

Calculating percent by mass/volume (Chem Worksheet 15-2)

Name _____

The concentration of a solution can be expressed as a percent – the ratio of solute to solution. This calculation is commonly performed based on the mass of a substance (solute) over the volume of solution (soln). A solution that is composed of 7 g of salt for every 100 g of water will have a mass percent of 7%.

$$\frac{7 \text{ g salt}}{100 \text{ g solution}} \times 100 = 7\%$$

A solution made from 20 mL of ethanol and 80 mL of water will have a percent by volume of 20%.

$$\frac{20 \text{ mL ethanol}}{100 \text{ mL ethanol + water}} \times 100 = 20\%$$

CONCENTRATION	
Percent by Mass	$\frac{\text{mass solute}}{\text{mass solution}} \times 100$
Percent by Volume	$\frac{\text{volume solute}}{\text{volume solution}} \times 100$
Solute is solute in solution	
S by v (200 g)	1.0 v (1000 mL)

Answer the following questions. Show all work and report answers with units.

1. What is the percent by mass of 750 g of iron (III) sulfate dissolved in 75.0 g of water?
2. A solution is made by adding 20 mL of hexane to 80 mL of ethanol. What is the percent by volume of hexane?
3. A solution is formed by adding 50 g of ammonium nitrate to 200 g of water. What is the percent by mass of ammonium nitrate?
4. What is the percent by volume of a solution formed by mixing 20 mL of isopropyl with 80 mL of water?
5. What is the mass percent of each component in the solution formed by adding 10 g of calcium sulfate, 10 g of sodium nitrate, and 20 g of potassium chloride to 700 g of water?
6. A solution is made by dissolving 100 g of sodium chloride in 1.0 kg of water. What is the percent by mass?
7. What is the percent by volume of a solution formed by adding 10 L of acetone to 20 L of water?
8. An experiment requires a solution that is 50% methyl alcohol by volume. What volume of methyl alcohol should be added to 200 mL of water to make this solution?