Connecticut Mathematics Summative Assessment Blueprint

In Connecticut, the Smarter Balanced Mathematics Summative Assessments include a computer adaptive test (CAT) and a performance task (PT). All CAT items in Grades 3-8 are designed to be machine scored (e.g., multiple choice, grid-in, multi-select, tables). For all grades, each mathematics PT contains 4-6 total items and a maximum of four PT items may require hand scoring.

For mathematics, Problem Solving (Claim 2) and Modeling and Data Analysis (Claim 4) have been combined into a single reporting category because of content similarity and to provide flexibility for item development. There are still four claims, but only three claim scores will be reported with the overall math score. The total number of items across the two reporting categories (Problem Solving/Modeling and Data Analysis and Communicating Reasoning) for any individual test event is 18-20.

The Connecticut Core Standards (CCS) for Mathematics require that mathematical content and mathematical practices are connected. Students are expected to make connections between content and practice, model a mathematical situation, and explain their reasoning when solving problems. In addition, two of the major design principles of the standards are focus and coherence. Coherence implies that the standards are more than a mere checklist of disconnected topics, while attending to focus will allow the student the time necessary to learn and master grade-level content in order to be able to build upon it the following year. Together, these features of the standards had an important influence on the design of the Smarter Balanced mathematics assessment.

Smarter Balanced uses Webb's Depth of Knowledge (DOK) to determine the expected rigor of a target and subsequently, any item measuring that target. In the CAT portion of the summative mathematics assessments, an algorithm has been configured to ensure that all students will receive at least 7 CAT items at DOK 2 or higher in Claim 1. For combined Claims 2 and 4, each student will receive at least 2 CAT items at DOK 3 or higher. Each student will receive at least 2 CAT items at DOK 3 or higher measuring Claim 3.

For more information on content categories and DOK levels, see the Content Specifications document at http://www.smarterbalanced.org/smarter-balanced-assessments/.

Mathematics Grades 3-5 Summative Assessment Blueprint						
Claim/Score Reporting Category	Content Category	Stimuli		Items		Total Items by Claim
		CAT	PT	CAT	PT	
1. Concepts and Procedures	Priority Cluster	0	0	13-15	0	17-20
	Supporting Cluster	0		4-5		
2. Problem Solving 4. Modeling and Data Analysis	Problem Solving	0	1	6	2-4	8-10
	Modeling and Data Analysis	0				
3. Communicating Reasoning	Communicating Reasoning	0		8	0-2	8-10

Mathematics Grades 6-8 Summative Assessment Blueprint						
Claim/Score Reporting Category	Content Category	Stimuli		Items		Total Items by Claim
		CAT	PT	CAT	PT	
1. Concepts and Procedures	Priority Cluster	0	0	12-15	0	16-20
	Supporting Cluster	0		4-5		
2. Problem Solving 4. Modeling and Data Analysis	Problem Solving	0	1	6	2-4	8-10
	Modeling and Data Analysis	0				
3. Communicating Reasoning	Communicating Reasoning	0		8	0-2	8-10

Target Sampling Mathematics Grade 3						
Claim	Content Category	Assessment Targets	DOK	Items		Total Items
				CAT	PT	
1. Concepts and Procedures	Priority Cluster	B. Understand properties of multiplication and the relationship between multiplication and division.	1	5-6	0	17-20
		C. Multiply and divide within 100.	1			
		I. Geometric measurement: understand concepts of area and relate area to multiplication and to addition.	1, 2			
		G. Solve problems involving measurement and estimation of intervals of time, liquid volumes, and masses of objects.	1, 2			
		D. Solve problems involving the four operations, and identify and explain patterns in arithmetic.	2	5-6		
		F. Develop understanding of fractions as numbers.	1, 2			
		A. Represent and solve problems involving multiplication and division.	1, 2	2-3		
	Supporting Cluster	E. Use place value understanding and properties of operations to perform multi-digit arithmetic.	1	3-4		
		J. Geometric measurement: recognize perimeter as an attribute of plane figures and distinguish between linear and area measures.	1			
		K. Reason with shapes and their attributes.	1, 2			
		H. Represent and interpret data.	2, 3	1		

