Fluency in Mathematics Standards

Clarifying "fluency" as "efficient, flexible, and accurate"

To deepen mathematical understanding and support equity of instruction, the Washington State K–12 Learning Standards for Mathematics (WA Math 2026) clarify fluency through three interrelated components: efficiency, flexibility, and accuracy. This clarification aligns with the intent of the Common Core State Standards for Mathematics in their explanation of fluency embedded in the Standards for Mathematical Practices (National Governors Association Center for Best Practices & Council of Chief State School Officers, 2010, p.6) but has often been overlooked in implementation.

Fluency has frequently been misinterpreted as speed-based memorization of facts or the rigid application of standard algorithms. This narrow interpretation has contributed to math anxiety, procedural misunderstandings, and the exclusion of many students from meaningful engagement with mathematics (Boaler, 2014; Bay-Williams & Kling, 2019). In contrast, the revised WA Math 2026 define fluency as the ability to use mathematical strategies efficiently, flexibly, and accurately. This definition reflects research-based understandings of mathematical proficiency and supports equitable instructional practices advanced by leading national organizations.

Fluency as a Matter of Equity

This fluency reframing in WA Math 2026 supports equity in mathematics education. All students have the right to develop procedural fluency, including those with disabilities and those from historically marginalized communities. Instruction that builds fluency effectively supports all students in developing mathematical agency and a positive math identity (Aguirre et al., 2013). Instruction aimed only at rote procedures and speed, on the other hand, can undermine confidence and reinforce long-standing inequities in achievement (Boaler, 2014; NCTM, 2020). The National Council of Teachers of Mathematics advocates teaching that links concepts to procedures, develops reasoning and flexibility, and encompasses assessment that addresses all aspects of fluency, not merely accuracy. Such teaching enables students to view themselves as mathematics doers who can make sense of problems and choose strategies that are efficient and accurate (NCTM, 2014, 2020).

Procedural Fluency as the Goal for All Students

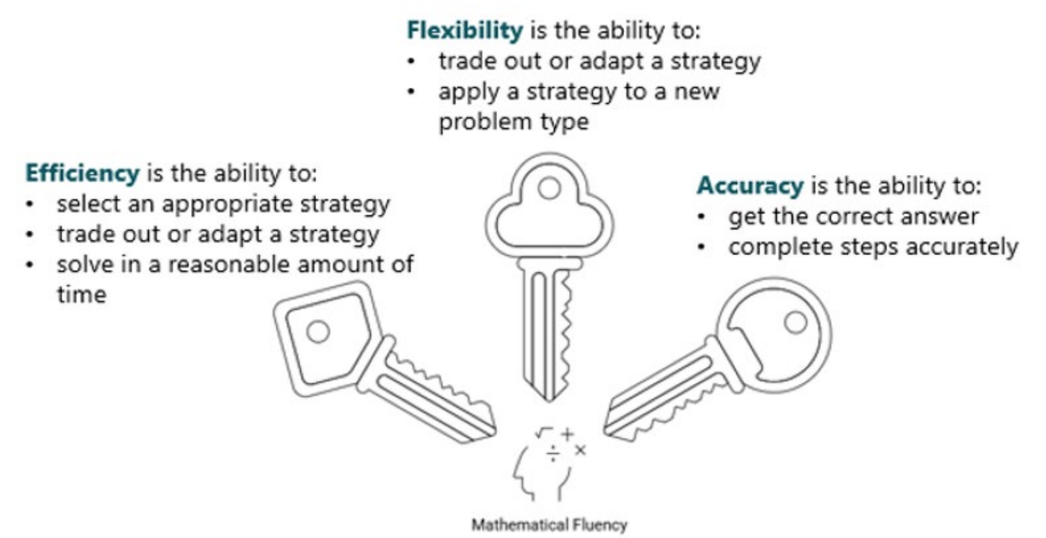
Procedural fluency, the ability to apply procedures efficiently, fluently, and accurately, goes far beyond rote memorization or speed (NCTM, 2014; NRC, 2001). Students need a variety of strategies they understand well. They learn these through clear instruction and by practicing in meaningful, real-world contexts—not just repetitive drills. Students who possess procedural fluency can compare various methods, select a strategy that is reasonable for a particular problem, and monitor their work for reasonableness along the way. These actions are reflections of real-world problem-solving, rather than school performance alone.

The Role of Computational and Basic Fact Fluency

Procedural fluency is the overall goal for students. It builds on a foundation of the four operations and basic facts, such as single-digit addition, subtraction, multiplication, and division. This foundation begins in elementary school and grows more complex in later grades as students work with expressions, equations, and real-world problems. Research shows these skills build on one another: basic fact fluency supports computational fluency, which supports procedural fluency (Bay-Williams & SanGiovanni, 2021). A student's need to master basic facts should not limit access to grade-level learning. Instruction should continue to build fact strategies while engaging students in more advanced work. Students learn best through explicit strategy instruction and meaningful practice, not memorization, which supports lasting understanding (Baroody et al., 2016; Henry & Brown, 2008).

Components of Fluency

Fluency is characterized by three interrelated components: efficiency, flexibility, and accuracy. Each component is evident across basic facts, computational, and procedural fluency.



Adapted from Bay-Williams, J.M., & SanGiovanni. J.J. (2021).

