

IPS
Chapter 4 Terms & Definitions

Name _____ Date _____ Period _____

Define each of the following words as precisely as you can in the context of our current topic of Solubility.

1. Solution
2. Solvent
3. Solute
4. Soluble
5. Solubility
6. Saturated
7. Concentration
8. Concentrated
9. Concentrate
10. Dissolve
11. Dilute
12. Dilution
13. Diluted
14. Miscible
15. Precipitate
16. Re-crystallization

$$\text{Concentration} = \frac{\text{quantity of solute}}{\text{quantity of solution}}$$

There are many ways to express the concentration of a solution but all of them have the fundamental relationship shown above. The differences result from having different ways of quantifying the solute and solution. In the IPS class, we will primarily use grams for the solute quantity and cm^3 for the solution quantity.

To be able to compare the concentrations of more than one solution, we must have a standard reference point. That reference point is a solution quantity of 100.0 cm^3 .

To accomplish this expression, an example problem will be worked below.

Example: Which of these two solutions is the most concentrated?
18.0 g of solute in 75.0 cm^3 or 5.00 g of solute in 21.5 cm^3

Solution:

Step 1 Set up a ratio of known solute/solution amounts to the desired amounts.

$$\frac{18.0 \text{ g}}{75.0 \text{ cm}^3} = \frac{X_a}{100.0 \text{ cm}^3} \quad \frac{5.00 \text{ g}}{21.5 \text{ cm}^3} = \frac{X_b}{100.0 \text{ cm}^3}$$

Step 2 Cross multiply and then divide.

$$[(18.0 \text{ g})(100.0 \text{ cm}^3)] / 75.0 \text{ cm}^3 = X_a$$

$$[(5.00 \text{ g})(100.0 \text{ cm}^3)] / 21.5 \text{ cm}^3 = X_b$$

Step 3 Express the concentration using the proper units.

$$24.0 \text{ g/cm}^3 \quad 23.2 \text{ g/cm}^3$$

Practice Question

Place the following solutions in order from most concentrated to least concentrated.

- A. 5.3 g solute in 22.5 cm^3 solution
- B. 14.5 g solute in 42.0 cm^3 solution
- C. 9.8 g solute in 41.5 cm^3 solution
- D. 13.3 g solute in 38.5 cm^3 solution
- E. 37.5 g solute in 158.9 cm^3 solution