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 3-2 presents examples of how the MP standards may be integrated into tasks appropriate for students in grade three. (Refer to the Overview of the Standards Chapters for a description of the MP standards.)

Table 3-2. Standards for Mathematical Practice—Explanation and Examples for Grade Three

Standards for Mathematical Practice	Explanation and Examples
MP.1 Make sense of problems and persevere in solving them.	In third grade, mathematically proficient 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 may use concrete objects, pictures, or drawings to help them conceptualize and solve problems such as these: "Jim purchased 5 packages of muffins. Each package contained 3 muffins. How many muffins did Jim purchase?"; or "Describe another situation where there would be 5 groups of 3 or 5×3." Students may check their thinking by asking themselves, "Does this make sense?" Students listen to other students' strategies and are able to make connections between various methods for a given problem.
MP.2 Reason abstractly and quantitatively.	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. For example, students apply their understanding of the meaning of the equal sign as "the same as" to interpret an equation with an unknown. When given $4 \times \_\_ = 40$, they might think: • 4 groups of some number is the same as 40. • 4 times some number is the same as 40. • I know that 4 groups of 10 is 40, so the unknown number is 10. • The missing factor is 10, because 4 times 10 equals 40. To reinforce students' reasoning and understanding, teachers might ask, "How do you know?" or "What is the relationship between the quantities?"
MP.3 Construct viable arguments and critique the reasoning of others.	Students may construct arguments using concrete referents, such as objects, pictures, and drawings. They refine their mathematical communication skills as they participate in mathematical discussions that the teacher facilitates by asking questions such as "How did you get that?" and "Why is that true?" Students explain their thinking to others and respond to others' thinking. For example, after investigating patterns on the hundreds chart, students might explain why the pattern makes sense.

Table 3-2 *(continued)*

Standards for Mathematical Practice	Explanation and Examples
MP.4 Model with mathematics.	Students represent problem situations in multiple ways using numbers, words (mathematical language), objects, and math drawings. They might also represent a problem by acting it out or by creating charts, lists, graphs, or equations. For example, students use various contexts and a variety of models (e.g., circles, squares, rectangles, fraction bars, and number lines) to represent and develop understanding of fractions. Students use models to represent both equations and story problems and can explain their thinking. They evaluate their results in the context of the situation and reflect on whether the results make sense. 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?"
MP.5 Use appropriate tools strategically.	Mathematically proficient students consider the available tools (including drawings or estimation) when solving a mathematical problem and decide when particular tools might be helpful. For instance, they may use graph paper to find all the possible rectangles that have a given perimeter. They compile the possibilities into an organized list or a table and determine whether they have all the possible rectangles. Students should be encouraged to answer questions (e.g., "Why was it helpful to use _____?").
MP.6 Attend to precision.	Students develop mathematical communication skills as they use clear and precise language in their discussions with others and in their own reasoning. They are careful to specify units of measure and to state the meaning of the symbols they choose. For instance, when calculating the area of a rectangle they record the answer in square units.
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 (e.g., commutative and distributive properties) as strategies to multiply and divide. 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.	Students notice repetitive actions in computations and look for "shortcut" methods. For instance, students may use the distributive property as a strategy to work with products of numbers they know to solve products they do not know. For example, to find the product of 7×8, students might decompose 7 into 5 and 2 and then multiply 5×8 and 2×8 to arrive at $40 + 16$, or 56. Third-grade students continually evaluate their work by asking themselves, "Does this make sense?" 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 Three

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 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 3-1).