KCM

KENTUCKY CENTER FOR MATHEMATICS

Math Fact Fluency-*Multiplication with Leah DixWhite*

Your host

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Math Fact Fluency

Five Basic Fact Fundamentals

1. Mastery Must Focus on Fluency
2. Fluency Develops in Three Phases
3. Foundational Facts Must Precede Derived Facts
4. Timed Tests Do Not Assess Fluency
5. Students Need Substantial and Enjoyable Practice

Bay-Williams, J., & Kling, G. (2019). Math Fact Fluency: 60+ Games and Assessment Tools to Support Learning and Retention. ASCD.

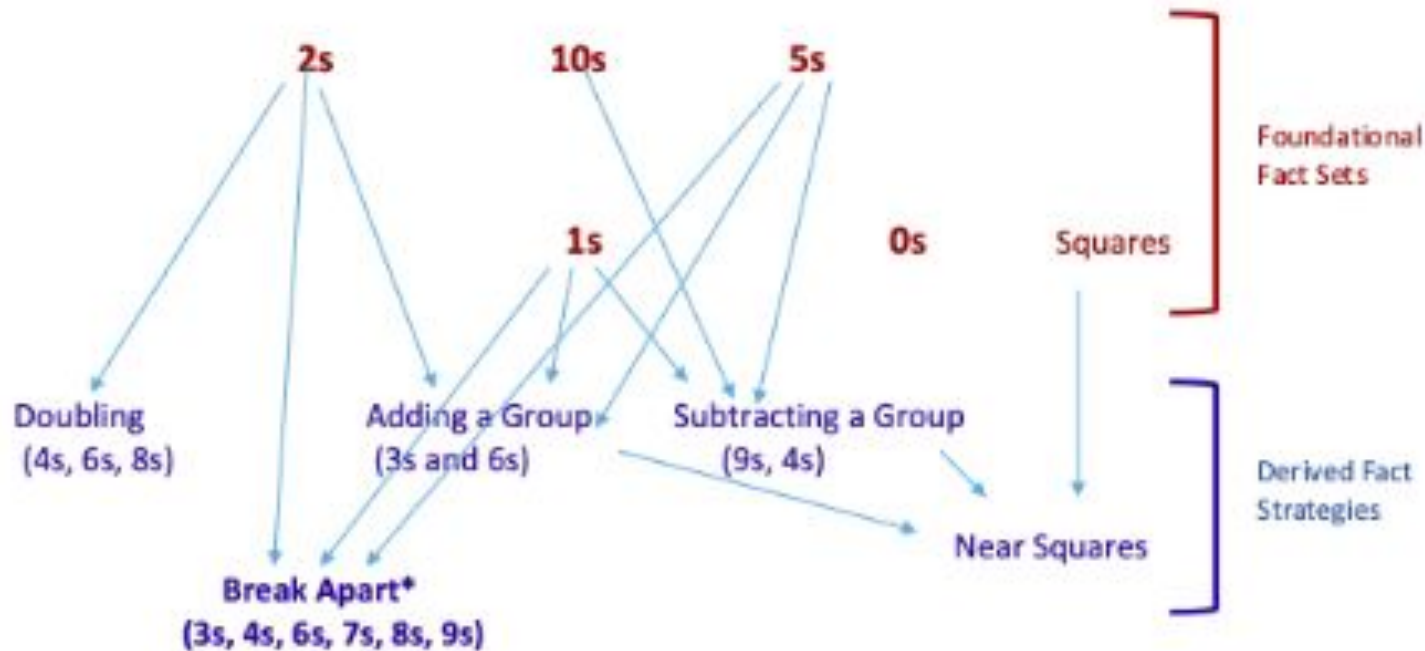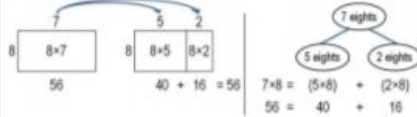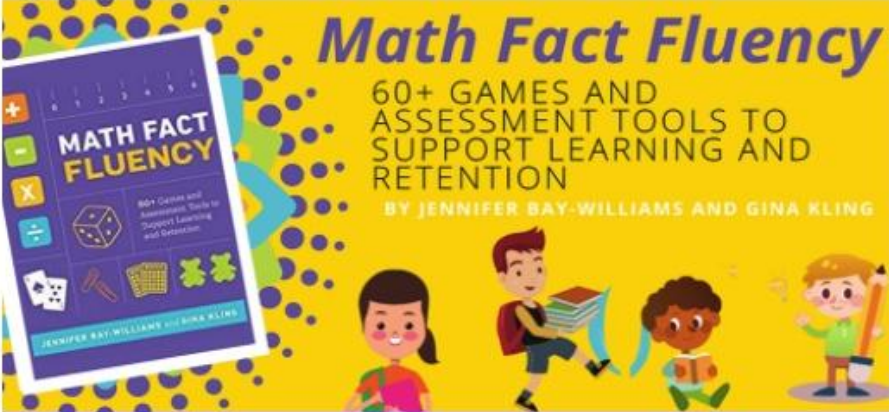# Multiplication Fact Fluency Flexible Learning Progression

