

Name : \_\_\_\_\_ Date : \_\_\_\_\_

## Solubility and Molarity

1. What is the definition of the term "molarity"?
2. What is the equation that is used to calculate molarity?
3. What is the molarity in which 58 g of NaCl are dissolved in a 1.0 L solution?
4. What is the molarity in which 10.0 g of  $\text{AgNO}_3$  is dissolved in 500 mL solution?
5. How many grams of  $\text{KNO}_3$  should be used to prepare 2.00 L of a 0.500 M solution?
6. To make a 4.00 M solution, how many moles of solute will be needed if 12.0 liters of solution are required?
7. How many moles of sucrose are dissolved in 250 mL solution if the concentration is 0.150 M?
8. What is the molarity of a solution of  $\text{HNO}_3$  that contains 12.6 grams of  $\text{HNO}_3$  in 1.0 L of solution?

## Solubility and Molarity

### Answers

1. What is the definition of the term "molarity"?

The amount of solute present per unit volume of solution in liters

2. What is the equation that is used to calculate molarity?

Molarity = Number of moles of the solute/ Volume of the solution in liters

3. What is the molarity in which 58 g of NaCl are dissolved in a 1.0 L solution?

Molar mass of NaCl = 23 g + 35.5 g = 58.5 g

58 g of NaCl = 58 g/58.5 g M<sup>-1</sup> = 1 M

Molarity = 1 M/1 L = 1 M/L

4. What is the molarity in which 10.0 g of AgNO<sub>3</sub> is dissolved in 500 mL solution?

Molar mass of AgNO<sub>3</sub> = 108 g + 14 g + 16 x 3 g = 170 g

10.0 g of AgNO<sub>3</sub> = 10 g/ 170 g M<sup>-1</sup> = 0.059 M

Molarity = 0.059 M/ 500 mL = 0.118 M/L

5. How many grams of KNO<sub>3</sub> should be used to prepare 2.00 L of a 0.500 M solution?

Molar mass of KNO<sub>3</sub> = 39 g + 14 g + 3 x 16 g = 101 g

0.5 M L<sup>-1</sup> = x/2 L => x = 1 M = 101 g

6. To make a 4.00 M solution, how many moles of solute will be needed if 12.0 liters of solution are required?

4.00 M L<sup>-1</sup> = x/12.0 L => x = 48 M

7. How many moles of sucrose are dissolved in 250 mL solution if the concentration is 0.150 M?

250 mL x 1 L / 1000 mL = 0.25 L

0.150 M L<sup>-1</sup> = x/0.25 L => x = 0.038 M

8. What is the molarity of a solution of HNO<sub>3</sub> that contains 12.6 grams of HNO<sub>3</sub> in 1.0 L of solution?

Molar mass of HNO<sub>3</sub> = 1 g + 14 g + 3 x 16 g = 63 g

12.6 g / 63 g M<sup>-1</sup> = 0.200 M

Molarity = 0.2 M