47.2: Introduction

The system of units used in the physical sciences is based on the metric system. Numbers that describe physical quantities range from the very large to the very small, so a set of standard prefixes are used to designate convenient-sized units that differ by multiples of ten. Every step in the metric system is a multiple of 10.

Table 47.2.1: Prefixes to designate convenient-sized units that differ by multiples of ten

Multiple	Prefix	Symbol
10^{24}	yotta	Y
10^{21}	zetta	Z
10^{18}	exa	E
10^{15}	peta	P
10^{12}	tera	T
10^{9}	giga	G
10^{6}	mega	M
10^{3}	kilo	k
10^{1}	deca	da
10^{0}		
10^{-1}	deci	d
10^{-2}	centi	c
10^{-3}	milli	m
10^{-6}	micro	μ
10^{-9}	nano	n
10^{-12}	pico	p
10^{-15}	femto	f
10^{-18}	atto	a
10^{-21}	zepto	z
10^{-24}	yocto	y

The United States continues to use English units. Conversion factors utilize equivalent sized measurements, to change from one unit to another. For example, 1 inch and 2.54 centimeters measure the exact same length. Converting from one unit to another requires multiplying by the appropriate conversion factor.

Table 47.2.2: English to Metric conversion

English to Metric
1 inch = 2.54 centimeter
1 mile = 1609 meters
0.2248 lb = 1 Newton

Example: [Measurement] x [Conversion Factor] = New Number

$$12 \ \cancel{\text{inches}} \times \frac{2.54 \text{ centimeters}}{1 \ \cancel{\text{inch}}} = 30.48 \text{ centimeters}$$

The inches in the numerator and the inches in the denominator cancel

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