**Expansion: The Metric Connection to Base-Ten**

(*Optional*: *For students who are looking for a challenge beyond the requirements of the standard*.)

Ask student to measure five objects within the classroom or hallway space available using the most appropriate metric measurement for each (such as millimeters, centimeters, decimeters, or meters). If time or supplies make this difficult, measurements may be provided to students instead.

Display the following metric chart for student use. Include the full metric names if students are not familiar enough to know them (kilometer, hectometer, decameter, meter, decimeter, centimeter, and millimeter).

**km hm deca m deci cm mm**

Explain to students that the metric system is based on groups of ten, unlike the customary system of inches, feet, and yards. Ten of any one metric measurement is equivalent to one of the measure to its left, just like in our place value system.

**“For example, 10 millimeters (mm) are equivalent to 1 centimeter (cm).”**

 1.0 = 10

**km hm deca m deci cm mm 10 mm = 1.0 cm**

**“Ten decimeters (deci) are equivalent to 1 meter (m).”**

 1.0 = 10

**km hm deca m deci cm mm 10 deci = 1.0 m**

**“Both of these compared a value to the measurement label to its left, notice it is like we moved the decimal point in the numeric value one to the left also.**

**Likewise, if we move one measurement label to the right, the decimal will move one to the right. For example: If 10 meters (m) are equivalent to 1 decameter (deca), then** $\frac{1}{10}$ **or 0.1 of a decameter is equivalent to 1 meter.**

0.1 = 1.0

**km hm deca m deci cm mm 0.1 deca = 1.0 m**

**And 10 decameters are equivalent to 100 meters. Notice that when moving our label one to the right, the decimal also moves one to the right.”**

 10 = 100

**km hm deca m deci cm mm 10 deca = 100 m**

**“The patterns with 10 and** $\frac{1}{10}$ **continue even if we move more than one place value or if we use numbers other than 1 or 10.”**

 40 = 400

 **km hm deca m deci cm mm 40 deca = 400 m**

 **km hm deca m deci cm mm 30 mm = 0.03 m**

**“In this example the label went from mm to m, which is three places to the left. The decimal also moves three to the left to represent the powers of ten the value changed by.”**

Instruct students to convert each of their five measures into hectometers (hm) and decimeters (deci). Students may choose to convert to more measures than this if time permits.