Bridging for Math Strength Resources

Standards of Learning Curriculum Framework (SOL)

Standard of Learning (SOL) 4.8b Estimate and measure weight/mass and describe the result in U.S. Customary and metric units

Student Strengths	Bridging Concepts	Standard of Learning
Students can estimate and measure weight to the nearest pound.	Students can estimate weight based on experiences weighing concrete objects of different weights.	Students can estimate and measure weight/mass and describe the result in U.S. Customary and metric units.

Understanding the Learning Trajectory

Big Ideas:

- Weight and mass are different. Mass is the amount of matter in an object. Weight is determined by the pull of gravity on the mass of an object. The mass of an object remains the same regardless of its location. The weight of an object changes depending on the gravitational pull at its location. In everyday life, most people are actually interested in determining an object's mass, although they use the term weight (e.g., "How much does it weigh?" versus "What is its mass?") (VDOE Grade 4 Curriculum Framework).
- Practical experience measuring the weight/mass of familiar objects (e.g., foods, pencils, book bags, shoes) helps to establish benchmarks and facilitates the student's ability to estimate weight/mass (VDOE Grade 4 Curriculum Framework).
- Measurement instruments are devices that replace the need for actual measurement units. It is important to understand how measurement instruments work so that they can be used correctly and meaningfully (Van de Walle et al., 2018).

Formative Assessment:

- Just in Time Mathematics Quick Check 4.8b PDF
- Just in Time Mathematics Quick Check 4.8b Desmos

Important Assessment Look Fors:

- The student determines an appropriate unit of measurement (ounce or pound/grams or kilograms) based on the object they are measuring.
- The student uses a scale to determine which object has a heavier weight/mass and which object has a lighter mass.

- The student reads a scale to determine the exact weight/mass of an object.
- The student chooses a reasonable estimate for the weight/mass of objects.

Purposeful Questions:

- How are weight and mass similar? How are they different?
- What units and tools are used to measure the attribute of weight?
- Why are units important in measurement?
- How can we estimate and measure the weight of various objects?
- How did you decide what unit of measurement to use?
- What are benchmark objects and how can you use them to help you to estimate weight/mass in metric units and in U.S. Customary units?

Bridging Activity to Support Standard	Instructional Tips
Routines: Same & Different: At the Beach	Display pictures A and B and ask students to think about how they are the same and how are they 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. Click here for more information: Same and Different Routine
Rich Tasks: Weighing a Beach Ball NC Department of Public Instruction	This task addresses a common misconception students have about weight/mass, that the weight/mass of an object is related to the size of the object**.** After students determine an answer, ask: How did you decide which student was correct?
Games: Select the Correct Customary Unit of Weight	The purpose of the "Select the Correct Unit of Weight" games is to provide students with practice choosing the correct unit to weigh each real-world object in order to help them to establish benchmarks.

Other Resources:

- Digital Manipulatives
  - Digital Scale (kg, g)
- Additional Routines: Notice & Wonder questions to ask: What do you notice? What do you wonder? Use pictures, models or numbers to show what you know about the situation. What mathematical questions can you ask about this situation?
  - Notice & Wonder: What is the combined weight?
  - Notice & Wonder: How much does the green dumbbell weigh?
  - Notice & Wonder: How much does the pumpkin weigh?
- VDOE Mathematics Instructional Plans (MIPS)
  - Fruit Basket Measurement
  - Measuring Weight/Mass
- VDOE Algebra Readiness Remediation Plans
  - Measurement Bingo
- VDOE Word Wall Cards: Grade 4 Word / PDF
  - Balance Scale
  - Scale
  - Ounce
  - Pound
  - Gram

- Kilogram

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.

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.

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)