

Mathematics Content Emphases

The pattern of emphasis for the Targets that compose the Claims is adapted from the work of national assessment initiatives. Individual standards, while important, are impossible to accurately measure with limited testing time. By assessing at the Target level, it is possible to highlight student comprehension of the connected material contained in the Standards. To capture the focus, coherence, and rigor of the Standards, it is necessary to vary the emphasis on particular Targets. All of the content is eligible for assessment, and the balance of tested content is derived from the expectations of the Standards.

The Claims are the broadest categories of knowledge, skills, and abilities that can have inferences drawn about them. Claims are built from Targets; Targets are drawn from the Standards.

The Goal Depth of Knowledge (an index of cognitive complexity) is provided as a general reference for the projected maximum DOK of items. Typically, items are at DOK 1 or 2, with some DOK 3 items as supported by the context. DOK 4 is generally reserved for performance tasks, such as geometric proofs or figure constructions.

The Relative Emphasis for each Target in Claim 1 is based on the work of the national assessment initiatives and the relative frequency with which items aligned to that Target would appear on an item-adaptive test. The Relative Emphasis should **NOT** be interpreted as a basis for making curricular decisions. Targets with a Low Relative Emphasis may include concomitant skills of other Medium or High Targets in the same grade. These Targets may also be important foundational skills in a progression, and key to success in later grades.

Content Emphases for Grade 3

| Claim (% of Test) | Target(s) | Goal DOK | Relative Emphasis/Comments |
|--|-----------|----------|---|
| 1. Concepts & Procedures (65-75%) | A | 2 | High |
| | B | 1 | High |
| | C | 1 | High |
| | D | 2 | High |
| | E | 1 | Low |
| | F | 2 | High |
| | G | 2 | High |
| | H | 3 | Medium |
| | I | 2 | High |
| | J | 2 | Low |
| | K | 2 | Medium |
| 2. Problem Solving (8-12%) | A-D | 3 | Tasks limited to machine-scorable responses, so not all Targets may be addressed. |
| 3. Communicating Reasoning (8-12%) | A-F | 3 | Tasks limited to machine-scorable responses, so not all Targets may be addressed. |
| 4. Modeling and Data Analysis (8-12%) | A-G | 3 | Tasks limited to machine-scorable responses, so not all Targets may be addressed. |

Grade 3, Claim 1 Targets

| | |
|-----------------|---|
| Target A | Represent and solve problems involving multiplication and division. |
| Target B | Understand properties of multiplication and the relationship between multiplication and division. |
| Target C | Multiply and divide up to 100. |
| Target D | Solve problems involving the four operations, and identify and explain patterns in arithmetic. |
| Target E | Use place value understanding and properties of operations to perform multi-digit arithmetic. |
| Target F | Develop understanding of fractions as numbers. |
| Target G | Solve problems involving measurement and estimation of intervals of time, liquid volumes, and masses of objects. |
| Target H | Represent and interpret data. |
| Target I | Geometric measurement: understand concepts of area and relate area to multiplication and to addition. |
| Target J | Geometric measurement: recognize perimeter as an attribute of plane figures and distinguish between linear and area measures. |
| Target K | Reason with shapes and their attributes. |

Content Emphases for Grade 4

| Claim (% of Test) | Target(s) | Goal DOK | Relative Emphasis/Comments |
|--|-------------------------------|----------|---|
| 1. Concepts & Procedures (65-75%) | A | 2 | High |
| | B | 1 | Medium |
| | C | 3 | Low |
| | D | 2 | High |
| | E | 2 | High |
| | F | 2 | High |
| | G | 2 | High |
| | H | 2 | High |
| | I | 2 | Medium |
| | J | 2 | Medium |
| | K | 2 | Low |
| | L | 2 | Low |
| | 2. Problem Solving (8-12%) | A-D | 3 |
| 3. Communicating Reasoning (8-12%) | A-F | 3 | Tasks limited to machine-scorable responses, so not all Targets may be addressed. |
| 4. Modeling and Data Analysis (8-12%) | A-G | 3 | Tasks limited to machine-scorable responses, so not all Targets may be addressed. |

Grade 4, Claim 1 Targets

| | |
|-----------------|---|
| Target A | Use the four operations with whole numbers to solve problems. |
| Target B | Gain familiarity with factors and multiples. |
| Target C | Generate and analyze patterns. |
| Target D | Generalize place value understanding for multi-digit whole numbers. |
| Target E | Use place value understanding and properties of operations to perform multi-digit arithmetic. |
| Target F | Extend understanding of fraction equivalence and ordering. |
| Target G | Build fractions from unit fractions by applying and extending previous understandings of operations on whole numbers. |
| Target H | Understand decimal notation for fractions, and compare decimal fractions. |
| Target I | Solve problems involving measurement and conversion of measurements from a larger unit to a smaller unit, and involving time. |
| Target J | Represent and interpret data. |
| Target K | Geometric measurement: understand concepts of angle and measure angles. |
| Target L | Draw and identify lines and angles, and classify shapes by properties of their lines and angles. |

