

Big Ideas and Mathematics Fluency Goals

Below is a summary of the Big Ideas and the mathematics fluency goals that are embedded in the Common Core. Students at each grade level in the district will be working toward mastering these ideas and fluency Goals in their mathematics lessons.



Grade K

Big Ideas:

- Numbers represent quantity
- Addition and subtraction equations
- Description of 2-D and 3-D shapes

Fluency Goals:

- ✓ Fluently add and subtract within 5

Grade 1

Big Ideas:

- Strategies to develop addition and subtraction within 20
- Links between addition and subtraction and counting, number line, construction and destruction
- Understanding of length and its units
- Composition of plane and solid figures

Fluency Goals:

- ✓ Add and subtract within 20, demonstrating fluency for addition and subtraction within 10. Use strategies such as counting on; making ten (e.g., $8 + 6 = 8 + 2 + 4 = 10 + 4 = 14$); decomposing a number leading to a ten (e.g., $13 - 4 = 13 - 3 - 1 = 10 - 1 = 9$); using the relationship between addition and subtraction (e.g., knowing that $8 + 4 = 12$, one knows $12 - 8 = 4$); and creating equivalent but easier or known sums (e.g., adding $6 + 7$ by creating the known equivalent $6 + 6 + 1 = 12 + 1 = 13$).

Grade 2

Big Ideas:

- Understanding of Base Ten notation and place value
- Counting by 5's, 10's, 100's
- Use of tools to measure and the understanding of standard units of measure
- Analyze shapes by their sides and angles
- Use building and drawing as a foundation for understanding area, volume, congruence, similarity, and symmetry in later grades

Fluency Goals:

- ✓ Fluently add and subtract within 20 using mental strategies
- ✓ By end of Grade 2, know from memory all sums of two one-digit numbers
- ✓ Fluently add and subtract within 100 using strategies based on place value, properties of operations, and/or the relationship between addition and subtraction.



Grade 3

Big Ideas

- Students understand the relationship between multiplication and division
- Develop understanding of fractions as a part relative to a whole
- Area is an attribute of 2-D regions, and the connection of rectangular area to multiplication
- Students relate fraction work to geometry by expressing the area of part of a shape as a unit fraction of the whole



Fluency Goals

- ✓ Fluently multiply and divide within 100, using strategies such as the relationship between multiplication and division (e.g., knowing that $8 \times 5 = 40$, one knows $40 \div 5 = 8$) or properties of operations. By the end of Grade 3, know from memory all products of two one-digit numbers.
- ✓ Fluently add and subtract within 1000 using strategies and algorithms based on place value, properties of operations, and/or the relationship between addition and subtraction.

Grade 4

Big ideas:

- Multiplication procedures work based on place value and properties of operations; and use them to solve problems
- Different fractions can be equivalent
- Fractions are a composition of unit fractions
- Shapes can be classified by properties of their lines and angles

Fluency Goals

- ✓ Fluently add and subtract multi-digit whole numbers using the standard algorithm.

Grade 5

Big Ideas

- Fractions are the division of numbers
- Explain why the procedure for multiplication and division of fractions makes sense
- Place value systems relation to computational methods
- Multiplication as scaling
- Volume of solid objects can be calculated and is additive

Fluency Goals

- ✓ Fluently multiply multi-digit whole numbers using the standard algorithm.



Grade 6

Big Ideas

- Rate, ratio and percent relation to multiplication and division
- Number order of rational numbers including fractions and negative numbers
- Variables can be used in mathematical expressions
- Data has variability, and there are different ways to measure central tendency
- Unit conversions is not resizing, but really multiplying by a fraction with equal amounts in the numerator and denominator. For example (1 m = 100 cm means there are 100 cm in every 1 m):

$$3 \text{ cm} = 0.03m \text{ because } 3 \text{ cm} \times \frac{1m}{100cm} = 0.03 m$$

Fluency Goals

- ✓ Fluently divide multi-digit numbers using the standard algorithm.
- ✓ Fluently add, subtract, multiply, and divide multi-digit decimals using the standard algorithm for each operation.



Grade 7

Big Ideas

- Percentages have a variety of real world applications (tips, taxes, discounts, price increases)
- Slope is the rate of change and plotting proportional relationships
- Interpretation of order of operations via real world problems
- Equations of one variable may model a real problem
- Relation of cross sectional area to volume
- Concept and calculation of surface area
- Data analysis can be used to draw conclusions about populations

Fluency Goals

- ✓ Solve word problems leading to equations of the form $px + q = r$ and $p(x + q) = r$, where p , q , and r are specific rational numbers. Solve equations of these forms fluently. Compare an algebraic solution to an arithmetic solution, identifying the sequence of the operations used in each approach. For example, the perimeter of a rectangle is 54 cm. Its length is 6 cm. What is its width?

Grade 8

Big Ideas

- Some numbers are not rational, and how their properties differ from rational numbers
- Relation between proportional relationships and linear equations
- Functions can be used to model relationships between quantities
- The concept of congruence of shapes or objects and how to determine it
- The application of the Pythagorean Theorem
- Bivariate data can be used to find relationships between two quantities

Fluency Goals

- ✓ Solve simple 2x2 systems by inspection

Focus on arithmetic and fluency with whole numbers at early grades

The K-S standards provide students with a solid foundation in whole numbers arithmetic (addition, subtraction, multiplication and division), fractions, and decimals. Mastery of these skills prepares students for learning more advanced concepts and procedures in later grades. The CCSS provide students with time to master topics by developing procedural fluency as well as conceptual understanding. Students who achieve fluency with essential math facts involving whole numbers will be better able to focus on more complex skills and algorithms.

Fluency with fractions and decimals

Student mastery of conceptual and procedural knowledge about fractions is essential to success in algebra. In Grade 3, students begin to develop an understanding of fractions as numbers and represent fractions on a number line diagram. Addition and subtraction of fractions are introduced in Grade 4 and multiplication and division in Grade 5. The standards for Grades 6 and 7 extend work with fractions and develop concepts such as rational numbers and proportional relationships.

Real world applications using modeling

Throughout the standards, students apply the mathematics they have learned to solve problems that arise in everyday life, society, and the workplace. The *Standards for Mathematical Practice* emphasize this skill and provide specific suggestions for modeling real-world situations using mathematics.

Algebra readiness by Grade 8

The CCSS are consistent with the goal that all students succeed in Algebra 1. Students who master the content and skills through Grade 7 will be well-prepared for algebra in Grade 8. Recognizing that all students must continue their study of mathematics, the CCSS moves students forward with Grade 8 standards that prepare them for higher math, include Algebra 1.

Focusing Attention Within Number and Operations

