SI Base Units

Quantity	Name	Abbreviation
length	**metre**	**m**
mass	**kilogram**	**kg**
time	**second**	**s**
amount of substance	**mole**	**mol**
temperature	**Kelvin**	**K**
electric current	**ampere**	**A**
luminous intensity	candela	cd

SI Prefixes

Factor	Prefix	Abbreviation	Relationship
10^{18}	exa	E	1 x 10^{18} *units* = 1 E*unit*
10^{15}	peta	P	1 x 10^{15} *units* = 1 P*unit*
10^{12}	tera	T	1 x 10^{12} *units* = 1 T*unit*
10^{9}	giga	G	1 x 10^{9} *units* = 1 G*unit*
10^{6}	**mega**	**M**	**1 x 10^{6} *units* = 1 M*unit***
10^{3}	**kilo**	**k**	**1,000 *units* = 1 k*unit***
10^{2}	hecto	h	100 *units* = 1 h*unit*
10^{1}	deka	da	10 *units* = 1 da*unit*
10^{0}	*unit*		1 *unit* = 1 *unit*
10^{-1}	deci	d	1 *unit* = 10 d*units*
10^{-2}	**centi**	**c**	**1 *unit* = 100 c*units***
10^{-3}	**milli**	**m**	**1 *unit* = 1,000 m*units***
10^{-6}	**micro**	**µ**	**1 *unit* = 10^{6} µ*units***
10^{-9}	nano	n	1 *unit* = 10^{9} n*units*
10^{-12}	pico	p	1 *unit* = 10^{12} p*units*
10^{-15}	femto	f	1 *unit* = 10^{15} f*units*
10^{-18}	atto	a	1 *unit* = 10^{24} a*units*

Note: The items in bold print are the ones you will use most in this class.

The following are worked examples using the Factor-Label Method:

1. How many grams of vitamin C are in a 1500 mg tablet?

    a. Start from the number you are given. (1500 g)

    b. Write a fraction with the units you wish to divide out (mg in this case) on the bottom and the base units — the ones without a prefix — (grams) on the top.

    c. Which units are bigger? (grams) Put a big 1 next to them. (1 g)

    d. How many of the smaller units does it take to make one of the bigger? (1000 mg make 1 gram) Put this number next to the smaller units.

$$(1500\cancel{mg})\cdot\left(\frac{1g}{1000\cancel{mg}}\right)=1.5g$$

2. Sparky the Wonder Dog has a mass of 0.629 kg. What is Sparky's mass in centigrams?

$$0.629\cancel{kg}\cdot\left(\frac{1000\cancel{g}}{1\cancel{kg}}\right)\cdot\left(\frac{100cg}{1\cancel{g}}\right)=62900cg$$

3. The LAPD has 283 μL sample of blood for processing at the serology lab. How many millilitres of blood is this?

$$(283\cancel{\mu L})\cdot\left(\frac{1\cancel{L}}{1000000\cancel{\mu L}}\right)\cdot\left(\frac{1000\,mL}{1\cancel{L}}\right)=0.238mL$$

4. Mr. Spears needs to set aside 5 litres of water per person at Bravo. There are 2,000 people at Bravo (students and staff). How many kilolitres of water does Mr. Spears need to have on hand for an emergency?

$$(2{,}000\ \cancel{\text{people}})\cdot\left(\frac{5\cancel{L}}{\cancel{\text{person}}}\right)\cdot\left(\frac{1\,kL}{1{,}000\cancel{L}}\right)=10\ kL$$

5. The average locker at Bravo has approximately 48,000 cm^3 of storage volume. How many cubic metres is this?

$$(48{,}000\cancel{cm^3})\cdot\left(\frac{1m}{100\cancel{cm}}\right)\cdot\left(\frac{1m}{100\cancel{cm}}\right)\cdot\left(\frac{1m}{100\cancel{cm}}\right)=0.048m^3$$