Bridging for Math Strength Resources

Standards of Learning Curriculum Framework

Standard of Learning (SOL) 3.4d Solve single-step practical problems involving multiplication of whole numbers, where one factor is 99 or less and the second factor is 5 or less.

Student Strengths	Bridging Concepts	Standard of Learning
Students can create and solve single-step and two-step problems involving addition and subtraction.	Students understand multiplication and division concepts as equal size groups, jumps or arrays. Students have strategies to find products and quotients.	Students can solve single-step practical problems involving multiplication of whole numbers, where one factor is 99 or less and the second factor is 5 or less.

Understanding the Learning Trajectory

Big Ideas:

- Some basic multiplication facts can be found by breaking apart the unknown fact into known facts. Then the answers to the known facts are combined to give the final value (Charles, 2005).
- Students should explore and apply the properties of multiplication and addition as strategies for solving multiplication and division problems using a variety of representations (e.g., manipulatives, diagrams, and symbols). (VDOE Grade 3 Curriculum Framework).
- The properties of the operations are “rules” about how numbers work and how they relate to one another. Students at this level do not need to use the formal terms for these properties but should utilize these properties to further develop flexibility and fluency in solving problems. (VDOE Grade 3 Curriculum Framework).
- Strategies for solving problems that involve multiplication or division may include mental strategies, partial products, the standard algorithm, and the commutative, associative, and distributive properties. (VDOE Grade 3 Curriculum Framework)
- Students should experience a variety of problem types related to multiplication and division. (VDOE Grade 3 Curriculum Framework)

Formative Assessment:

- VDOE Just in time Quick Check SOL 3.4d PDF / Desmos

Important Assessment Look Fors:

- The student can explain how to find the product or quotient.
- The student is able to use a variety of strategies and representations.
- The student's work shows that they understand the context given in the problem and can use it to determine the operation needed in order to solve.

Purposeful Questions:

- How did you represent your thinking?
- How do you know your answer is correct?
- Can you show your thinking using a different strategy?
- How can you use what you know to find a product with a two-digit number as one of its factors?

Bridging Activity to Support Standard	Instructional Tips
Routine Which One Doesn't Belong: Color Array	As students discuss this routine, consider recording the big ideas and highlighting the vocabulary that students use as they explain their thinking. Challenge students to think of reasons why each image might not belong with the other three.
Same and Different: Broken Rectangles	For the Same & Different routine, display pictures A and B and ask students to think about how they are the same and how they are different. Provide students with time to think. Then have the students share their thinking while the teacher records students' ideas on the board using a T-chart. Sample responses can be found here: Sample Responses.
Numberless Word Problems	Word problems that slowly introduce numbers, encouraging students to focus on the context of the problem.
Rich Tasks The Bake Sale	Nate and Marcus are competing to see who can sell more cookies in the bake sale. The chart below shows how much each boy sold. Nate | Packs of 2 cookies | Sold 18 packs Marcus | Packs of 3 cookies | Sold 12 packs Nate says that he won because he sold 18 packs of cookies and 18 is more than 12. Marcus said that he won because his packs contained more cookies. Which boy is correct? Who sold more cookies? Explain your thinking using pictures, numbers and words. Write a number sentence for each solution.
Games Multiplication Compare	In this Investigations game, a pair of students each draws two cards and multiplies them. Then the students compare whose cards have the biggest product.

Other Resources:

- VDOE Word Wall Cards: Grade 3 (Word) | (PDF)
- Virtual Manipulatives
  - Number Pieces
  - Area Model Multiplication
  - Partial Product Finder

- Desmos Area Model
- Math Tools (click on “Counters” and then “Arrays”)

Learning Trajectory Resources:

Charles, R. (2005). Big ideas and understandings as the foundation for elementary and middle school mathematics. *Journal of Mathematics Education Leadership*, *7*(3), NCSM.

Clements, D. H., & Sarama, J. (2019). Learning and teaching with learning trajectories [LT]2. Marsico Institute, Morgridge College of Education, University of Denver. https://www.learningtrajectories.org/

Common Core Standards Writing Team. (2019). Progressions for the Common Core State Standards for Mathematics. Tucson, AZ: Institute for Mathematics and Education, University of Arizona.

Richardson, K. (2012). How Children Learn Number Concepts: A Guide to Critical Learning Phases. Bellingham: Math Perspectives Teacher Development Center.

Van De Walle, J., Karp, K. S., & Bay-Williams, J. M. (2018). *Elementary and Middle School Mathematics: Teaching Developmentally.* (10th edition) New York: Pearson (2019:9780134802084)

VDOE Curriculum Framework for All Grades - Standard of Learning Curriculum Framework (SOL)