Target Sampling Mathematics Grade 3 (Continued)						
Claim	Content Category	Assessment Targets	DOK	Items		Total Items
				CAT	PT	
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.	2, 3	2	1–2	8-10
		B. Select and use appropriate tools strategically. C. Interpret results in the context of a situation. D. Identify important quantities in a practical situation and map their relationships (e.g., using diagrams, two-way tables, graphs, flow charts, or formulas).	1, 2, 3	1		
	Modeling and Data Analysis (drawn across content domains)	A. Apply mathematics to solve problems arising in everyday life, society, and the workplace. D. Interpret results in the context of a situation.	2, 3	1	1–3	
		B. Construct, autonomously, chains of reasoning to justify mathematical models used, interpretations made, and solutions proposed for a complex problem. E. Analyze the adequacy of and make improvements to an existing model or develop a mathematical model of a real phenomenon.	2, 3, 4	1		
		C. State logical assumptions being used. F. Identify important quantities in a practical situation and map their relationships (e.g., using diagrams, two-way tables, graphs, flow charts, or formulas).	1, 2, 3	1		
		G. Identify, analyze, and synthesize relevant external resources to pose or solve problems.	3, 4	0		

Target Sampling Mathematics Grade 3 (Continued)						
Claim	Content Category	Assessment Targets	DOK	Items		Total Items
				CAT	PT	
3. Communicating Reasoning	Communicating Reasoning (drawn across content domains)	A. Test propositions or conjectures with specific examples. D. Use the technique of breaking an argument into cases.	2, 3	3	0-2	8-10
		B. Construct, autonomously, chains of reasoning that will justify or refute propositions or conjectures. E. Distinguish correct logic or reasoning from that which is flawed, and—if there is a flaw in the argument—explain what it is.	2, 3, 4	3		
		C. State logical assumptions being used. F. Base arguments on concrete referents such as objects, drawings, diagrams, and actions.	2, 3	2		

Target Sampling Mathematics Grade 4						
Claim	Content Category	Assessment Targets	DOK	Items		Total Items
				CAT	PT	
1. Concepts and Procedures	Priority Cluster	A. Use the four operations with whole numbers to solve problems.	1, 2	8-9	0	17-20
		E. Use place value understanding and properties of operations to perform multi-digit arithmetic.	1, 2			
		F. Extend understanding of fraction equivalence and ordering.	1, 2			
		G. Build fractions from unit fractions by applying and extending previous understandings of operations on whole numbers.	1, 2	2-3		
		D. Generalize place value understanding for multi-digit whole numbers.	1, 2	1-2		
		H. Understand decimal notation for fractions, and compare decimal fractions.	1, 2	1		
	Supporting Cluster	I. Solve problems involving measurement and conversion of measurements from a larger unit to a smaller unit.	1, 2	2-3		
		K. Geometric measurement: understand concepts of angle and measure angles.	1, 2			
		B. Gain familiarity with factors and multiples.	1, 2	1		
		C. Generate and analyze patterns.	2, 3			
		J. Represent and interpret data.	1, 2			
		L. Draw and identify lines and angles, and classify shapes by properties of their lines and angles.	1, 2	1		

Target Sampling Mathematics Grade 4 (Continued)						
Claim	Content Category	Assessment Targets	DOK	Items		Total Items
				CAT	PT	
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.	2, 3	2	1–2	8-10
		B. Select and use appropriate tools strategically. C. Interpret results in the context of a situation. D. Identify important quantities in a practical situation and map their relationships (e.g., using diagrams, two-way tables, graphs, flow charts, or formulas).	1, 2, 3	1		
	Modeling and Data Analysis (drawn across content domains)	A. Apply mathematics to solve problems arising in everyday life, society, and the workplace. D. Interpret results in the context of a situation.	2, 3	1	1–3	
		B. Construct, autonomously, chains of reasoning to justify mathematical models used, interpretations made, and solutions proposed for a complex problem. E. Analyze the adequacy of and make improvements to an existing model or develop a mathematical model of a real phenomenon.	2, 3, 4	1		
		C. State logical assumptions being used. F. Identify important quantities in a practical situation and map their relationships (e.g., using diagrams, two-way tables, graphs, flow charts, or formulas).	1, 2, 3	1		
		G. Identify, analyze, and synthesize relevant external resources to pose or solve problems.	3, 4	0		

