Achievement Level Descriptors (ALDs) for Summative Smarter Balanced Assessment for Grade 4 Mathematics

Smarter Balanced Assessments
Smarter Balanced assessments in English language arts (ELA) and mathematics are administered to students in grades 3–8 and high school. Smarter Balanced Achievement Level Descriptors (ALDs) were developed by K–12 teachers and administrators and higher education faculty from the Smarter Balanced Governing States. The ALDs are aligned to the academic level colleges expect students to have when they arrive on campus. The ALDs describe the knowledge, skills, and processes that students demonstrate on state tests in each performance level, at each tested grade level.

Range ALDs:
Grade- and content-specific descriptions of the cognitive and content rigor encompassed within each achievement level. The range ALDs describe the knowledge, skills, and processes typical of students in each achievement level.

The Range ALDs presented in this document represent a new direction in the focus and purpose of ALDs. In the past, ALDs were developed near the end of the test development cycle and could only summarize student performance. This new approach allows for the development of ALDs at the beginning of the test development cycle so that expectations for student performance may guide the way tests are conceived and produced.

The Range ALDs presented in this document are identical to the Smarter Balanced ALDs. We have extracted the Claim 1 Range ALDs and bulleted them for ease of reading. The Claims 2, 3, and 4 Range ALDs have also been extracted and formatted by removing the assessment targets for those claims.

It is important to note that this document is not intended to be used as a checklist. This is especially true for the high school ALDs which do not describe all of the content in the Standards that students should be learning. The ALDs should, instead, be used to inform educators regarding the typical skills and knowledge a student in each achievement level (Level 1, 2, 3, and 4) is likely to have. They can also be used to inform educators of the skills and knowledge required for students to perform at Levels 3 and 4, levels that show students are making adequate progress toward career- and college-ready skills.

Any questions about this document can be sent to mathematics@k12.wa.us. Thank you.
Achievement Level Descriptors (ALDs) for Summative Smarter Balanced Assessment for Grade 4 Mathematics

Achievement level descriptors (ALDs) describe student performance on a standardized test in terms of levels or categories of performance. For the Smarter Balanced assessments, outcomes will be reported in terms of four levels of achievement: Level 1, Level 2, Level 3, and Level 4. The ALDs are text descriptions of the knowledge, skills, and processes that are expected to be demonstrated by students in each category of performance.

**CLAIM 1: Students can explain and apply mathematical concepts and carry out mathematical procedures with precision and fluency.**

<table>
<thead>
<tr>
<th>Target A: Use the four operations with whole numbers to solve problems.</th>
<th>Level 1 students should be able to:</th>
<th>Level 2 students should be able to:</th>
<th>Level 3 students should be able to:</th>
<th>Level 4 students should be able to:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>• Use the four operations (add, subtract, multiply, and divide) to solve one-step problems involving equal groups and arrays.</td>
<td>• Use the four operations to solve one-step problems involving an unknown number.</td>
<td>• Use the four operations (add, subtract, multiply, and divide) to solve one-step problems involving equal groups and arrays, including problems where the remainder must be interpreted.</td>
<td>• Assess the reasonableness of answers using mental computation and estimation strategies, including rounding.</td>
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<tr>
<td>Target D: Generalize place value understanding for multi-digit whole numbers.</td>
<td>• Read and write multi-digit whole numbers less than or equal to 1,000 using base-ten numerals, number names, and expanded form.</td>
<td>• Look for and use repeated reasoning to generalize place value understanding to be able to read and write multi-digit whole numbers less than or equal to 100,000 using base-ten numerals, number names, and expanded form.</td>
<td>• Look for and use repeated reasoning to generalize place value understanding to be able to read and write multi-digit whole numbers less than or equal to 1,000,000 using base-ten numerals, number names, and expanded form.</td>
<td>• Assess the reasonableness of answers using mental computation and estimation strategies, including rounding.</td>
</tr>
<tr>
<td></td>
<td>• Compare multi-digit numbers up to 1,000 using &lt;, &gt;, and =.</td>
<td>• Compare multi-digit numbers up to 100,000 using &lt;, &gt;, and =.</td>
<td>• Compare multi-digit numbers up to 1,000,000 using &lt;, &gt;, and =.</td>
<td>• Assess the reasonableness of answers using mental computation and estimation strategies, including rounding.</td>
</tr>
<tr>
<td></td>
<td>• Round multi-digit whole numbers up to 1,000 to any place.</td>
<td>• Round multi-digit whole numbers up to 100,000 to any place.</td>
<td>• Round multi-digit whole numbers up to 1,000,000 to any place.</td>
<td>• Assess the reasonableness of answers using mental computation and estimation strategies, including rounding.</td>
</tr>
</tbody>
</table>

