This is a list of the most common relationships used throughout general chemistry calculations. You must know which ideas are related for each and how to use them as conversion factors.

1. Density: mass ⇄ volume
2. Mass percent: mass X ⇄ mass Y
3. Avogadro's Number: moles ⇄ number of things
4. Molar mass: moles ⇄ mass
5. Stoichiometry: moles X ⇄ moles Y
6. Molarity: moles X ⇄ liters solution

1. Density

mass ⇄ volume

- convert from mass to volume

$$6.54\ \cancel{g}\left(\frac{1\ cm^3}{0.7857\ \cancel{g}}\right) = 8.32\ cm^3 = 8.32\ mL$$

- convert from volume to mass

$$28.56\ \cancel{cm^3}\left(\frac{0.7857\ g}{1\ \cancel{cm^3}}\right) = 22.44\ g$$

- calculate density directly

$$\text{density} = \frac{371\ g}{19.3\ cm^3} = 19.2\ g/mL$$

This is a list of the most common relationships used throughout general chemistry calculations. You must know which ideas are related for each and how to use them as conversion factors.

1. Density — mass ⇄ volume

2. Mass percent — mass X ⇄ mass Y

3. Avogadro's Number — moles ⇄ number of things

4. Molar mass — moles ⇄ mass

5. Stoichiometry — moles X ⇄ moles Y

6. Molarity — moles X ⇄ liters solution

2. Mass percent

mass X ⇄ mass Y

$$55.5\ \text{g}\ \cancel{CuF_2}\left(\frac{37.42\ \text{g F}}{100\ \text{g}\ \cancel{CuF_2}}\right) = 20.8\ \text{g F}$$

This is a list of the most common relationships used throughout general chemistry calculations. You must know which ideas are related for each and how to use them as conversion factors.

1. Density — mass ⇄ volume

2. Mass percent — mass X ⇄ mass Y

3. Avogadro's Number — moles ⇄ number of things

4. Molar mass — moles ⇄ mass

5. Stoichiometry — moles X ⇄ moles Y

6. Molarity — moles X ⇄ liters solution

3. Avogadro's Number moles ⇄ number of things

- number of things to moles

$$3.7\times10^{24} \text{ Al atoms} \left(\frac{1 \text{ mole}}{6.02\times10^{23} \text{ atoms}}\right) = 6.1 \text{ moles of Al}$$

- moles to number of things

$$5.52 \text{ mole sulfur} \left(\frac{6.02\times10^{23} \text{ atoms}}{1 \text{ mole sulfur}}\right) = 3.32\times10^{24} \text{ sulfur atoms}$$

This is a list of the most common relationships used throughout general chemistry calculations. You must know which ideas are related for each and how to use them as conversion factors.

1. Density — mass ⇄ volume

2. Mass percent — mass X ⇄ mass Y

3. Avogadro's Number — moles ⇄ number of things

4. Molar mass — moles ⇄ mass

5. Stoichiometry — moles X ⇄ moles Y

6. Molarity — moles X ⇄ liters solution

4. Molar mass

moles ⇄ mass

- moles to mass

$$43.9 \text{ mole Xe} \left(\frac{131.3 \text{ g}}{1 \text{ mol Xe}} \right) = 5760 \text{ g Xe}$$

- mass to moles

$$72.5 \text{ g } CCl_4 \left(\frac{1 \text{ mol } CCl_4}{153.8 \text{ g } CCl_4} \right) = 0.471 \text{ mol } CCl_4$$

This is a list of the most common relationships used throughout general chemistry calculations. You must know which ideas are related for each and how to use them as conversion factors.

1. Density: mass ⇄ volume

2. Mass percent: mass X ⇄ mass Y

3. Avogadro's Number: moles ⇄ number of things

4. Molar mass: moles ⇄ mass

5. Stoichiometry: moles X ⇄ moles Y

6. Molarity: moles X ⇄ liters solution

5. Stoichiometry   moles X $\rightleftarrows$ moles Y

- stoichiometry of a compound formula

$$1.87 \text{ mole } C_8H_{18} \left(\frac{18 \text{ mol H}}{1 \text{ mol } C_8H_{18}} \right) = 33.7 \text{ mol H atoms}$$

- stoichiometry of a balanced reaction

$$2.6 \text{ mole } N_2H_4 \left(\frac{4 \text{ mol } NH_3}{3 \text{ mol } N_2H_4} \right) = 3.5 \text{ mol } NH_3$$

This is a list of the most common relationships used throughout general chemistry calculations. You must know which ideas are related for each and how to use them as conversion factors.

1. Density: mass ⇄ volume
2. Mass percent: mass X ⇄ mass Y
3. Avogadro's Number: moles ⇄ number of things
4. Molar mass: moles ⇄ mass
5. Stoichiometry: moles X ⇄ moles Y
6. Molarity: moles X ⇄ liters solution

6. Molarity

moles X ⇄ liters solution

- moles to liters

$$0.45 \text{ mole EtOH} \left(\frac{1 \text{ L soln}}{0.200 \text{ mol EtOH}} \right) = 2.3 \text{ L of solution}$$

- liters to moles

$$0.114 \text{ L soln} \left(\frac{1.85 \text{ mol KCl}}{1 \text{ L soln}} \right) = 0.211 \text{ mol KCl}$$

- calculate molarity directly

$$0.0324 \text{ g NaCl} \left(\frac{1 \text{ mol NaCl}}{58.4 \text{ g NaCl}} \right) = 5.55\text{x}10^{-4} \text{ mole NaCl}$$

$$\text{molarity} = \frac{\text{moles X}}{\text{L soln}} = \frac{5.55\text{x}10^{-4} \text{ mol NaCl}}{0.1224 \text{ L solution}} = 4.53\text{x}10^{-3} \text{ M NaCl}$$