Target Sampling Mathematics Grade 4 (Continued)						
Claim	Content Category	Assessment Targets	DOK	Items		Total Items
				CAT	PT	
3. Communicating Reasoning	Communicating Reasoning (drawn across content domains)	A. Test propositions or conjectures with specific examples. D. Use the technique of breaking an argument into cases.	2, 3	3	0-2	8-10
		B. Construct, autonomously, chains of reasoning that will justify or refute propositions or conjectures. E. Distinguish correct logic or reasoning from that which is flawed, and—if there is a flaw in the argument—explain what it is.	2, 3, 4	3		
		C. State logical assumptions being used. F. Base arguments on concrete referents such as objects, drawings, diagrams, and actions.	2, 3	2		

Target Sampling Mathematics Grade 5						
Claim	Content Category	Assessment Targets	DOK	Items		Total Items
				CAT	PT	
1. Concepts and Procedures	Priority Cluster	E. Use equivalent fractions as a strategy to add and subtract fractions.	1, 2	5-6	0	17-20
		I. Geometric measurement: understand concepts of volume and relate volume to multiplication and to addition.	1, 2			
		F. Apply and extend previous understandings of multiplication and division to multiply and divide fractions.	1, 2	4-5		
		D. Perform operations with multi-digit whole numbers and with decimals to hundredths.	1, 2	3-4		
		C. Understand the place value system.	1, 2			
	Supporting Cluster	J. Graph points on the coordinate plane to solve real-world and mathematical problems.	1	2-3		
		K. Classify two-dimensional figures into categories based on their properties.	2			
		A. Write and interpret numerical expressions.	1	2		
		B. Analyze patterns and relationships.	2			
		G. Convert like measurement units within a given measurement system.	1			
		H. Represent and interpret data.	1, 2			

Target Sampling Mathematics Grade 5 (Continued)						
Claim	Content Category	Assessment Targets	DOK	Items		Total Items
				CAT	PT	
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.	2, 3	2	1–2	8-10
		B. Select and use appropriate tools strategically. C. Interpret results in the context of a situation. D. Identify important quantities in a practical situation and map their relationships (e.g., using diagrams, two-way tables, graphs, flow charts, or formulas).	1, 2, 3	1		
	Modeling and Data Analysis (drawn across content domains)	A. Apply mathematics to solve problems arising in everyday life, society, and the workplace. D. Interpret results in the context of a situation.	2, 3	1	1–3	
		B. Construct, autonomously, chains of reasoning to justify mathematical models used, interpretations made, and solutions proposed for a complex problem. E. Analyze the adequacy of and make improvements to an existing model or develop a mathematical model of a real phenomenon.	2, 3, 4	1		
		C. State logical assumptions being used. F. Identify important quantities in a practical situation and map their relationships (e.g., using diagrams, two-way tables, graphs, flow charts, or formulas).	1, 2, 3	1		
		G. Identify, analyze, and synthesize relevant external resources to pose or solve problems.	3, 4	0		

Target Sampling Mathematics Grade 5 (Continued)						
Claim	Content Category	Assessment Targets	DOK	Items		Total Items
				CAT	PT	
3. Communicating Reasoning	Communicating Reasoning (drawn across content domains)	A. Test propositions or conjectures with specific examples. D. Use the technique of breaking an argument into cases.	2, 3	3	0-2	8-10
		B. Construct, autonomously, chains of reasoning that will justify or refute propositions or conjectures. E. Distinguish correct logic or reasoning from that which is flawed, and—if there is a flaw in the argument—explain what it is.	2, 3, 4	3		
		C. State logical assumptions being used. F. Base arguments on concrete referents such as objects, drawings, diagrams, and actions.	2, 3	2		

