Table 4-1 *(continued)*

Explanations of Major and Additional/Supporting Cluster-Level Emphases

Major Clusters (▲) — Areas of intensive focus where students need fluent understanding and application of the core concepts. These clusters require greater emphasis than others based on the depth of the ideas, the time needed to master them, and their importance to future mathematics or the demands of college and career readiness.

Additional Clusters — Expose students to other subjects; may not connect tightly or explicitly to the major work of the grade.

Supporting Clusters — Designed to support and strengthen areas of major emphasis.

Note of caution: Neglecting material, whether it is found in the major or additional/supporting clusters, will leave gaps in students' skills and understanding and will leave students unprepared for the challenges they face in later grades.

Adapted from Smarter Balanced Assessment Consortium 2011, 84.

Connecting Mathematical Practices and Content

The Standards for Mathematical Practice (MP) are developed throughout each grade and, together with the content standards, prescribe that students experience mathematics as a rigorous, coherent, useful, and logical subject. The MP standards represent a picture of what it looks like for students to understand and do mathematics in the classroom and should be integrated into every mathematics lesson for all students.

Although the description of the MP standards remains the same at all grade levels, the way these standards look as students engage with and master new and more advanced mathematical ideas does change. Table 4-2 presents examples of how the MP standards may be integrated into tasks appropriate for students in grade four. (Refer to the "Overview of the Standards Chapters" for a description of the MP standards.)

Table 4-2. Standards for Mathematical Practice—Explanation and Examples for Grade Four

Standards for Mathematical Practice	Explanation and Examples
MP.1 Make sense of problems and persevere in solving them.	In grade four, students know that doing mathematics involves solving problems and discussing how they solved them. Students explain to themselves the meaning of a problem and look for ways to solve it. Students might use an equation strategy to solve a word problem. For example: "Chris bought clothes for school. She bought 3 shirts for $12 each and a skirt for $15. How much money did Chris spend on her new school clothes?" Students could solve this problem with the equation $3 \times \$12 + \$15 = a$. Students may use visual models to help them conceptualize and solve problems. They may check their thinking by asking themselves, "Does this make sense?" They listen to the strategies of others and will try different approaches. They often use another method to check their answers.

Table 4-2 *(continued)*

MP.2 Reason abstractly and quantitatively.	Grade-four students recognize that a number represents a specific quantity. They connect the quantity to written symbols and create a logical representation of the problem at hand, considering both the appropriate units involved and the meaning of quantities. They extend this understanding from whole numbers to their work with fractions and decimals. Students write simple expressions, record calculations with numbers, and represent or round numbers using place-value concepts. Students might use array or area drawings to demonstrate and explain 154 × 6 as 154 added six times, and so they develop an understanding of the distributive property. For example: $154 \times 6 = (100 + 50 + 4) \times 6$ $= (100 \times 6) + (50 \times 6) + (4 \times 6)$ $= 600 + 300 + 24$ $= 924$ To reinforce students' reasoning and understanding, teachers might ask, "How do you know?" or "What is the relationship of the quantities?"
MP.3 Construct viable arguments and critique the reasoning of others.	Students may construct arguments using concrete referents, such as objects, pictures, drawings, and actions. They practice their mathematical communication skills as they participate in mathematical discussions involving questions such as "How did you get that?", "Explain your thinking," and "Why is that true?" They not only explain their own thinking, but also listen to others' explanations and ask questions. Students explain and defend their answers and solution strategies as they answer questions that require an explanation.
MP.4 Model with mathematics.	Students experiment with representing problem situations in multiple ways, including writing numbers; using words (mathematical language); creating math drawings; using objects; making a chart, list, or graph; and creating equations. Students need opportunities to connect the different representations and explain the connections. They should be able to use all of these representations as needed. Students should be encouraged to answer questions such as "What math drawing or diagram could you make and label to represent the problem?" or "What are some ways to represent the quantities?" Fourth-grade students evaluate their results in the context of the situation and reflect on whether the results make sense. For example, a student may use an area/array rectangle model to solve the following problem by extending from multiplication to division: "A fourth-grade teacher bought 4 new pencil boxes. She has 260 pencils. She wants to put the pencils in the boxes so that each box has the same number of pencils. How many pencils will there be in each box?"
MP.5 Use appropriate tools strategically.	Students consider the available tools (including estimation) when solving a mathematical problem and decide when certain tools might be helpful. For instance, they might use graph paper, a number line, or drawings of dimes and pennies to represent and compare decimals, or they might use protractors to measure angles. They use other measurement tools to understand the relative size of units within a system and express measurements given in larger units in terms of smaller units. Students should be encouraged to answer questions such as, "Why was it helpful to use _____ ?"

Table 4-2 *(continued)*

Standards for Mathematical Practice	Explanation and Examples
MP.6 Attend to precision.	As fourth-grade students develop their mathematical communication skills, they try to use clear and precise language in their discussions with others and in their own reasoning. They are careful about specifying units of measure and state the meaning of the symbols they choose. For instance, they use appropriate labels when creating a line plot.
MP.7 Look for and make use of structure.	Students look closely to discover a pattern or structure. For instance, students use properties of operations to explain calculations (partial products model). They generate number or shape patterns that follow a given rule. Teachers might ask, "What do you notice when _____ ?" or "How do you know if something is a pattern?"
MP.8 Look for and express regularity in repeated reasoning.	In grade four, students notice repetitive actions in computation to make generalizations. Students use models to explain calculations and understand how algorithms work. They examine patterns and generate their own algorithms. For example, students use visual fraction models to write equivalent fractions. Students should be encouraged to answer questions such as "What is happening in this situation?" or "What predictions or generalizations can this pattern support?"

Adapted from Arizona Department of Education (ADE) 2010 and North Carolina Department of Public Instruction (NCDPI) 2013b.

Standards-Based Learning at Grade Four

The following narrative is organized by the domains in the Standards for Mathematical Content and highlights some necessary foundational skills from previous grade levels. It also provides exemplars to explain the content standards, highlight connections to the various Standards for Mathematical Practice (**MP**), and demonstrate the importance of developing conceptual understanding, procedural skill and fluency, and application. A triangle symbol (▲) indicates standards in the major clusters (see table 4-1).

Domain: Operations and Algebraic Thinking

In grade three, students focused on concepts, skills, and problem solving with single-digit multiplication and division (within 100). A critical area of instruction in grade four is developing understanding and fluency with multi-digit multiplication and developing understanding of division to find quotients involving multi-digit dividends.