and evaluate probability models. (DOK 1, 2)	7.SP.5: Understand that the probability of a chance event is a number between 0 and 1 that expresses the likelihood of the event occurring. Larger numbers indicate greater likelihood. A probability near 0 indicates an unlikely event, a probability around 1/2 indicates an event that is neither unlikely nor likely, and a probability near 1					
	7.SP.6: Approximate the probability of a chance event by collecting data on the chance process that produces it and observing its long-run relative frequency, and predict the approximate relative frequency given the probability. For example, when rolling a number cube 600 times, predict that a 3 or 6 would be rolled roughly 200 times, but probably not exactly 200 times.					
	7.SP.7: Develop a probability model and use it to find probabilities of events. Compare probabilities from a model to observed frequencies; if the agreement is not good, explain possible sources of the discrepancy.					
	7.SP.8: Find probabilities of compound events using organized lists, tables, tree diagrams, and simulation.					
Total Items for Claim #1			17 - 20		0	

Claim 2. Problem Solving and 4. Modeling and Data Analysis: Students can solve a range of complex well posed problems in pure and applied mathematics, making productive use of knowledge and problem solving strategies. Students can analyze complex, real-world scenarios and can construct and use mathematical models to interpret and solve problems.

Targets		Content Standards	Threshold Achievement Level Descriptors (ALD) Students Entering Level (2, 3, or 4) will be able to...	Item Types		Total Items
				CAT	PT	
Claim 2: Problem Solving Claim 4: Modeling and Data Analysis	<p align="center">Claim 2</p> <p>Target A Apply mathematics to solve well-posed problems arising in everyday life, society, and the workplace. (DOK 2, 3) Target B Select and use appropriate tools strategically. (DOK 1, 2, 3) Target C Interpret results in the context of a situation. (DOK 1, 2, 3) Target D. Identify important quantities in a practical situation and map their relationships (e.g., using diagrams, two-way tables, graphs, flow charts, or formulas. (DOK 1, 2, 3)</p>	<p align="center">See content standards for Claim 1: Target A, B, C, D, E, F</p>	<ul style="list-style-type: none"> 2 Select tools to solve a familiar and moderately scaffolded problem and apply them with partial accuracy. <p>Use the necessary elements given in a problem situation to solve a problem.</p> <p>Apply mathematics to propose solutions by identifying important quantities and by locating missing information from relevant external resources.</p>	<p align="center">Target A 2</p> <p align="center">Target B, C, D 1</p>	1 - 2	8-10
	<p align="center">Claim 4</p> <p>Target A: Apply problems arising in everyday life, society, and the workplace (DOK 2, 3) Target B: Construct, autonomously, chains of reasoning to justify mathematical models used, interpretations made, and solutions proposed for a complex problem. (DOK 2, 3, 4) Target C: State logical assumptions being used. (DOK 1, 2, 3) Target D: Interpret results in the context of a situation. (DOK 2, 3) Target E: Analyze the adequacy of and make improvements to an existing model or develop a mathematical model of a real phenomenon. (DOK 2, 3, 4) Target F: Identify important quantities in a practical situation and map their relationships (e.g., using diagrams, two-way tables, graphs, flowcharts, or (formulas). (DOK 1, 2, 3) Target G*: Identify, analyze, and synthesize relevant external resources to pose or solve problems. (DOK 3, 4)</p>	<p align="center">See content standards for Claim 1: Target A, B, C, E, F, G, H, I</p>	<ul style="list-style-type: none"> 3 Use appropriate tools to accurately solve problems arising in everyday life, society, and the workplace. <p>Apply mathematics to solve problems by identifying important quantities and mapping their relationship and by stating and using logical assumptions.</p> <ul style="list-style-type: none"> 4 Analyze and interpret the context of an unfamiliar situation for problems of increasing complexity. <p>Begin to solve problems optimally.</p> <p>Construct multiple plausible solutions and approaches.</p>	<p align="center">Target A, D 1</p> <p align="center">Target B, E 1</p> <p align="center">Target C, F 1</p> <p align="center">Target G 0</p>	1 - 3	

Claim 3 Communicating Reasoning: Students can clearly and precisely construct viable arguments to support their own reasoning and to critique the reasoning of others.

Targets		Content Standards	Threshold Achievement Level Descriptors (ALD) Students Entering Level (2, 3, or 4) will be able to...	Item Types		Total Items
				CAT	PT	
Claim 3: Communicating Reasoning	Claim 3	See content standards for Claim 1: Target A (7.RP.2), B, C	<ul style="list-style-type: none"> • 2 Find and identify the flaw in an argument. • 3 Use stated assumptions, definitions, and previously established results and examples to identify and repair a flawed argument. <p>Use previous information to support his or her own reasoning on a routine problem.</p> <ul style="list-style-type: none"> • 4 Begin to construct chains of logic about abstract concepts autonomously. 	Target A, D 3	0 - 2	8 - 10
	<p>Target A: Test propositions or conjectures with specific examples. (DOK 2, 3)</p> <p>Target B. Construct, autonomously, chains of reasoning that will justify or refute propositions or conjectures. (DOK 2, 3, 4)</p> <p>Target C. State logical assumptions being used. (DOK 2, 3)</p> <p>Target D. Use the technique of breaking an argument into cases. (DOK 2, 3)</p> <p>Target E. Distinguish correct logic or reasoning from that which is flawed and —if there is a flaw in the argument—explain what it is. (DOK 2, 3, 4)</p> <p>Target F. Base arguments on concrete references such as objects, drawings, diagrams, and actions. (DOK 2, 3)</p> <p>Target 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.) (DOK 2, 3)</p>			Target B, E 3		