Core Content

Cluster Title: Understand ratio concepts and use ratio reasoning to solve problems.
Standard 3: Use ratio and rate reasoning to solve real-world and mathematical problems, e.g., by reasoning about tables of equivalent ratios, tape diagrams, double number line diagrams, or equations. d. Use ratio reasoning to convert measurement units; manipulate and transform units appropriately when multiplying or dividing quantities.
MASTERY Patterns of Reasoning:
Conceptual: Understand that measurement units employ ratio reasoning (e.g., If 3 feet is equal to yard, then 6 feet is equal to 2 yards). Understand that tools such as tables of equivalent ratios, tape diagrams, double number line diagrams, and equations can help scaffold understanding for converting measurement units. Understand that establishing connections between *tools* allow for extended reasoning and synthesis of the concept of ratios and rates (e.g., How do tape diagrams and double number lines show rate reasoning given the same context?). **Procedural:** Convert customary units using ratio tools and methods. Convert metric units by multiplying or dividing by powers of ten. **Representational:** Represent relationships between measurement units using tables of equivalent ratios, tape diagrams, double number line diagrams, and equations.

Supports for Teachers

Critical Background Knowledge
Conceptual: Understand customary and metric units of measurement. Understand ratios and unit rates.

Procedural:

Use customary and metric units of measurement.
Be able to multiply and divide by powers of 10.

Representational:

Represent multiplication and division with powers of 10 with charts, tables and manipulatives.

Academic Vocabulary and Notation
convert, 10^n (power of 10 notation)

Instructional Strategies Used	**Resources Used**
1. Use double number line, tape diagrams, tables of equivalent values, or equations to convert measurements in customary and metric units. **2.** If 4 cups equals one quart, how many cups in 12 quarts? $\frac{4\ cups}{1\ quart} = \frac{x\ cups}{12\ quarts}$	NLVM conversion manipulative: http://nlvm.usu.edu/en/nav/frames_asid_272_g_2_t_4.html?open=instructions&from=category_g_2_t_4.html

Assessment Tasks Used	
Skill-based Task: How many inches are in three feet? How many inches in two miles?	**Problem Task:** In the store a package of candy that weighs 150 grams costs $1.00. A package of 200 candies that each weigh 200 milligrams also costs $1.00. Which package is the better deal?