NAME DATE PERIOD

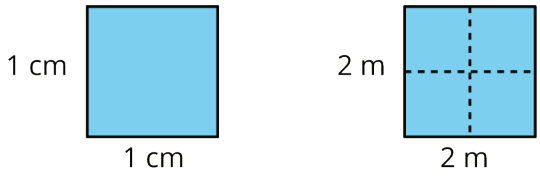
Lesson 12 Summary

Sometimes scales come with units, and sometimes they don't. For example, a map of Nebraska may have a scale of 1 mm to 1 km. This means that each millimeter of distance on the map represents 1 kilometer of distance in Nebraska. The same scale without units is 1:1,000,000, which means that each unit of distance on the map represents 1,000,000 units of distance in Nebraska. This is true for *any* choice of unit.

To see that these two scales are equivalent, notice that there are 1,000 millimeters in 1 meter and 1,000 meters in 1 kilometer. This means there are $1{,}000 \cdot 1{,}000$ or 1,000,000 millimeters in 1 kilometer. So the actual distances in Nebraska are 1,000,000 times as far as the distances on the map.

A scale tells us how a length on a drawing corresponds to an actual length, and it also tells us how an area on a drawing corresponds to an actual area.

For example, if 1 centimeter on a scale drawing represents 2 meters in actual distance, what does 1 *square* centimeter on the drawing represent in actual area? The square on the left shows a square with side lengths 1 cm, so its area is 1 square cm.



The square on the right shows the actual dimensions represented by the square on the left. Because each side length in the actual square is 2 m, the actual square has an area of 2^2 or 4 square meters.

We can use this relationship to find the actual area of any region represented on this drawing. If a room has an area of 18 cm^2 on the drawing, we know that it has an actual area of $18 \cdot 4 = 72$ or 72 m^2.

In general, if 1 unit on the drawing represents n actual units, then one square unit on the drawing represents n^2 actual square units.