Partnership for Inquiry Learning

NUMBER SENSE (GRADE 2) AND COMPUTATION (GRADES 3-5)

MULTIPLYING AND DIVIDING FLUENTLY

described by Courtney Flessner and Ryan Flessner

There are often misconceptions that fluency means one must memorize basic facts and traditional algorithms in order to do math quickly. Such is not the case. Students are fluent when they can efficiently solve a problem using strategies they understand. Further, students are fluent when they build off their number sense and explain how they computed. As students achieve correct answers, they must do so while explaining their methods. The standards in this strand allow students to transition from skip counting to learning and mastering basic multiplication and division facts. After that, they expand their fact knowledge into fluently multiplying and dividing within 100 before they master the traditional American algorithm for multiplication in fifth grade. The expectation is that students will understand why the traditional algorithm works by building off the work they do in Grades 2-4. It is important to note that fluency with the traditional American algorithm for long division is a sixth grade standard and, therefore, it is not included in this particular strand.

GRADE 2

Count by ones, twos, fives, tens, and hundreds up to at least 1,000 from any given number. (2.NS.1)

Unpacking the Standard
In second grade, students should regularly practice counting and skip counting. Counting can start from the number itself (e.g. 5, 10, 15, 20…), but students should also regularly count from any number (e.g. 3, 8, 13, 18, 21…). In doing this, they will begin to see numerical patterns and develop an understanding of how the patterns change when a second or third digit is introduced to the number.

Considerations for Lessons and Assessment
This video shows how students can skip count in a large or small group, by any given number, on a regular basis. Choral counting will also be introduced as a routine to develop skip counting skills. Formative and summative assessments will include individual and small group interviews, observations during whole group skip counting, observing number patterns and filling in hundreds charts.

GRADE 3

Demonstrate fluency with mastery of multiplication facts and corresponding division facts of 0 to 10. (3.C.6)

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Unpacking the Standard

Fluency in multiplication and division requires students to demonstrate flexibility, efficiency, and accuracy when solving problems. Students need to spend their third-grade year working on multiplication facts, developing an understanding of the relationship between multiplication and division, and then using that knowledge to master basic division facts.

Considerations for Lessons and Assessment

This video will introduce activities you can do to build fluency with your students. It will also show how asking questions of your students while observing their play will help you understand what facts they know, the strategies they are using, and how they might be able to use those strategies to work on additional facts. Additionally, it will show how you can develop a clear understanding of the relationship between multiplication and division.

GRADE 4

Multiply fluently within 100. (4.C.4)

Unpacking the Standard

Prior to fourth grade, students work to develop their fluency and master their basic facts up to 10 x 10 and 100/10. They have also determined what strategies work best for them to efficiently solve a problem. Using this knowledge, as well as their place value number sense, students move into fluently multiplying and dividing two-digit numbers by one-digit numbers (e.g. 3 x 32 and 75/5).

Considerations for Lessons and Assessment

This video will show how students can build on their knowledge of basic facts, as well as number sense they have developed throughout their elementary career, to multiply increasingly larger numbers. Additionally, they will be able to explain their thinking to show a true conceptual understanding of their processes. Lessons and assessments should teach and evaluate students' developing understanding of strategies and tools used for multiplying and dividing (e.g., base ten blocks, ratio tables, partial products, and area models).

GRADE 5

Multiply multi-digit whole numbers fluently using a standard algorithmic approach. (5.C.1)

Unpacking the Standard

In fifth grade, students master the standard American algorithm. It is expected that students' prior understandings from previous grades are used as the starting point in fifth grade. Instruction related to the standard American algorithm should build upon these prior understandings.

Considerations for Lessons and Assessment

This video will demonstrate how knowledge developed in fourth grade can be leveraged to efficiently master the standard algorithm. It will show an inquiry based approach to breaking down the standard algorithm so that students are learning, not just memorizing, procedural steps. Formative assessments will allow opportunities for students to demonstrate their understanding of the algorithm using smaller numbers. Summative assessments will allow students to solve multi-digit by multi-digit problems.

ADDITIONAL RESOURCES

Bay-Williams, J. & Kling, G. (2019). *Math fact fluency: 60+ games and assessment tools to support learning and retention*. ASCD.

Franke, M.L., Kazemi, E., & Turro, A.C. (2018). *Choral counting and counting collections.* Stenhouse.

Kling, G. & Bay-Williams, J. (2018). *Games and tools for teaching multiplication facts (a quick reference guide).* ASCD.

O'Connell, S. & SanGiovanni, J. (2014). *Mastering the basic math facts in multiplication and division: Strategies, activities, and interventions to move students beyond memorization*. Heinemann.

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