Core Content

Cluster Title: Solve problems involving measurement and estimation of intervals of time, liquid volumes, and masses of objects.
Standard 2: Measure and estimate liquid volumes and masses of objects using standard units of grams (g), kilograms (kg), and liters (l).[1] Add, subtract, multiply, or divide to solve one-step word problems involving masses or volumes that are given in the same units, e.g., by using drawings (such as a beaker with a measurement scale) to represent the problem.[2] Notes: [1]Excludes compound units such as cm^3 and finding the geometric volume of a container. [2]Excludes multiplicative comparison problems (problems involving notions of “times as much”).
MASTERY Patterns of Reasoning:
Conceptual: Students will understand the concept of mass in relationship to weight. Students will understand the concept when a liquid takes up space it is measured by volume. Students will understand units of metric capacity (liter, gram, kilogram), their measuring tools and their application to real life (e.g., two liters of soda). Students will understand that masses and volumes can be added, subtracted, multiplied and divided. Students will understand how to estimate measurement of liquid volume and mass. Students will understand abbreviations used to represent units of measure. **Procedural:** Students can estimate the capacity of real-life items to the nearest liter. Students can accurately measure liquids using liters. Students can estimate the mass of real-life items to the nearest gram or kilogram. Students can measure mass using grams and kilograms. Students can choose appropriate units of measure for specific problems and solve. **Representational:** Students can solve story problems about metric capacity and mass by drawing pictures to represent the problem. Students can explain in writing the strategies used to solve. Students can estimate volume and mass accurately.

Supports for Teachers

Critical Background Knowledge
Conceptual: Students will understand the concept of measurement and how it relates to real life. Students will understand what liquids and solids are. Students will understand the concepts of *greater than* and *less than*, and heavier and lighter. Students will understand why someone would measure an item. Students will understand basic place value concepts, and the concepts of addition, subtraction, multiplying, and dividing. Students will understand sequential language (e.g., first, next, finally, etc.). Students will understand the structure of word problems. **Procedural:** Students can solve one-step story problems involving basic addition and subtraction. **Representational:** Students can represent addition and subtraction problems in pictures and draw items to approximate size labeling. Students can use sequential language accurately, both verbally and in writing
Academic Vocabulary and Notation
gram (g), kilogram (kg), liter (l), capacity, liquid volume, mass, weight, scale, estimate

Instructional Strategies Used	Resources Used
Review centimeters and meters, and their relationship to one another. Review that there are also measurements for length and for capacity. Relate the concept to grams, kilograms, and liters. Brainstorm events where exact measurement is necessary and times when an estimate is sufficient. Share items from daily routine that are measured in grams, kilograms, and liters. Demonstrate objects, such as paper clips, that weigh a gram or kilogram for students to manipulate. Show products such as soda bottles that contain a whole number of liters. Hold student scavenger hunts to find classroom items (or items from home) that weigh close to a gram or kilogram. Have students find vessels that are close to a liter. Students can fill larger containers with only a liter of liquid. Have students estimate volume or mass, then check. (You can make it into a game—e.g., who gets closest to the true amount.) Use think-pair-share strategies for solving one-step word problems involving mass or liquid volume given in the same units, such as: “Charlie had six pieces of candy that had a mass of 10 grams each. What was the mass of the candy?”	Trumbauer, Lisa. *What Is Volume*? Children’s Press, 2006. Pluckrose, Henry. *Capacity.* Children’s Press, 1995. Murphy, Stuart J. *Room for Ripley (Mathstart: Level 3).* HarperCollins, 1999. Schwarz, David M. *Millions to Measure.* HarperCollins, 2006. http://www.ixl.com/math/grade-2 http://www.ixl.com/math/grade-3 http://www.bbc.co.uk/skillswise/topic/capacity http://www.bbc.co.uk/skillswise/topic/weight

Assessment Tasks Used	
Skill-Based Task: Students will precisely measure and label a required amount of liquid in liters using measuring tools accurately. Students will add, subtract, multiply and divide amounts of the same unit accurately. Students will draw a representation of multiple amounts of the same unit, and figure the total accurately.	**Problem Task:** Lisa has a wading pool that has 10 liter measuring marks on the side. It will hold 120 liters of water. Draw a picture of the pool. Right now it has 50 liters of water in it. How many more liters can she pour in? Angela is doing an experiment with paper clips. She discovered that 90 paper clips have a mass of 450 grams. What is the mass of each paper clip?