

Section 15.2 Solution Concentration

In your textbook, read about expressing concentration and using percent to describe concentration.

Data related to aqueous solutions of sodium chloride (NaCl) and aqueous solutions of ethanol (C_2H_5OH) are provided in the table below. Use the table to answer the following questions. Circle the letter of the choice that best answers the question.

Solution	Mass (g)		Solution	Volume (mL)	
	NaCl	H ₂ O		C ₂ H ₅ OH	H ₂ O
1	3.0	100.0	5	2.0	100.0
2	3.0	200.0	6	5.0	100.0
3	3.0	300.0	7	9.0	100.0
4	3.0	400.0	8	15.0	100.0

- What is the percent by mass of NaCl in solution 1?
 - 0.030%
 - 2.9%
 - 3.0%
 - 33%
- Which of the following solutions is the most dilute?
 - Solution 1
 - Solution 2
 - Solution 3
 - Solution 4
- What is the percent by volume of C_2H_5OH in Solution 5?
 - 0.2%
 - 1.9%
 - 2.0%
 - 22%
- Which of the following solutions is the most concentrated?
 - Solution 5
 - Solution 6
 - Solution 7
 - Solution 8

In your textbook, read about molarity and preparing molar solutions.

Read the following problem and then answer the questions.

An 85.0-mL aqueous solution contains 7.54 g iron(II) chloride ($FeCl_2$). Calculate the molarity of the solution.

- What is the mass of the solute? _____
- What is the volume of the solution? _____
- Write the equation that is used to calculate molarity.

- In what unit must the amount of the solute be expressed to calculate molarity? _____
- In what unit must the volume of the solution be expressed to calculate molarity? _____
- Write the expression needed to convert the volume of the solution given in the problem to the volume needed to calculate molarity. _____

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- 11.** What quantity must be used to convert the mass of the solute given in the problem to the amount of solute needed to calculate molarity?

- 12.** Write the expression used to calculate the amount of solute.

- 13.** Calculate the molarity of the solution. Show all your work.

In your textbook, read about molality and mole fractions.

Answer the following questions.

- 14.** How does molality differ from molarity?

- 15.** Calculate the molality of a solution of 15.4 g sodium bromide (NaBr) dissolved in 125 g of water. Show all your work.

- 16.** What is mole fraction?

- 17.** Calculate the mole fraction of HCl in an aqueous solution that contains 33.6% HCl by mass. Show all your work.