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| Target E: Use place value understanding and properties of operations to perform multi-digit arithmetic. | • Add and subtract one- and two-digit whole numbers using strategies based on place value.  
• Multiply two one-digit whole numbers based on place value and properties of operations.  
• Find whole-number quotients with no remainders with up to two-digit dividends and one-digit divisors using strategies based on place value, the properties of operations, and/or the relationship between multiplication and division. | • Use place value understanding to add and subtract two- and three-digit whole numbers using a standard algorithm.  
• Multiply whole numbers up to and including four digits by one digit based on place value and properties of operations;  
• Find whole-number quotients and remainders with up to two-digit dividends and one-digit divisors using strategies based on place value, the properties of operations, and/or the relationship between multiplication and division.  
• Illustrate multiplication and division by using equations, arrays, and/or area models. | • Fluently add and subtract multi-digit whole numbers using the standard algorithm.  
• Multiply whole numbers including two digits by two digits based on place value and properties of operations.  
• Find whole-number quotients and remainders with up to four-digit dividends and one-digit divisors using strategies based on place value understanding, the properties of operations, and/or the relationship between multiplication and division.  
• Explain multiplication and division using equations, arrays, and/or area models. |  |
| --- | --- | --- | --- |  |
| Target F: Extend understanding of fraction equivalence and ordering. | • Recognize that fraction comparisons are valid only when the two fractions are referring to the same whole. | • Compare two fractions with different numerators and different denominators using <, >, and = by comparing to a benchmark fraction such as 1/2.  
• Recognize equivalent fractions using visual models. | • Extend understanding to compare two fractions with different numerators and different denominators using <, >, and = by creating common denominators or numerators.  
• Recognize and generate equivalent fractions using visual models. | • Extend understanding to compare two fractions with different numerators and different denominators using <, >, and = and justify the conclusions using a visual fraction model. |  |
| Target G: Build fractions from unit fractions by applying and extending understandings of operations on whole numbers. | • Understand that a fraction a/b with a > 1 is the sum of its unit fractional parts by extending previous understandings of addition on whole numbers.  
• Identify fractions using visual models. | • Understand that a fraction a/b is a multiple of 1/b by extending previous understanding of multiplication on whole numbers.  
• Solve one-step problems involving addition and subtraction of fractions referring to the same whole with like denominators; and use visual fraction models and/or equations to represent the problem. | • Identify and generate equivalent forms of a fraction including mixed numbers with like denominators.  
• Solve one-step problems involving multiplication of a fraction by a whole number. |  |
| Target H: Understand decimal notation for fractions, and compare decimal fractions. | • Express a fraction with denominator 10 as an equivalent fraction with denominator 100 and express those fractions as decimals. | Add two fractions with respective denominators 10 and 100 by first converting to two fractions with like denominators.  
• Compare two decimals to the hundredths using >, <, =, or on a number line.  
• Compare decimals by reasoning about their size. | Compare two decimals to the hundredths using <, >, and = and justify the conclusions by using visual models. |  |