Content Emphases for Grade 5

| Claim (% of Test) | Target(s) | Goal DOK | Relative Emphasis/Comments |
|--|-----------|----------|---|
| 1. Concepts & Procedures (65-75%) | A | 1 | Low |
| | B | 2 | Low |
| | C | 2 | High |
| | D | 2 | High |
| | E | 2 | High |
| | F | 2 | High |
| | G | 1 | Medium |
| | H | 2 | Medium |
| | I | 2 | High |
| | J | 1 | Low |
| | K | 2 | Low |
| 2. Problem Solving (8-12%) | A-D | 3 | Tasks limited to machine-scorable responses, so not all Targets may be addressed. |
| 3. Communicating Reasoning (8-12%) | A-F | 3 | Tasks limited to machine-scorable responses, so not all Targets may be addressed. |
| 4. Modeling and Data Analysis (8-12%) | A-G | 3 | Tasks limited to machine-scorable responses, so not all Targets may be addressed. |

Grade 5, Claim 1 Targets

| | |
|-----------------|---|
| Target A | Write and interpret numerical expressions. |
| Target B | Analyze patterns and relationships. |
| Target C | Understand the place value system. |
| Target D | Perform operations with multi-digit whole numbers and with decimals to hundredths. |
| Target E | Use equivalent fractions as a strategy to add and subtract fractions. |
| Target F | Apply and extend previous understandings of multiplication and division to multiply and divide fractions. |
| Target G | Convert like measurement units within a given measurement system and solve problems involving time. |
| Target H | Represent and interpret data. |
| Target I | Geometric measurement: understand concepts of volume and relate volume to multiplication and to addition. |
| Target J | Graph points on the coordinate plane to solve real-world and mathematical problems. |
| Target K | Classify two-dimensional (plane) figures into categories based on their properties. |

Content Emphases for Grade 6

| Claim (% of Test) | Target(s) | Goal DOK | Relative Emphasis/Comments |
|--|-----------|----------|---|
| 1. Concepts & Procedures (65-75%) | A | 2 | High |
| | B | 2 | High |
| | C | 1 | Low |
| | D | 2 | High |
| | E | 2 | High |
| | F | 2 | High |
| | G | 2 | High |
| | H | 2 | Medium |
| | I | 2 | Low |
| | J | 2 | Low |
| 2. Problem Solving (8-12%) | A-D | 3 | Tasks limited to machine-scorable responses, so not all Targets may be addressed. |
| 3. Communicating Reasoning (8-12%) | A-F | 3 | Tasks limited to machine-scorable responses, so not all Targets may be addressed. |
| 4. Modeling and Data Analysis (8-12%) | A-G | 3 | Tasks limited to machine-scorable responses, so not all Targets may be addressed. |

Grade 6, Claim 1 Targets

| | |
|-----------------|---|
| Target A | Understand ratio concepts and use ratio reasoning to solve problems. |
| Target B | Apply and extend previous understandings of multiplication and division to divide fractions by fractions. |
| Target C | Compute fluently with multi-digit numbers and find common factors and multiples. |
| Target D | Apply and extend previous understandings of numbers to the system of rational numbers. |
| Target E | Apply and extend previous understandings of arithmetic to algebraic expressions. |
| Target F | Reason about and solve one-variable equations and inequalities. |
| Target G | Represent and analyze quantitative relationships between dependent and independent variables. |
| Target H | Solve real-world and mathematical problems involving area, surface area, and volume. |
| Target I | Develop an understanding of statistics variability. |
| Target J | Summarize and describe distributions. |

Content Emphases for Grade 7

| Claim (% of Test) | Target(s) | Goal DOK | Relative Emphasis/Comments |
|--|-----------|----------|---|
| 1. Concepts & Procedures (65-75%) | A | 2 | High |
| | B | 2 | High |
| | C | 1 | High |
| | D | 2 | High |
| | E | 3 | Low |
| | F | 2 | Low |
| | G | 2 | Medium |
| | H | 2 | Low |
| | I | 2 | Medium |
| 2. Problem Solving (8-12%) | A-D | 3 | Tasks limited to machine-scorable responses, so not all Targets may be addressed. |
| 3. Communicating Reasoning (8-12%) | A-F | 3 | Tasks limited to machine-scorable responses, so not all Targets may be addressed. |
| 4. Modeling and Data Analysis (8-12%) | A-G | 3 | Tasks limited to machine-scorable responses, so not all Targets may be addressed. |

Grade 7, Claim 1 Targets

| | |
|-----------------|--|
| Target A | Analyze proportional relationships and use them to solve real-world and mathematical problems. |
| Target B | Apply and extend previous understandings of operations with fractions to add, subtract, multiply, and divide rational numbers. |
| Target C | Use properties of operations to generate equivalent expressions. |
| Target D | Solve real-life and mathematical problems using numerical and algebraic expressions and equations. |
| Target E | Draw, construct, and describe geometrical figures and describe the relationships between them. |
| Target F | Solve real-life and mathematical problems involving angle measure, area, surface area, and volume. |
| Target G | Use random sampling to draw inferences about a population. |
| Target H | Draw informal comparative inferences about two populations. |
| Target I | Investigate chance processes and develop, use, and evaluate probability models. |

