Third Grade Family Letter

Unit 11: Volume and Weight

In this unit, third graders will work with **standard units of measurement** to measure volume and mass. They use standard measurements, meaning measurements that are universally agreed upon, such as one gram or one liter, and decide what units to use based on the thing they are measuring. Humans first standardized measurement centuries ago to make it consistent across different situations. Students have worked formally with this idea since 2nd grade. In this unit, they solve word problems about volume and weight using drawings, diagrams, and equations.

The Metric System

People all over the world, including scientists and mathematicians, use the **metric system**, which uses meters for length, grams for weight, and liters for liquid capacity. Everything in the **metric system** is measured in multiples of ten, so third graders can continue to work within the base ten number system as they solve problems with measurement during this unit.

How Much Is a Gram?

In all elementary units about measurement, students have real world experiences that help them explore attributes such as length, weight, volume, and capacity.

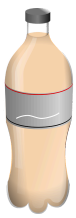
A gram is a unit used to measure weight. Students use everyday objects to estimate how much something might weigh in grams. For example, a dollar bill weighs about one gram, and so does a single raisin. With lots of real world practice, students can start to reason about weight. If asked how many grams a pencil might weigh, a 3rd grader might say that 4 grams is far too low an estimate, but 200 grams is far too high an estimate. In this unit, students measure objects against everyday items in their own classroom, and describe the relative weight of items using estimation and reasoning.

The pencil is heavier than the raisins. Each raisin weighs about one gram so the pencil weighs more than four grams.

In the metric system, the number 1000 is shown with the prefix “kilo.” One thousand grams is called a **kilogram**. A pineapple weighs about a kilogram. So does a small laptop.

Balance scales such as the ones shown here are a good way for students to practice with weight and estimation. Students have used balance scales since kindergarten.

Three apples weigh about 1 kilogram.



How Much Is a Liter?

A liter is a unit used to measure liquid capacity. Many plastic bottles come in this size. In this unit, students get real world experience with capacity by pouring in and out of different sized containers. They use estimation and reasoning to solve real world problems about capacity.

What is the difference between volume and capacity?

This unit uses many terms that adults often confuse. **Capacity**, sometimes called "liquid measurement," is the amount that a container can hold. Capacity usually measures items that can be poured, including liquids like milk or water and solids like sugar or rice. In the metric system, liters are most often used for capacity. We also measure capacity with US customary measurements such as cups or gallons, but that is not a focus of this unit.

By contrast, **volume** measures the space that a figure takes up. Students will spend more time with the formal concept of volume starting in fifth grade.

In practice, volume and capacity are often equal.

What is the difference between weight and mass?

The *K–5 Progression on Measurement and Data* states, "The Standards do not differentiate between weight and mass. Technically, mass is the amount of matter in an object. Weight is the force exerted on the body by gravity." This document goes on to remind us that on the earth's surface, we don't feel the difference between weight and mass. However, on the moon, that object would have the same exact mass but would weight *less* than it does on earth due to the lower gravity that the moon has.

In unit 3.11, the term "weight" is used, but students are also exposed to the term "mass." The distinction between the words will matter more as students get older and progress in their studies of both math and science.

The progressions are narrative descriptions of the mathematics within one big domain, such as measurement, and they describe how the math flows from grade to grade and course to course. If you want to read more, you can find the progression for measurement at www.sfusdmath.org/major-work-and-progressions.html

Activities You Can Do to Support Math at Home

Helping Your Child with Homework

The Standards for Mathematical Practice describe the ways students behave as they learn math. While the mathematics content changes from grade to grade, these standards are the same for kindergarten through high school. Mathematical Practice Standard 3 says: ***Construct viable arguments and critique the reasoning of others.***

This standard represents one of the most important shifts in the Common Core State Standards, that math is so much more than getting the right answer. Many professionals who use math in their everyday lives need to be able to explain their thinking, and defend why their ideas make sense. In homework, students are often asked to "explain why their ideas make sense" or "defend their answers." These are some questions and prompts that will help students say more about what they know and how they know it.

- Tell me what your answer means.
- How do you know that your answer is correct?
- If I told you I think the answer should be (*offer a wrong answer*), how would you explain to me why I'm wrong?