Measurement:
Comparison to a standard.

What are the qualities of a good standard?

Why do we need a standard?

M.K.S. System

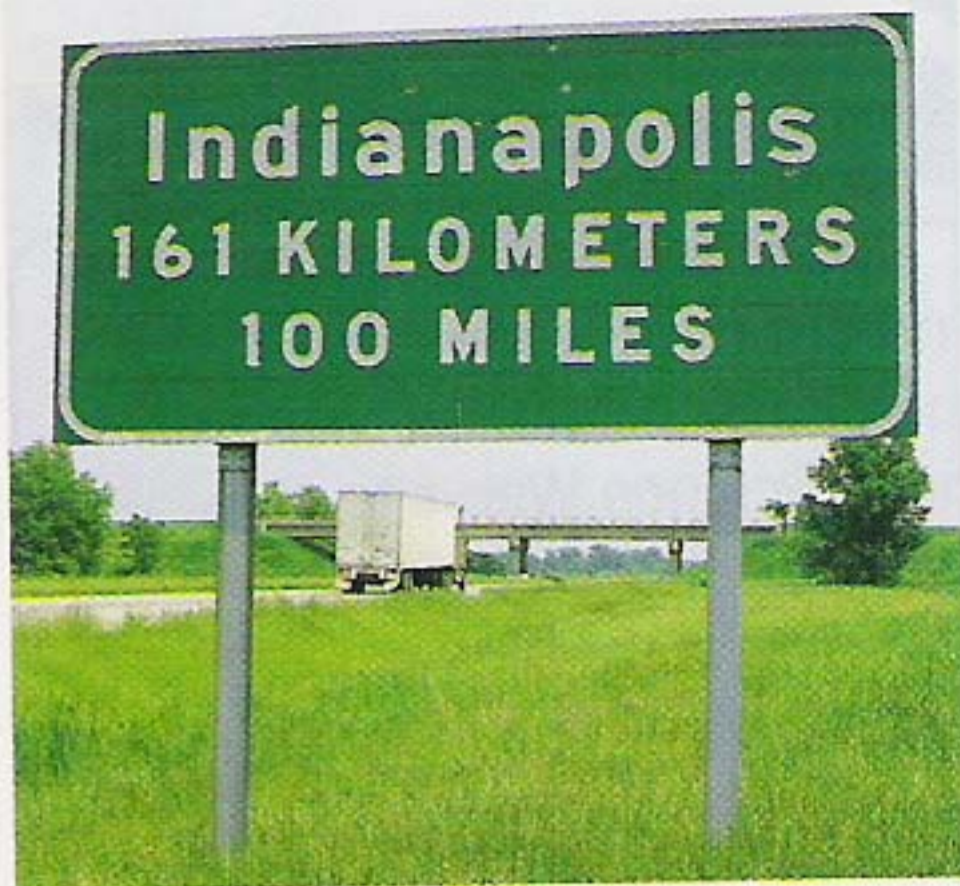Meter

Kilogram

Second

centi = 1/100
milli = 1/1000
kilo = 1000

FIGURE 2–1 The Metric Conversion Act became law in the United States in 1975.

Significant Digits:
All measurements are made to some limited accuracy.
We record ONE AND ONLY ONE estimated digit.

The number of digits depends upon the measuring instrument
being used as well as the magnitude of the measurement itself.
(Magnitude means size)
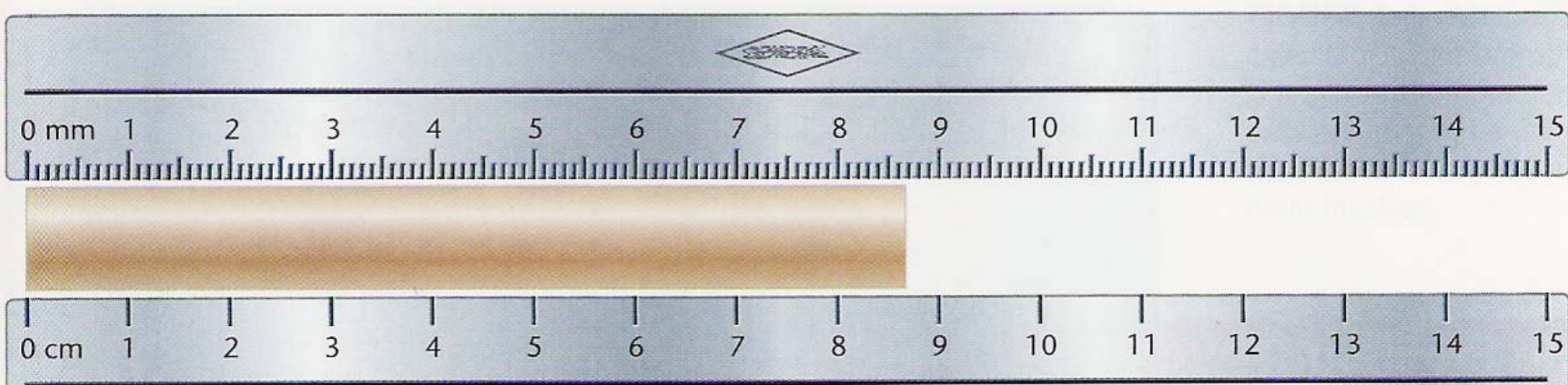
Zeroes:

Nonzero digits are always significant.
Zeroes between nonzero digits are always significant.
Leading zeroes are never significant.
Trailing zeroes are significant ONLY if the decimal point is explicit.

Doing Arithmetic

When doing arithmetic with measured quantities, the answer can never be more precise than the least precise measurement.

+- Answer has as many decimal places as the measurement with the fewest number of decimal places.

X / Answer has as many significant digits as the measurement with the fewest number of significant digits.

Problem:
What is the area of a rectangular field 125.4 m long and 5.3 m wide?
(area = length x width)

What is the perimeter of that field?

Fundamental Units and derived units

Fundamental Units
Meter, Kilogram Second, kelvin, mole, ampere, candella

Any other units are derived: m ,m^2 , m/s , m/s^2

Impromptu lab:

Using a meter stick, measure the length, width, and height of an object and calculate its volume. Express your measurements and calculation to the proper number of significant figures and do not forget to include the units.

Name _____

Object: _____

Length: _____ Width: _____ Height: _____

Calculated Volume: _____