Bridging for Math Strength Resources

Standards of Learning Curriculum Framework

Standard of Learning (SOL) 2.5a Recognize and use the relationships between addition and subtraction to solve single-step practical problems, with whole numbers to 20

Student Strengths	Bridging Concepts	Standard of Learning
Students can understand that addition is combining and subtraction is separating.	Students can use related facts to help solve practical problems.	Students can recognize and use relationships between addition and subtraction to solve single-step practical problems, with whole numbers to 20.

Understanding the Learning Trajectory

Big Ideas:

- According to the learning trajectories, children around age 7-8 move from being a "deriver" to a "problem solver". At the level, deriver, a child can use flexible strategies and related facts/derived combinations (for example, "7 1 7 is 14, so 7 1 8 is 15") to solve all types of problems. As children develop their addition and subtraction problem solving abilities, they can solve all types of problems by using flexible strategies and many known combinations. For example, when asked, "If I have 13 and you have 9, how could we have the same number?" this child says, "9 and 1 is 10, then 3 more to make 13. 1 and 3 is 4. I need 4 more!" (For more information, go to learning trajectories levels at https://www.learningtrajectories.org/.)
- Addition and subtraction are related and have an inverse relationship.
- Number relationships provide the foundation for strategies that help students remember basic facts.
- The patterns formed by related facts facilitate the solution of problems involving a missing addend in an addition sentence or a missing part in a subtraction sentence.

Formative Assessment:

- VDOE Just in Time Mathematics Quick Check 2.5a (PDF)
- VDOE Just in Time Mathematics Quick Check 2.5a (Desmos)

Important Assessment Look Fors:

- Student has an understanding of the word "related."

- Student models an addition story problem with manipulatives.
- Student creates a number sentence to model the practical problem.
- Student models and writes equations to match various types of word problems.

Purposeful Questions:

- Is there a way to use a different operation to solve this number story?
- Does the number sentence you wrote match the number story? What could be used to represent what information we are looking for?
- How can using the inverse operation help us?

Bridging Activity to Support Standard	Instructional Tips
Routine Splat	Splat provides a great way to add variety to a number talk routine. Use the visual models to connect number sentences to related facts.
Rich Task 3-Act Task-Cupcakes From Learning from Children: Cupcakes 3-Act Task-Happy Birthday From Learning from Children: Happy Birthday	As you work through the task, take anecdotal notes on how students are representing their thinking.
Games/Tech Salute Virginia Beach City Public Schools, Adapted from NCTM Desmos 2.5ab Addition Strategies	While playing this game, consider using the recording sheet and talk cards to guide the conversation between students listening for vocabulary. In this activity students build their understanding of addition strategies by creating various combinations to sums of 21 or less.

Other Resources:

- VDOE Mathematics Instructional Plans (MIPS):
  - 2.5/2.6 - The FUNction Machine (Word) / PDF Version
  - 2.5a - If I Know, Then I Know (Word) / PDF Version
  - 2.5a - Related Facts (Word) / PDF Version
- VDOE Word Wall Cards: Grade 2 (Word) | (PDF)

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)