



North Carolina Department of Public Instruction

INSTRUCTIONAL SUPPORT TOOLS

FOR ACHIEVING NEW STANDARDS

4th Grade Mathematics • Unpacked Contents

For the new Standard Course of Study that will be effective in all North Carolina schools in the 2018-19 School Year.

This document is designed to help North Carolina educators teach the 4th Grade Mathematics Standard Course of Study. NCDPI staff are continually updating and improving these tools to better serve teachers and districts.

What is the purpose of this document?

The purpose of this document is to increase student achievement by ensuring educators understand the expectations of the new standards. This document may also be used to facilitate discussion among teachers and curriculum staff and to encourage coherence in the sequence, pacing, and units of study for grade-level curricula. This document, along with on-going professional development, is one of many resources used to understand and teach the NC SCOS.

What is in the document?

This document includes a detailed clarification of each standard in the grade level along with a *sample* of questions or directions that may be used during the instructional sequence to determine whether students are meeting the learning objective outlined by the standard. These items are included to support classroom instruction and are not intended to reflect summative assessment items. The examples included may not fully address the scope of the standard. The document also includes a table of contents of the standards organized by domain with hyperlinks to assist in navigating the electronic version of this instructional support tool.

How do I send Feedback?

Please send feedback to us at feedback@dpi.state.nc.us and we will use your input to refine our unpacking of the standards. Thank You!

Just want the standards alone?

You can find the standards alone at <http://www.ncpublicschools.org/curriculum/mathematics/scos/>.

Standards for Mathematical Practice

Practice	Explanation and Example
1. Make sense of problems and persevere in solving them.	Mathematically proficient students in grade 4 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.
2. Reason abstractly and quantitatively.	Mathematically proficient fourth grade students should 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.
3. Construct viable arguments and critique the reasoning of others.	In fourth grade mathematically proficient 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?” and “Why is that true?” They explain their thinking to others and respond to others’ thinking.
4. Model with mathematics.	Mathematically proficient fourth grade 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.
5. Use appropriate tools strategically.	Mathematically proficient fourth grader students 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 or a number line to represent and compare decimals and 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.
6. Attend to precision.	As fourth grader 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.
7. Look for and make use of structure.	In fourth grade mathematically proficient 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 tree diagrams and arrays to the multiplication principal of counting. They generate number or shape patterns that follow a given rule.
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.

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Number and Operations in Base Ten

Use place value understanding and properties of operations to perform multi-digit arithmetic.

NC.4.NBT.4 Add and subtract multi-digit whole numbers up to and including 100,000 using the standard algorithm with place value understanding.

Clarification

In this standard, students build on their conceptual understanding of addition and subtraction, their use of place value and their flexibility with multiple strategies to make sense of the standard algorithm. They continue to use place value in describing and justifying the processes they use to add and subtract. Students are expected to explain their thinking to show understanding of the algorithm.

This is the first grade level in which students are expected to be proficient at using the standard algorithm to add and subtract. However, other previously learned strategies are still appropriate for students to use.

In mathematics, an algorithm is defined by its steps and not by the way those steps are recorded in writing. With this in mind, minor variations in methods of recording standard algorithms are acceptable.

Students may ask if it is possible to subtract a larger number from a smaller number. While it is not the focus or expectation of this standard in this grade, students should know that it is mathematically possible, and they will be learning more about that concept in later grades. If the misconception that larger numbers cannot be subtracted from smaller numbers is confirmed or reinforced, students may struggle to make the transition to negative numbers in later grades.

Checking for Understanding

The following amounts of juice were in separate containers after the school's parent breakfast.

- Container 1: 750 mL
- Container 2: 1,450 mL
- Container 3: 2,087 mL
- Container 4: 299 mL
- Container 5: 476 mL

If all of the liquid was put into one large container how much liquid would be in the large container?

On a field trip, three different schools send their fourth graders across town to the high school for a math competition. Each school sends between 120 and 170 students each. There are 417 students total.

1. How many students could have come from each school? Show your thinking.
2. Find another possible solution to this task. Show your thinking.
3. If the number of students from each school was the same, how many students came from each school? Explain how you found your solution.

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Measurement and Data

Represent and interpret data.

NC.4.MD.4 Represent and interpret data using whole numbers.

- Collect data by asking a question that yields numerical data.
- Make a representation of data and interpret data in a frequency table, scaled bar graph, and/or line plot.
- Determine whether a survey question will yield categorical or numerical data.

Clarification

In this standard, students will interact with data through data collection, creation of a scaled bar graph or a line plot, and interpretation of data. In third grade, students collected data by asking a question that yielded categorical data, which is data that can be grouped into categories. Students in fourth grade will build on that concept and begin to also ask questions that provide numerical data, which is data that is measurable such as time, height, weight, temperature, etc.

Once data is collected, students should be able to choose an appropriate representation of categorical or numerical data and create the representation. Students will create frequency tables, scaled bar graphs or line plots based on the data collected. Graphs should include a title, categories, category label, key, and data. Once graphs are created, students should be able to solve simple one and two-step problems using the information in the graphs.

Scaled bar graphs have a scale on the y-axis in which the labels do not include every number.

Checking for Understanding

Mrs. Smith's class tracked the daily high temperatures for 20 days in July. The chart below shows the data that the class collected.

90	92	93	92	89
93	91	95	88	90
95	94	97	97	94
94	91	90	89	94

- a. Create a line plot that shows the frequency of the July high temperatures. Make sure you label the scale.



- b. If the normal daily high temperature for July is 90°, how many days was the high temperature less than normal?
- c. What was the most frequent daily high temperature recorded during the 20 days?

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