

How Does Solution Dilution Work?

Worksheet

When diluting, moles before = moles after: $MV = MV$. The molarity decreases as volume increases.

$$M_1 V_1 = M_2 V_2$$

Questions

1. 0.5 M, 200 mL diluted to 1 L. Final M?

- A) 0.1 M
- B) 2.5 M
- C) 0.25 M
- D) 0.5 M

2. Dilution = adding what?

- A) More solute
- B) Solvent (water)
- C) Salt
- D) Acid

3. Moles of solute during dilution

- A) Increase
- B) Stay the same
- C) Decrease
- D) Double

4. 3 M, 100 mL 300 mL. Final M?

- A) 1 M
- B) 9 M
- C) 0.33 M
- D) 3 M

5. You have 100 mL of 2 M HCl. Dilute to 500 mL. Final molarity?

6. Start: 250 mL of 0.8 M NaOH. Add water to 1 L total. Molarity?

7. To make 2 L of 0.05 M from 0.5 M stock, what volume needed?

8. Define: Dilution equation?

9. Define: What stays the same in dilution?

10. Define: After dilution, molarity goes

Answer Key

1. A) $0.1 \text{ M} \cdot \text{MV} = \text{MV} \cdot 0.50.2 = \text{M}1 \text{ M} = 0.1 \text{ M}$.
2. B) Solvent (water) - Dilution adds solvent, not solute.
3. B) Stay the same - No solute is added/removed, only water.
4. A) $1 \text{ M} \cdot 30.1 = \text{M}0.3 \text{ M} = 1 \text{ M}$.
5. $\text{MV} = \text{MV} \cdot 2 \cdot 0.1 = \text{M} \cdot 0.5 \text{ M} = 0.2/0.5 = 0.4 \text{ M}$
6. $\text{MV} = \text{MV} \cdot 0.8 \cdot 0.25 = \text{M} \cdot 1 \text{ M} = 0.2 \text{ M}$
7. $\text{MV} = \text{MV} \cdot 0.5 \text{ V} = 0.05 \cdot 2 \text{ V} = 0.1/0.5 = 0.2 \text{ L} = 200 \text{ mL}$
8. $\text{MV} = \text{MV}$. Moles before = moles after.
9. The number of moles of solute - only water is added.
10. Down - volume increases, concentration decreases.

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