Efficiency

Efficiency refers to selecting and conducting strategies that are appropriate for the problem and that lead to a solution in a reasonable amount of time. This includes the ability to trade out or adapt a strategy when appropriate and reflects purposeful and informed decision making in the use of strategies beyond speed alone.

- In basic fact fluency, students use known relationships and reasoning strategies (e.g., composing and decomposing numbers, using benchmarks such as ten) to determine unknown facts without reliance on counting or memorizing alone.
- In computational fluency, students select strategies that minimize unnecessary steps and support productive progress when working with multi-digit numbers and operations and adjust their approach if a strategy proves inefficient.
- In procedural fluency, students choose methods suited to the structure of the problem, monitor their progress, and revise or replace strategies when a more efficient approach is available.

Examples:

Equation	Explanation
6 X 8=48	When solving six groups of eight, a student who is unsure of the product may repeatedly add 8 six times or skip count by 8s. As students develop efficiency, they begin to select strategies that reduce unnecessary steps while maintaining understanding. A student might use a known fact, such as recognizing that three groups of eight is 24 and double the product. Another student may reason that five groups of eight is 40 and then one more group of eight is 48. These strategies reflect increasingly efficient use of number relationships and mathematical reasoning.
1000-4=996	When solving this problem counting on or counting back would be more efficient than the standard algorithm for subtraction.
$\frac{1}{2} + \frac{8}{16} = 1$	Recognizing that $\frac{8}{16}$ is an equivalent fraction to a half would be more efficient than the standard algorithm for adding fractions with unlike denominators.

Flexibility

Flexibility refers to a depth of understanding that enables students to use, select, and adapt to a range of strategies, including the ability to trade out or modify a strategy when appropriate and to apply strategies to new problem types and contexts.

- In basic fact fluency, students develop and use multiple reasoning strategies, recognize relationships among numbers and operations, and adjust or replace strategies based on the numbers in single digit addition, subtraction multiplication, or division problems.
- In computational fluency, students apply known strategies to new numerical contexts, including larger numbers, decimals, and fractions, and adapt strategies when working across representations or when initial approaches are not effective.
- In procedural fluency, students generalize strategies, transfer them to new problem types, and modify or replace approaches that are responsive to the structure of the problem and the context.

Examples:

Equation	Explanation
4x7=28 4x9=36	While a student may efficiently apply the doubling strategy when multiplying 4 groups of seven by taking 2 groups of seven and doubling the product. When the student applies the doubling strategy above to 4 groups of nine they may find that it's not efficient to double 18. The student may then trade out a strategy by taking a known fact like 10 groups of four and subtract a group to demonstrate flexibility.
8+9=7+10=17	A student may apply the make a ten strategy to solve the adding of single digit numbers.
297+754=300+751=1051	A student may demonstrate flexibility in applying the make a ten strategy to making a hundred when adding multi-digit numbers.
4.9+1.8=5+1.7=6.7 $\frac{1}{2}+\frac{5}{8}=\frac{1}{2}+\frac{4}{8}+\frac{1}{8}=1\frac{1}{8}$	A student may demonstrate flexibility in applying the make a hundred strategy to make a whole number when working with fractions and decimals.
-24+38=-24+24+14=14	A student may demonstrate flexibility in applying the make a whole strategy to making a zero when working with integers.

Accuracy

Accuracy refers to correctly conducting procedures and obtaining valid solutions.

- In basic fact fluency, students accurately determine sums, differences, products, and quotients using reasoning strategies and known relationships.
- In computational fluency, students correctly implement strategies or algorithms and focus on place value to produce mathematically valid and reasonable solutions.
- In procedural fluency, students apply procedures accurately within and across contexts, producing solutions that are mathematically valid and reasonable.
- While accuracy is essential, it must be developed in conjunction with efficiency and flexibility to fully represent fluency.

Efficient, Flexible, and Accurate Strategies in High School Math

Misunderstandings surface in high school math through an emphasis on shortcuts and tricks, or rule memorization that undermine principles that ground mathematical understanding across the high school experience. As a result, students carry frustration with mathematical concepts rather than an understanding of the meaning behind those concepts and their connections to postsecondary goals, careers, and daily life.

The emphasis on efficient, flexible, and accurate strategies takes on additional layers in high school, yet mathematical fluency remains rooted in student decision making that best supports an answer path toward accuracy and procedural understanding. Quantitative reasoning is built throughout a student's K–12 career and early numeracy strategies pay dividends as students efficiently and flexibly utilize strategies with accuracy. In high school these foundations continue to be essential as students consider slopes, intercepts, symmetries, zeros, and asymptotes. Strategic thinking and number understandings are essential to help students understand the purpose and meaning of these values in context.

Throughout WA Math 2026, in all grades, students apply math to real-world situations in ways that are meaningful and tangible. In high school, fluency also means students can work with functions in ways that make sense to them and fit the situation. The standards ask students to use tables, graphs, and equations to explore ideas. For example, one student might solve a system by looking at where two graphs intersect and explain what that point means in a real-world situation, while another might use substitution or elimination, understanding how the parts of the equations represent that same situation. The solution both Student A and Student B come to is accurate and the strategies to communicate the relationship (table, graph, equation) are also efficiently and flexibly applied.