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<th>Target B: Gain familiarity with factors and multiples.</th>
<th>• Recognize that a whole number is a multiple of each of its factors.</th>
<th>• Find factor pairs for whole numbers in the range of 1–100 that are multiples of 2 or 5.</th>
<th>• Determine whether a given whole number in the range of 1–100 is a multiple of a given one-digit number.</th>
<th>• Find all factor pairs for whole numbers in the range of 1–100.</th>
<th>• Determine whether a given whole number in the range of 1–100 is prime or composite.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Target C: Generate and analyze patterns.</td>
<td>• Extend a number or shape pattern that follows a given rule.</td>
<td>• Generate a number or shape pattern that follows a given rule.</td>
<td>• Analyze a pattern for apparent features that are not explicit in the rule itself.</td>
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</tr>
<tr>
<td>Target I: Solve problems involving measurement and conversion of measurements from a larger unit to a smaller unit.</td>
<td>• Know relative sizes of measurement units within one system of units, including km, m, cm; kg, g; lb, oz; l, ml; and hr, min, sec.</td>
<td>• Express measurements in a larger unit in terms of a smaller unit within a single system of measurement and record measurement equivalents in a two-column table.</td>
<td>• Apply the perimeter formula to rectangles in mathematical problems.</td>
<td>• Use the four operations to solve problems involving distances, intervals of time, liquid volumes, masses of objects, and money, including problems involving simple fractions or decimals, and problems that require expressing measurements given in a larger unit in terms of a smaller unit.</td>
<td>• Apply the perimeter and area formulas to rectangles in word problems.</td>
</tr>
<tr>
<td>Target J: Represent and interpret data.</td>
<td>• Identify data from a given line plot using whole numbers.</td>
<td>• Use data from a given line plot using fractions 1/2, 1/4, and 1/8 to solve one-step problems.</td>
<td>• Create a line plot to represent a data set using fractions 1/2, 1/4, and 1/8.</td>
<td>• Interpret data from a line plot to solve problems involving addition and subtraction of fractions with like denominators.</td>
<td>---</td>
</tr>
<tr>
<td>Target K: Geometric measurement: understand concepts of angle and measure angles.</td>
<td>• Recognize whole-number degrees on a protractor and measure angles in whole-number degrees using a protractor.</td>
<td>• Construct angles in whole-number degrees using a protractor</td>
<td>• Use understanding of angle concepts to decompose a larger angle with two or more smaller angles that have the same sum as the original.</td>
<td>• Determine an unknown angle measure in a diagram.</td>
<td>• Solve addition and subtraction problems to find unknown angles on a diagram in problems by using an equation with a symbol for the unknown angle measure.</td>
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**Target L: Draw and identify lines and angles, and classify shapes by properties of their lines and angles.**

- Draw points, lines, line segments, rays, angles (right, acute, obtuse), and perpendicular and parallel lines.
- Recognize a line of symmetry for a familiar two-dimensional figure.
- Identify right triangles.

**CLAIM 2: Students can solve a range of complex, well-posed problems in pure and applied mathematics, making productive use of knowledge and problem-solving strategies.**

<table>
<thead>
<tr>
<th>Level 1 students should be able to:</th>
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<tr>
<td>Identify important quantities in the context of a familiar situation and translate words to equations or other mathematical formulation. When given the correct math tool(s), students should be able to apply the tool(s) to problems with a high degree of scaffolding. Apply mathematics to solve familiar problems arising in everyday life, society, and the workplace by identifying important quantities and by beginning to develop a model.</td>
<td>Identify important quantities in the context of an unfamiliar situation and to select tools to solve a familiar and moderately scaffolded problem or to solve a less familiar or a non-scaffolded problem with partial accuracy. Provide solutions to familiar problems using an appropriate format (e.g., correct units, etc.). Interpret information and results in the context of a familiar situation. Apply mathematics to propose solutions by identifying important quantities, locating missing information from relevant external resources, beginning to construct chains of reasoning to connect with a model, producing partial justification and interpretations, and beginning to state logical assumptions.</td>
<td>Map, display, and identify relationships, use appropriate tools strategically, and apply mathematics accurately in everyday life, society, and the workplace. Interpret information and results in the context of an unfamiliar situation. Apply mathematics to solve unfamiliar problems arising in everyday life, society, and the workplace by identifying important quantities and mapping, displaying, explaining, or applying their relationship and by locating missing information from relevant external resources. Construct chains of reasoning to justify a model used, produce justification of interpretations, state logical assumptions, and compare and contrast multiple plausible solutions.</td>
<td>Analyze and interpret the context of an unfamiliar situation for problems of increasing complexity and solve problems with optimal solutions. Apply mathematics to solve unfamiliar problems by constructing chains of reasoning to analyze a model, producing and analyzing justification of interpretations, stating logical assumptions, and constructing and comparing/contrasting multiple plausible solutions and approaches.</td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>Level 1 students should be able to:</th>
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<tr>
<td>• Base arguments on concrete referents such as objects, drawings, diagrams, and actions.</td>
<td>• Find and identify the flaw in an argument by using examples or particular cases.</td>
<td>• Use stated assumptions, definitions, and previously established results and examples to test and support their reasoning or to identify, explain, and repair the flaw in an argument.</td>
<td>• Use stated assumptions, definitions, and previously established results to support their reasoning or repair and explain the flaw in an argument.</td>
</tr>
<tr>
<td>• Identify obvious flawed arguments in familiar contexts.</td>
<td>• Break a familiar argument given in a highly scaffolded situation into cases to determine when the argument does or does not hold.</td>
<td>• Break an argument into cases to determine when the argument does or does not hold.</td>
<td>• Construct a chain of logic to justify or refute a proposition or conjecture and to determine the conditions under which an argument does or does not apply.</td>
</tr>
</tbody>
</table>

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