Content Emphases for Grade 8

| Claim (% of Test) | Target(s) | Goal DOK | Relative Emphasis/Comments |
|--|-----------|----------|---|
| 1. Concepts & Procedures (65-75%) | A | 1 | Medium |
| | B | 1 | High |
| | C | 2 | High |
| | D | 2 | High |
| | E | 2 | High |
| | F | 2 | Medium |
| | G | 2 | High |
| | H | 2 | High |
| | I | 2 | Low |
| | J | 2 | Medium |
| 2. Problem Solving (8-12%) | A-D | 3 | Tasks limited to machine-scorable responses, so not all Targets may be addressed. |
| 3. Communicating Reasoning (8-12%) | A-F | 3 | Tasks limited to machine-scorable responses, so not all Targets may be addressed. |
| 4. Modeling and Data Analysis (8-12%) | A-G | 3 | Tasks limited to machine-scorable responses, so not all Targets may be addressed. |

Grade 8, Claim 1 Targets

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

Content Emphases for Grade 10

| Claim (% of Test) | Target(s) | Goal DOK | Relative Emphasis/Comments |
|--|-----------|----------|--|
| 1. Concepts & Procedures (65-75%) | A | 2 | Low |
| | C | 2 | Medium |
| | D | 1 | Medium |
| | E | 2 | Medium |
| | F | 1 | Medium |
| | G | 2 | High |
| | H | 2 | Medium-High |
| | I | 2 | Medium |
| | J | 2 | Very High |
| | K | 1 | Medium |
| | L | 2 | Medium-High |
| | M | 3 | Medium |
| | N | 2 | Low |
| | O | 2 | Low |
| | P | 2 | Medium |
| | Q | 2 | High |
| R | 2 | Medium | |
| 2. Problem Solving (8-12%) | A-D | 3 | Tasks are limited to machine-scorable responses, so not all Targets will be addressed. |
| 3. Communicating Reasoning (8-12%) | A-F | 3 | Tasks are limited to machine-scorable responses, so not all Targets will be addressed. |
| 4. Modeling and Data Analysis (8-12%) | A-G | 3 | Tasks are limited to machine-scorable responses, so not all Targets will be addressed. |

Grade 10, Claim 1 Targets

| | |
|-----------------|---|
| Target A | Extend the properties of exponents to rational exponents. |
| Target C | Reason quantitatively and use units to solve problems. |
| Target D | Interpret the structure of expressions. |
| Target E | Write expressions in equivalent forms to solve problems. |
| Target F | Perform arithmetic operations on polynomials. |
| Target G | Create equations that describe numbers or relationships. |
| Target H | Understand solving equations as a process of reasoning and explain the reasoning. |
| Target I | Solve equations and inequalities in one variable. |
| Target J | Represent and solve equations and inequalities graphically. |
| Target K | Understand the concept of a function and use function notation. |
| Target L | Interpret functions that arise in applications in terms of the context. |
| Target M | Analyze functions using different representations. |
| Target N | Build a function that models a relationship between two quantities. |
| Target O | Define trigonometric ratios and solve problems involving right triangles. |
| Target P | Summarize, represent, and interpret data on a single count or measurement variable. |
| Target Q | Prove geometric theorems. |
| Target R | Explain volume formulas and use them to solve problems. |

Claims 2, 3, and 4 Targets – All Grades

Claim 2: Problem Solving

| | |
|-----------------|---|
| Target A | Apply mathematics to solve well-posed problems in pure mathematics and arising in everyday life, society, and the workplace. |
| Target B | Select and use appropriate tools strategically. |
| Target C | Interpret results in the context of a situation. |
| Target D | Identify important quantities in a practical situation and map their relationships (e.g., using diagrams, two-way tables, graphs, flowcharts, or formulas). |

Claim 3: Communicating Reasoning

| | |
|-----------------|--|
| Target A | Test propositions or conjectures with specific examples. |
| Target B | Construct, autonomously, chains of reasoning that will justify or refute propositions or conjectures. |
| Target C | State logical assumptions being used. |
| Target D | Use the technique of breaking an argument into cases. |
| 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. |
| Target F | Base arguments on concrete referents such as objects, drawings, diagrams, and actions. |

Claim 4: Modeling and Data Analysis

| | |
|-----------------|---|
| Target A | Apply mathematics to solve problems arising in everyday life, society, and the workplace. |
| Target B | Construct, autonomously, chains of reasoning to justify mathematical models used, interpretations made, and solutions proposed for a complex problem. |
| Target C | State logical assumptions being used. |
| Target D | Interpret results in the context of a situation. |
| Target E | Analyze the adequacy of and make improvements to an existing model or develop a mathematical model of a real phenomenon. |

| | |
|-----------------|---|
| Target F | Identify important quantities in a practical situation and map their relationships (e.g., using diagrams, two-way tables, graphs, flowcharts, or formulas). |
|-----------------|---|