Grade 4: Critical Questions for Use with the Progressions Documents for the Mathematics K–12 Learning Standards

The Mathematics K–12 Learning Standards (formerly the Common Core State Standards, also referred to as "the Standards") were built on learning progressions, informed both by research on children's cognitive development and by the logical structure of mathematics. These progression documents describe the cognitive development and structure of mathematics in several important areas of the standards. These documents note key connections among standards, point out cognitive difficulties and pedagogical solutions, and give more detail on particularly knotty areas of the mathematics. These documents are intended to inform teacher preparation programs and professional development, curriculum organization, and textbook content. Thus, their audience includes teachers and anyone involved with schools, teacher education, test development, or curriculum development.

Critical Questions

For each progression document, including the Front Matter document, OSPI staff have developed several critical questions to guide discussions as you read through the documents. This document focuses on progression documents relevant for grade 4. These questions are not meant to be a "scavenger hunt" of the document, but rather an opportunity to engage in deeper conversation and consideration of the ideas and thoughts presented in the document. We encourage educators to use these questions to guide department, PLC, or staff meeting engagement with and conversations about the Progressions Documents for the Mathematics K–12 Learning Standards. Feedback and clarifying questions on these critical questions are welcome; please send your thoughts to asi@k12.wa.us.

Draft Front Matter

1. Why is each audience identified as an important audience for discussions on learning progressions and these progression documents?
2. How can focusing on a small collection of general mathematical properties help students gain a better understanding and facility with mathematics than a large collection of specialized procedures?
3. Since well documented progressions for all of K–12 mathematics do not exist, what process can educators use to inform a learning progression in content for which a progression document does not exist?
4. Why is the inclusion of the Standards for Mathematical Practice important to a learning progression?

5. As the Standards call for educators to approach mathematical concepts differently than many adults experienced them when they were in school, parents and non-educator stakeholders in particular often question the need for and value in a different approach. How can educators communicate the importance of this new approach, including changes such as described in the *Reconceptualized topics; changed notation and terminology* section, to parents and non-educator stakeholders?

Draft K–6 Progression on Geometry

1. What is spatial structuring and why is it critical that students have experience with it?
2. What similarities and differences do you see between composing and decomposing numbers and composing and decomposing shapes?
3. How is learning, and therefore teaching, geometry different from learning and teaching numbers?

Draft K–5 Progression on Measurement and Data (measurement part)

1. What are some of the misconceptions students will have when learning to work with continuous attributes, such as lengths?
2. What is a "length unit" and what are the concepts and skills that need to be learned related to measuring with length units
3. How are perimeter and area developed so that these concepts are easily distinguishable by students?

Draft K–5 Progression on Measurement and Data (data part)

1. How does the development of Measurement and Data support the development of whole numbers and/or fractions at each grade level?
2. What is the difference between categorical and measurement data and how is each displayed in Grades K–5?
3. How does the development of line plots support the work of whole numbers and fractions in Grades 2–5?

Draft K–5 Progression on Number and Operations in Base Ten

1. What are the experiences students should have in developing a conceptual understanding of addition and subtraction prior to introducing the standard algorithm for addition and subtraction in Grade 4?
2. What are the experiences students should have in developing a conceptual understanding of multiplication and division prior to introducing the standard algorithm for multiplication in Grade 5 and the standard algorithm for division in Grade 6?
3. How does the development of decimal understanding and operations extend from students' understanding of whole numbers and fractions?

Draft K–5 Progression on Counting and Cardinality and Operations and Algebraic Thinking

1. What are the progressions that students need to make as they develop the count sequence and cardinality for number?
2. Read and discuss the addition and subtraction situations found on page 9 and determine how you could adapt your curriculum materials to ensure all students understand and can find the unknown in each situation.
3. Read and discuss the multiplication and subtraction situations found on page 23 and determine how you could adapt your curriculum materials to ensure all students understand and can find the unknown in each situation whether working with whole numbers, fractions, and/or decimals.

Draft 3–5 Progression on Number and Operations—Fractions

1. How is the unit fraction used in Grades 3–5 to develop a conceptual understanding of fractions and operations with them?
2. How does each operation with fractions build on the understanding of whole numbers?