

I-6: Molev Molev Activity

Part 1: Sample problems involving molarity

1. The following table shows the relationship between mass of sucrose, moles of sucrose, volume of sucrose, and the molarity of sucrose solution. The molecular formula for sucrose is $C_{12}H_{22}O_{11}$. Complete the table.

mass	moles	volume	Molarity
342 g	1.0 mole	1.0 L	
34.2 g		1.0 L	0.10 M
3.42 g		100 mL	
0.342 g			0.10 M
27.4 g	0.080 moles	1.0 L	0.080 M
17.1 g		1.0 L	0.050 M
6.84 g		1.0 L	
27.4 g	0.080 moles	500 mL	0.040 M
17.1 g	0.050 moles		0.025 M
		500 mL	0.010 M

2. What is the molecular weight of sucrose?

3. Suppose you remove a very tiny volume of solution from a 0.10 M sucrose solution so that it contains only 40 sucrose molecules. (You couldn't actually remove a volume this small!) If you removed the same volume from a solution that is 0.05 M and one that is 0.10 M, how many sucrose molecules would you have? Sketch your answers in your notebook.



0.05 M sucrose



0.01 M sucrose

4. A typical soda pop has a concentration of sucrose, $C_{12}H_{22}O_{11}$, of about 0.75 M.

a) How many moles of sucrose is in 2.2L?

b) How many grams of sucrose is in 2.5L?

Part II: Sample problems involving dilution

1. The following table shows how the molarity changes when a certain volume of a solution is diluted to a new volume. Copy the table below and complete it.

volume	molarity	moles	Dilute to	New molarity
1.0 L	1.0 M	1.0 mole	10.0 L	0.10 M
1.0 L	0.10 M		10.0 L	
500 mL	1.0 M		1.0 L	
250 mL	1.0 M		1.0 L	
500 mL	0.10 M		1.0 L	
250 mL	0.10 M		1.0 L	
500 mL	0.20 M		5.0 L	
250 mL	0.20 M		5.0 L	

2. Suppose you have 10 mL of 0.10 M sucrose solution. You add 90 mL of water to the solution.

a) Do the numbers of moles of sucrose change? Explain your reasoning.

b) Does the molarity change? Explain your reasoning.

3. What volume of 0.75M glucose is needed to make 1.0 L of 0.15 M glucose?

4. Suppose you have 10 mL of a solution containing 0.01 moles of a toxin. Water containing the toxin is considered safe if the concentration is below 0.0005M. What volume of water do you need to dilute the solution to so that it is safe for drinking?