Target Sampling Mathematics Grade 6						
Claim	Content Category	Assessment Targets	DOK	Items		Total Items
				CAT	PT	
1. Concepts and Procedures	Priority Cluster	E. Apply and extend previous understandings of arithmetic to algebraic expressions.	1	5-6	0	16-19
		F. Reason about and solve one-variable equations and inequalities.	1, 2			
		A. Understand ratio concepts and use ratio reasoning to solve problems.	1, 2	3-4		
		G. Represent and analyze quantitative relationships between dependent and independent variables.	2	2		
		B. Apply and extend previous understandings of multiplication and division to divide fractions by fractions.	1, 2			
		D. Apply and extend previous understandings of numbers to the system of rational numbers.	1, 2	2		
	Supporting Cluster	C. Compute fluently with multi-digit numbers and find common factors and multiples.	1, 2	4-5		
		H. Solve real-world and mathematical problems involving area, surface area, and volume.	1, 2			
		I. Develop understanding of statistical variability.	2			
		J. Summarize and describe distributions.	1, 2			

Target Sampling Mathematics Grade 6 (Continued)						
Claim	Content Category	Assessment Targets	DOK	Items		Total Items
				CAT	PT	
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.	2, 3	2	1–2	8-10
		B. Select and use appropriate tools strategically. C. Interpret results in the context of a situation. D. Identify important quantities in a practical situation and map their relationships (e.g., using diagrams, two-way tables, graphs, flow charts, or formulas).	1, 2, 3	1		
	Modeling and Data Analysis (drawn across content domains)	A. Apply mathematics to solve problems arising in everyday life, society, and the workplace. D. Interpret results in the context of a situation.	2, 3	1	1–3	
		B. Construct, autonomously, chains of reasoning to justify mathematical models used, interpretations made, and solutions proposed for a complex problem. E. Analyze the adequacy of and make improvements to an existing model or develop a mathematical model of a real phenomenon.	2, 3, 4	1		
		C. State logical assumptions being used. F. Identify important quantities in a practical situation and map their relationships (e.g., using diagrams, two-way tables, graphs, flow charts, or formulas).	1, 2, 3	1		
		G. Identify, analyze, and synthesize relevant external resources to pose or solve problems.	3, 4	0		

Target Sampling Mathematics Grade 6 (Continued)						
Claim	Content Category	Assessment Targets	DOK	Items		Total Items
				CAT	PT	
3. Communicating Reasoning	Communicating Reasoning (drawn across content domains)	A. Test propositions or conjectures with specific examples. D. Use the technique of breaking an argument into cases.	2, 3	3	0-2	8-10
		B. Construct, autonomously, chains of reasoning that will justify or refute propositions or conjectures. E. Distinguish correct logic or reasoning from that which is flawed, and—if there is a flaw in the argument—explain what it is.	2, 3, 4	3		
		C. State logical assumptions being used. F. Base arguments on concrete referents such as objects, drawings, diagrams, and actions. 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.)	2, 3	2		

Target Sampling Mathematics Grade 7						
Claim	Content Category	Assessment Targets	DOK	Items		Total Items
				CAT	PT	
1. Concepts and Procedures	Priority Cluster	A. Analyze proportional relationships and use them to solve real-world and mathematical problems.	2	8-9	0	17-20
		D. Solve real-life and mathematical problems using numerical and algebraic expressions and equations.	1, 2			
		B. Apply and extend previous understandings of operations with fractions to add, subtract, multiply, and divide rational numbers.	1, 2	5-6		
		C. Use properties of operations to generate equivalent expressions.	1, 2			
	Supporting Cluster	E. Draw, construct, and describe geometrical figures and describe the relationship between them.	1, 2	2-3		
		F. Solve real-life and mathematical problems involving angle measure, area, surface area, and volume.	1, 2			
		G. Use random sampling to draw inferences about a population.	1, 2	1-2		
		H. Draw informal comparative inferences about two populations.	2			
		I. Investigate chance processes and develop, use, and evaluate probability models.	1, 2			

