Standards for Mathematical Practice – Grade 4

The Standards for Mathematical Practice describe the skills that mathematics educators should seek to develop in their students. The descriptions of the mathematical practices in this document provide examples of how student performance will change and grow as they engage with and master new and more advanced mathematical ideas across the grade levels.

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

In fourth grade, 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. Fourth graders 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 listen to the strategies of others and will try different approaches. They often will use another method to check their answers.

Students might use an equation strategy to solve the word problem. For example, students could solve the problem "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?" with the equation $3 \times \$12 + \$15 = a$. Fourth graders 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 listen to the strategies of others and will try different approaches. They often will use another method to check their answers.

MP.2 Reason abstractly and quantitatively.

Fourth graders should recognize that a number represents a specific quantity. They connect the quality 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 base 10 blocks or drawings to demonstrate 154×6, as 154 added six times, and develop an understanding of the distributive property. For example:

154×6
$= (100 + 50 + 4) \times 6$
$= (100 \times 6) + (50 \times 6) + (4 \times 6)$
$= 600 + 300 + 24 = 924$

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

In fourth grade, students may construct arguments using concrete referents, such as objects, pictures, and drawings. They explain their thinking and make connections between models and equations. They refine 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 listen to others' explanations. Students explain and defend their answers and solution strategies as they answer question that require an explanation. For example, "Vincent cuts 2 meters of string into 4 centimeter pieces for a craft. How many pieces of string does Vincent have? Explain your reasoning." Students ask appropriate questions and they decide if explanations make sense.

(Adapted from Arizona Department of Education, California Mathematics Framework, and North Carolina Department of Public Instruction)

MP.4 Model with mathematics.

Students experiment with representing problem situations in multiple ways including numbers, words (mathematical language), drawing pictures, using objects, making a chart, list, or graph, creating equations, etc. Students need opportunities to connect the different representations and explain the connections. They should be able to use all of these representations as needed.

Fourth graders should evaluate their results in the context of the situation and reflect on whether the results make sense. For example, students may use money (i.e. dollars and coins) or base-10 blocks to solve the following problem: Elsie buys a drink for $1.39 and a granola bar for $0.89. How much change will she receive if she pays with a $5 bill?

MP.5 Use appropriate tools strategically.

Fourth graders consider the available tools (including estimation) when solving a mathematical problem and decide when certain tools might be helpful. For instance, they may use graph paper, a number line, or base 10 blocks to represent, compare, add, and subtract decimals to the hundredths. Students in fourth grade use protractors to measure angles. They use other measurement tools to understand the relative size of units within a given system and express measurements given in larger units in terms of smaller units.

MP.6 Attend to precision.

As fourth graders develop their mathematical communication skills, they try to use clear and precise language in their discussions with others and in their own reasoning. For instance, they may use graph paper or a number line to represent, compare, add, and subtract decimals to the hundredths. Students in fourth grade use protractors to measure angles. 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.

In fourth grade, students look closely to discover a pattern or structure. For instance, students use properties of operations to explain calculations (partial products model). They relate representations of counting problems such as arrays and area models to the multiplication principal of counting. They generate number or shape patterns that follow a given rule using two-column tables.

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

Students in fourth grade should notice repetitive actions in computation to make generalizations. Students use models to explain calculations and understand how algorithms work. They also use models to examine patterns and generate their own algorithms. For example, students use visual fraction models to write equivalent fractions.