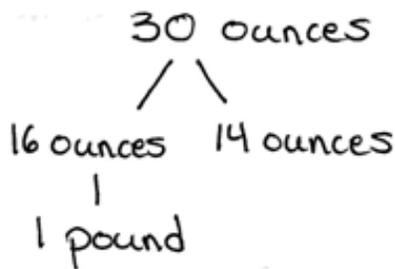


### Exploring Measurement with Multiplication

In this final module of Grade 4, students build their competencies in measurement as they relate multiplication to the conversion of measurement units. Throughout the module, students will explore multiple strategies for solving measurement problems involving unit conversion.



Decomposing 30 ounces to make a unit of one pound and x ounces

Pounds	Ounces
1	16
2	32
3	48
4	64
5	80
6	96
7	112
8	128
9	144
10	160

A pound-ounce conversion table like those students will create and use in Module 7

### What Came Before this Module:

Students explored decimal numbers and their relationship to decimal fractions. They learned to express a given quantity in both fraction and decimal forms, and compared decimal numbers using the place value chart.

### New Terms in this Module:

**Customary system of measurement** - measurement system used in the United States that includes such units as yards, pounds, and gallons

**Customary unit** - e.g., foot, ounce, quart

**Cup (c)** - customary unit of measure for liquid volume

**Gallon (gal)** - customary unit of measure for liquid volume

**Metric system of measurement** - base ten system of measurement used internationally that includes such units as meters, kilograms, and liters

**Metric unit** - e.g., kilometer, gram, milliliter

**Ounce (oz)** - customary unit of measure for weight

**Pint (pt)** - customary unit of measure for liquid volume

**Pound (lb)** - customary unit of measure for weight

**Quart (qt)** - customary unit of measure for liquid volume

### + How you can help at home:

- As often as possible, notice and discuss customary units like ounces and pounds with your student (in the grocery store, at home, etc.)
- Review time by asking questions such as “How many more minutes until the next hour”, or “How many hours until the next day?”

## Key Common Core Standards:

- Use the four operations with whole numbers to solve problems**
  - Interpret a multiplication equation as a comparison, e.g., interpret  $35 = 5 \times 7$  as a statement that 35 is 5 times as many as 7 and 7 times as many as 5
  - Multiply or divide to solve word problems involving multiplicative comparison
  - Solve multi-step word problems posed with whole numbers and having whole-number answers using the four operations
- Solve problems involving measurement and conversion of measurements from a larger unit to a smaller unit**
  - Know relative sizes of measurement units within one system of units
  - Use the four operations to solve word problems involving distances, intervals of time, liquid volumes, masses of objects, and money

Two different Two-Column Tables featuring customary measurements and time from Module 7

Quarts	Pints
1	
2	
6	
10	
16	

Minutes	Seconds
1	60
2	120
3	180
4	240
5	300
6	360
7	420
8	480
9	540
10	600

Spotlight on Math Tools:

Two-Column Table

Students use this mathematical tool in Module 7 of *A Story of Units*.

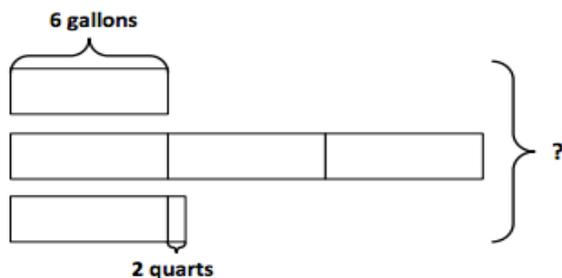
*A Story of Units* has several key mathematical tools that are used to solidify mathematical concepts.

Module 7 further tells the *Story of Units* by focusing on customary measurement units (gallons, pints, yards, etc.). Students decompose them, convert them, and strengthen their sense of what each customary unit means. Two-column tables are an important organizational tool that helps students see how the larger and smaller units relate to each other, as well as what a “unit” means in each situation, e.g. every 16 ounces = 1 pound.

Two-column tables will also reappear as organizational tools in later years, when students learn simple linear functions and use the tables to calculate coordinate pairs. In this module the structure of the table is often provided for students in order to scaffold their learning, though this will not always be the case as students gain conceptual skills.

Sample Problem from Module 7, Lesson 5:

Find the total amount of quarts:



Peter filled his car with 6 gallons of gasoline.  
Doug's car had 3 times 6 gallons of gasoline.  
Wesley's car had 2 more quarts of gas than Peter.  
How many quarts of gas do they have in all?

$6 \times 4 \text{ quarts} = 24 \text{ quarts}$   
 $3 \times 24 \text{ quarts} = 72 \text{ quarts}$   
 $24 + 2 \text{ quarts} = 26 \text{ quarts}$   
 $24 + 72 + 26 = 122 \text{ quarts}$   
 There are 122 quarts in all.