Figure 1.3

*We acknowledge that all the derived fact strategies are break apart (distributive property) strategies. We focus on specific ways to break apart (e.g., adding a group) and move towards generalizing the Break Apart strategy.

Standards

Operations and Algebraic Thinking	
Standards for Mathematical Practice	
MP.1. Make sense of problems and persevere in solving them. **MP.2.** Reason abstractly and quantitatively. **MP.3.** Construct viable arguments and critique the reasoning of others. **MP.4.** Model with mathematics.	**MP.5.** Use appropriate tools strategically. **MP.6.** Attend to precision. **MP.7.** Look for and make use of structure. **MP.8.** Look for and express regularity in repeated reasoning.

Cluster: Understand properties of multiplication and the relationship between multiplication and division.

Standards	**Clarifications**
KY.3.OA.5 Apply properties of operations as strategies to multiply and divide. **MP.3, MP.4**	Students need not use formal terms for these properties. If 6 x 4 is known, then 4 x 6 = 24 is also known (Commutative property of multiplication). 3 x 5 x 2 can be found by 3 x 5 = 15, then 15 x 2 = 30, or by 5 x 2 = 10, then 3 x 10 = 30 (Associative property of multiplication). Knowing that 8 x 5 = 40 and 8 x 2 = 16, one can find 8 x 7 as 8 x (5+2) = (8 x 5) + (8 x 2) = 40 + 16 = 56 (Distributive property). KY.4.NBT.5 Coherence KY.3.OA.5→KY.4.NBT.6
KY.3.OA.6 Understand division as an unknown-factor problem. **MP.2**	Find 32 ÷ 8 by finding the number that makes 32 when multiplied by 8. Coherence KY.3.OA.6→KY.4.NBT.6

Attending to the Standards for Mathematical Practice

Students use strategies beyond skip counting to solve multiplication problems. They decide how to use known facts to solve facts like 6 x 9. Students use strategies like Adding a Group, thinking 5 groups of 9 (45) plus one more group (54) and Subtracting a Group, thinking 9 x 6 and reasoning 10 groups of 6 (60) minus one group of 6 (54) (**MP.7**). Students explain their selected reasoning strategy and listen and critique other students' strategies, considering which strategies make sense and are efficient (**MP.3**). Students think about 84 ÷ 4 as, "How many sets of 4 can be made from 84 items?" or "How many in a group, if there 84 items and 4 groups?" and use this relationship to solve the problem (**MP.2**).

Math Fact Fluency

60+ GAMES AND ASSESSMENT TOOLS TO SUPPORT LEARNING AND RETENTION

BY JENNIFER BAY-WILLIAMS AND GINA KLING

Math Fact Fluency Resources

The KCM has created a companion website for *Math Fact Fluency: 60+ Games and Assessment Tools to Support Learning and Retention* by Jennifer Bay-Williams and Gina Kling. Access some of the games and assessment tools from the book at the Math Fact Fluency Site.

http://kcm.nku.edu/mathfactfluency/