

Standards for Mathematical Practice Explanations and Examples for Kindergarten

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

In kindergarten, students begin to build the understanding 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. Real-life experiences should be used to support students' ability to connect mathematics to the world. To help students connect the language of mathematics to their everyday life ask students questions such as "How many students are absent" or have them gather enough blocks for the students at their table. Younger students 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?" or they may try another strategy.

MP.2 Reason abstractly and quantitatively.

Younger students begin to recognize that a number represents a specific quantity and to connect the quantity to written symbols. Quantitative reasoning entails creating a representation of a problem while attending to the meanings of the quantities. For example, a student may write the numeral "11" to represent an amount of objects counted, select the correct number card "17" to follow "16" on a vertical calendar with days arranged in tens, or build a pile of counters depending on the number drawn. In addition, kindergarten students begin to draw pictures, manipulate objects, or use diagrams or charts to express quantitative ideas. Students need to be encouraged to answer questions, such as, "How do you know", which reinforces their reasoning and understanding and helps student develop mathematical language.

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

Younger students construct arguments using actions and concrete materials, such as objects, pictures, and drawings. They begin to develop their mathematical communication skills as they participate in mathematical discussions involving questions like "How did you get that?" and "Why is that true?" They explain their thinking to others and respond to others' thinking. They begin to develop the ability to reason and analyze situations as they consider questions such as, "Are you sure...?", "Do you think that would happen all the time...?", and "I wonder why...?"

MP.4 Model with mathematics

In early grades students begin to represent problem situations in multiple ways (e.g., using numbers, words or mathematical language, objects, acting out, making a chart or list, drawing pictures, or creating equations). For example, a student may use cubes or tiles to show the different number pairs for 5, or place three objects on a ten frame and then determine how many more are needed to “make a ten.” Students rely on manipulatives (or other visual and concrete representations) while solving tasks and record an answer with a drawing or equation.

MP.5 Use appropriate tools strategically

Younger students begin to consider the available tools when solving a mathematical problem and decide when certain tools might be helpful. For instance, kindergarteners may decide to use linking cubes to represent two quantities and then compare the two representations side-by-side or later, make math drawings of the quantities. Students decide which tools may be helpful to use depending on the problem or task and explain why they use specific mathematical tools.

MP.6 Attend to precision

Kindergarten students begin to develop precise communication skills, calculations, and measurements. Students describe their own actions, strategies; and reasoning using grade-level appropriate vocabulary. Opportunities to work with pictorial representations and concrete objects can help students develop understanding and descriptive vocabulary. For example, students analyze and compare two- and three-dimensional shapes and they sort objects based on appearance. While measuring objects iteratively (repetitively), students check to make sure that there are no gaps or overlaps. During tasks involving number sense, students check their work to ensure the accuracy and reasonableness of solutions. Students should be encouraged to answer questions such as, “How do you know your answer is reasonable?”

MP.7 Look for and make use of structure

Younger students begin to discern a pattern or structure in the number system. For instance, students recognize that $3 + 2 = 5$ and $2 + 3 = 5$. Students notice patterns in counting strategies to build fluency in facts to five. Teachers might ask, “What do you notice when...?” Students may use various strategies to attain fluency such as counting on, counting all, and taking away.

MP.8 Look for and express regularity in repeated reasoning

In the early grades, students notice repetitive actions in counting, computations, and mathematical tasks. For example, the next number in a counting sequence is one more when counting by ones and ten more when counting by tens (or one more group of ten). Students should be encouraged to answer questions such as “What would happen if...? In the task “There are 8 crayons in the box. Some are red and some are blue. How many of each could there be?” Kindergarten students realize 8 crayons could include 4 of each color ($8 = 4 + 4$), 5 of one color and 3 of another ($8 = 5 + 3$), etc. For each solution, students repeatedly engage in the process of finding two numbers to join together to equal 8.

(Adapted from Arizona Department of Education [Arizona] 2010 and North Carolina 88 Department of Public Instruction [N. Carolina] 2013)