

# 1 • The Science of Physics

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## I n t r o   t o   C o n v e r s i o n s   a n d   D i m e n s i o n a l   A n a l y s i s   # 1

Units give meaning to numbers; they describe the number so that it becomes something more. In physics we will use the parentheses method of dimensional analysis to convert from one unit to another. You will need your conversion sheet to help you out.

For example: John ran 2,345 ft. How many miles is this?

Example #2: A sack of peanuts has a mass of 86.2 grams. How many pounds is this?

Practice these on your own. Remember, show all work!

2)     26.0 ft            to            m

4)     16.0 metric tons    to            kg

6)     362.4 cm           to            ft

7)      $3.0 \times 10^7 \text{ s}$     to            days

In physics we use the SI system, not the Imperial system or US Customary units. In order to understand and use the SI system, we need to be able to convert using the different prefixes. After all, it's the unit that makes the number!

Example #1: How many centimeters are in 18 meters?

Example #2: How many micrometers are in 26 meters?

Convert the following:

3) 86.2 megatons to tons

4) 16.0 nanograms to grams

5) 17.5 teraseconds to seconds

6) 362.4 seconds to nanoseconds

7)  $3.0 \times 10^7$  seconds to megaseconds

9) 3.6 picometers to micrometers (tougher question)

| Prefixes for Powers of 10 |        |            |
|---------------------------|--------|------------|
| Prefix                    | Symbol | Notation   |
| tera                      | T      | $10^{12}$  |
| giga                      | G      | $10^9$     |
| mega                      | M      | $10^6$     |
| kilo                      | k      | $10^3$     |
| deci                      | d      | $10^{-1}$  |
| centi                     | c      | $10^{-2}$  |
| milli                     | m      | $10^{-3}$  |
| micro                     | $\mu$  | $10^{-6}$  |
| nano                      | n      | $10^{-9}$  |
| pico                      | p      | $10^{-12}$ |

