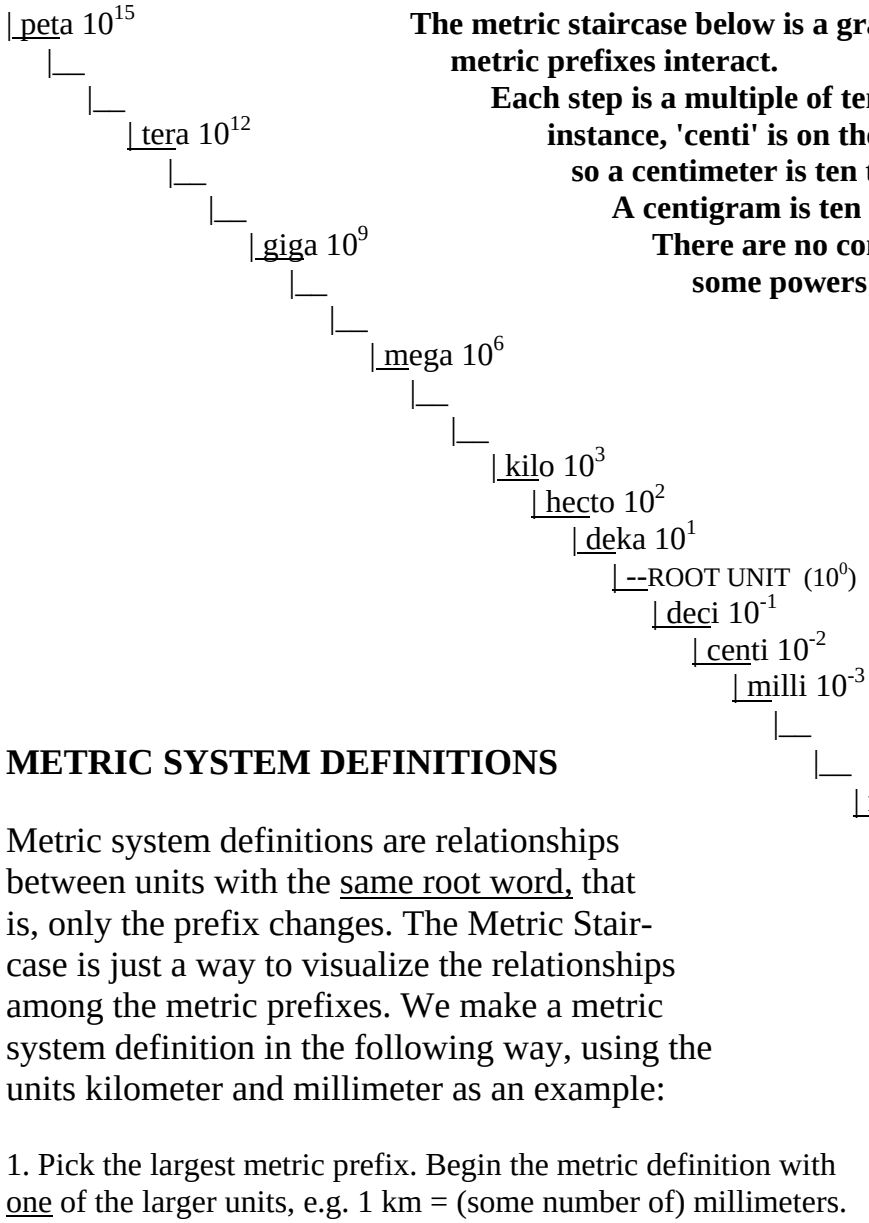
THE METRIC STAIRCASE

Adapted from http://www.chemtutor.com/unit.htm



The metric staircase below is a graphic way of showing how metric prefixes interact.

Each step is a multiple of ten of the lower step. For instance, 'centi' is on the next step above 'milli,' so a centimeter is ten times larger than a millimeter. A centigram is ten times larger than milligram. There are no common metric prefixes for some powers of ten such as 10^4, 10^5, 10^{-7}, etc.

METRIC SYSTEM DEFINITIONS

Metric system definitions are relationships between units with the same root word, that is, only the prefix changes. The Metric Staircase is just a way to visualize the relationships among the metric prefixes. We make a metric system definition in the following way, using the units kilometer and millimeter as an example:

1. Pick the largest metric prefix. Begin the metric definition with one of the larger units, e.g. 1 km = (some number of) millimeters.

2. Count the number of 'steps' down the metric staircase between the two metric prefixes. For instance, kilo- to milli- is six steps.

3. The number of the smaller unit is ten to the power of the number of steps between the metric prefixes. In our example, 1 km = 1x 10^6 mm. Another way to think of it is that the number of spaces you move the decimal point is the number of steps, so six steps is six decimal places, which means that 1 km = 1,000,000 mm. Or if you went from the smaller to the larger unit, 1mm = .000001km

One reason for stating the metric system definitions this way is to make calculations easier and make the sense of the definition more obvious. It is easier to use 1 km = 1x 10^6mm (or 1 km = E6 mm) than to use 1 mm = 1x 10^{-6} km, (or .000001km or 1/1,000,000 km) in computations, even though they are both correct.