

Standards for Mathematical Practice Explanations and Examples for Grade Two

MP.1. Make sense of problems and persevere in solving them.

In second grade, students realize that doing mathematics involves reasoning about and solving problems. Students explain to themselves the meaning of a problem and look for ways to solve it. They may use concrete objects or pictures to help them conceptualize and solve problems. They may check their thinking by asking themselves, “Does this make sense?” They make conjectures about the solution and plan out a problem-solving approach.

MP.2. Reason abstractly and quantitatively.

Younger students recognize that a number represents a specific quantity. They connect the quantity to written symbols. Quantitative reasoning entails creating a representation of a problem while attending to the meanings of the quantities. Students represent situations by decontextualizing tasks into numbers and symbols. For example, in the task, “There are 25 children in the cafeteria, and they are joined by 17 more children. How many students are in the cafeteria?” Students translate the situation into an equation, such as: $25 + 17 = _$ and then solve the problem. Students also contextualize situations during the problem solving process. Teachers might ask, “How do you know?” or “What is the relationship of the quantities?” to reinforce students’ reasoning and understanding.

MP.3. Construct viable arguments and critique the reasoning of others.

Second graders may construct arguments using concrete referents, such as objects, pictures, math drawings, and actions. They practice their mathematical communication skills as they participate in mathematical discussions involving questions like “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. They decide if the explanations make sense and ask appropriate questions.

Students critique the strategies and reasoning of their classmates. For example, to solve $74 - 18$, students might use a variety of strategies and discuss and critique each other’s reasoning and strategies.

MP.4. Model with mathematics.

In early grades, students experiment with representing problem situations in multiple ways including writing numbers, using words (mathematical language), drawing pictures, using objects, acting out, making a chart or list, and creating equations. Students need opportunities to connect the different representations and explain the connections.

Students model real-life mathematical situations with an equation and check to make sure that their equation accurately matches the problem context. They use concrete manipulative and/or math drawings to explain the equation. They create an appropriate problem situation from an equation. For example, students create a story problem for the equation $43 + \square = 82$ such as “There were 43 gumballs in the machine. Tom poured in some more gumballs. There are 82 gumballs in the machine now. How many did Tom pour in?” 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.

In second grade, students consider the available tools (including estimation) when solving a mathematical problem and decide when certain tools might be better suited than others. For instance, second graders may decide to solve a problem by making a math drawing rather than writing an equation.

Students may use tools such as snap cubes, place value (base ten) blocks, hundreds number boards, number lines, rulers, virtual manipulatives, diagrams, and concrete geometric shapes (e.g., pattern blocks, three-dimensional solids). Students understand which tools are the most appropriate to use. For example, while measuring the length of the hallway, students can explain why a yardstick is more appropriate to use than a ruler. Students should be included to answer questions such as, “Why was it helpful to use...?”

MP.6. Attend to precision.

As children begin to develop their mathematical communication skills, they try to use clear and precise language in their discussions with others and when they explain their own reasoning. Students communicate clearly, using grade-level appropriate vocabulary accurately and precise explanations and reasoning to explain their process and solutions. For example, when measuring an object, students carefully line up the tool correctly to get an accurate measurement. During tasks involving number sense, students consider if their answer is reasonable and check their work to ensure the accuracy of solutions.

MP.7. Look for and make use of structure.

Second graders look for patterns and structures in the number system. For example, students notice number patterns within the tens place as they connect counting by 10s to corresponding numbers on a 100s chart. Students see structure in the base-ten number system as they understand that 10 ones equal a ten, and 10 tens equal a hundred. Teachers might ask, “What do you notice when...?” or “How do you know if something is a pattern?”

Students adopt mental math strategies based on patterns (making ten, fact families, doubles). They use structure to understand subtraction as an unknown addend problem (e.g., $50 - 33 = _$ can be written as $33 + _ = 50$ and can be thought of as “How much more do I need to add to 33 to get to 50?”).

MP.8 Look for and express regularity in repeated reasoning.

Second grade students notice repetitive actions in counting and computation (e.g., number patterns to count by tens or hundreds). Students continually check for the reasonableness of their solutions during and after completing a task 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 [Arizona] 2012 and North Carolina 90 Department of Public Instruction [N. Carolina] 2011)