Target Sampling Mathematics Grade 7 (Continued)						
Claim	Content Category	Assessment Targets	DOK	Items		Total Items
				CAT	PT	
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.	2, 3	2	1–2	8-10
		B. Select and use appropriate tools strategically. C. Interpret results in the context of a situation. D. Identify important quantities in a practical situation and map their relationships (e.g., using diagrams, two-way tables, graphs, flow charts, or formulas).	1, 2, 3	1		
	Modeling and Data Analysis (drawn across content domains)	A. Apply mathematics to solve problems arising in everyday life, society, and the workplace. D. Interpret results in the context of a situation.	2, 3	1	1–3	
		B. Construct, autonomously, chains of reasoning to justify mathematical models used, interpretations made, and solutions proposed for a complex problem. E. Analyze the adequacy of and make improvements to an existing model or develop a mathematical model of a real phenomenon.	2, 3, 4	1		
		C. State logical assumptions being used. F. Identify important quantities in a practical situation and map their relationships (e.g., using diagrams, two-way tables, graphs, flow charts, or formulas).	1, 2, 3	1		
		G. Identify, analyze, and synthesize relevant external resources to pose or solve problems.	3, 4	0		

Target Sampling Mathematics Grade 7 (Continued)						
Claim	Content Category	Assessment Targets	DOK	Items		Total Items
				CAT	PT	
3. Communicating Reasoning	Communicating Reasoning (drawn across content domains)	A. Test propositions or conjectures with specific examples. D. Use the technique of breaking an argument into cases.	2, 3	3	0-2	8-10
		B. Construct, autonomously, chains of reasoning that will justify or refute propositions or conjectures. E. Distinguish correct logic or reasoning from that which is flawed, and—if there is a flaw in the argument—explain what it is.	2, 3, 4	3		
		C. State logical assumptions being used. F. Base arguments on concrete referents such as objects, drawings, diagrams, and actions. 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.)	2, 3	2		

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.	1, 2	5-6	0	17-20
		D. Analyze and solve linear equations and pairs of simultaneous linear equations.	1, 2			
		B. Work with radicals and integer exponents.	1, 2	5-6		
		E. Define, evaluate, and compare functions.	1, 2			
		G. Understand congruence and similarity using physical models, transparencies, or geometry software.	1, 2			
		F. Use functions to model relationships between quantities.	1, 2	2-3		
		H. Understand and apply the Pythagorean Theorem.	1, 2			
	Supporting Cluster	A. Know that there are numbers that are not rational, and approximate them by rational numbers.	1, 2	4-5		
		I. Solve real-world and mathematical problems involving volume of cylinders, cones, and spheres.	1, 2			
		J. Investigate patterns of association in bivariate data.	1, 2			

Target Sampling Mathematics Grade 8 (Continued)						
Claim	Content Category	Assessment Targets	DOK	Items		Total Items
				CAT	PT	
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.	2, 3	2	1–2	8-10
		B. Select and use appropriate tools strategically. C. Interpret results in the context of a situation. D. Identify important quantities in a practical situation and map their relationships (e.g., using diagrams, two-way tables, graphs, flow charts, or formulas).	1, 2, 3	1		
	Modeling and Data Analysis (drawn across content domains)	A. Apply mathematics to solve problems arising in everyday life, society, and the workplace. D. Interpret results in the context of a situation.	2, 3	1	1–3	
		B. Construct, autonomously, chains of reasoning to justify mathematical models used, interpretations made, and solutions proposed for a complex problem. E. Analyze the adequacy of and make improvements to an existing model or develop a mathematical model of a real phenomenon.	2, 3, 4	1		
		C. State logical assumptions being used. F. Identify important quantities in a practical situation and map their relationships (e.g., using diagrams, two-way tables, graphs, flow charts, or formulas).	1, 2, 3	1		
		G. Identify, analyze, and synthesize relevant external resources to pose or solve problems.	3, 4	0		

Target Sampling Mathematics Grade 8 (Continued)						
Claim	Content Category	Assessment Targets	DOK	Items		Total Items
				CAT	PT	
3. Communicating Reasoning	Communicating Reasoning (drawn across content domains)	A. Test propositions or conjectures with specific examples. D. Use the technique of breaking an argument into cases.	2, 3	3	0-2	8-10
		B. Construct, autonomously, chains of reasoning that will justify or refute propositions or conjectures. E. Distinguish correct logic or reasoning from that which is flawed, and—if there is a flaw in the argument—explain what it is.	2, 3, 4	3		
		C. State logical assumptions being used. F. Base arguments on concrete referents such as objects, drawings, diagrams, and actions. 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.)	2, 3	2		