

Solution Dilution — Answer Key

Instructor reference • Worked solutions in red

Explanations use introductory chemistry conventions. Equivalent valid structures or correctly rounded numeric answers may also receive credit.

1. Calculate the volume of 2 M stock solution needed to prepare 100 mL of 0.5 M final solution. Explain how to make the dilution.

$V_1 = (C_2V_2)/C_1 = (0.5 \text{ M} \times 100 \text{ mL})/2 \text{ M} \approx 25 \text{ mL}$. Transfer the stock aliquot and dilute to 100 mL final volume.

2. Calculate the volume of 6 M stock solution needed to prepare 250 mL of 1.5 M final solution. Explain how to make the dilution.

$V_1 = (C_2V_2)/C_1 = (1.5 \text{ M} \times 250 \text{ mL})/6 \text{ M} \approx 62.5 \text{ mL}$. Transfer the stock aliquot and dilute to 250 mL final volume.

3. Calculate the volume of 1 M stock solution needed to prepare 500 mL of 0.1 M final solution. Explain how to make the dilution.

$V_1 = (C_2V_2)/C_1 = (0.1 \text{ M} \times 500 \text{ mL})/1 \text{ M} \approx 50 \text{ mL}$. Transfer the stock aliquot and dilute to 500 mL final volume.

4. Calculate the volume of 0.8 M stock solution needed to prepare 200 mL of 0.2 M final solution. Explain how to make the dilution.

$V_1 = (C_2V_2)/C_1 = (0.2 \text{ M} \times 200 \text{ mL})/0.8 \text{ M} \approx 50 \text{ mL}$. Transfer the stock aliquot and dilute to 200 mL final volume.

5. Calculate the volume of 12 M stock solution needed to prepare 150 mL of 1 M final solution. Explain how to make the dilution.

$V_1 = (C_2V_2)/C_1 = (1 \text{ M} \times 150 \text{ mL})/12 \text{ M} \approx 12.5 \text{ mL}$. Transfer the stock aliquot and dilute to 150 mL final volume.

6. Calculate the volume of 3 M stock solution needed to prepare 50 mL of 0.75 M final solution. Explain how to make the dilution.

$V_1 = (C_2V_2)/C_1 = (0.75 \text{ M} \times 50 \text{ mL})/3 \text{ M} \approx 12.5 \text{ mL}$. Transfer the stock aliquot and dilute to 50 mL final volume.

7. Calculate the volume of 0.5 M stock solution needed to prepare 80 mL of 0.125 M final solution. Explain how to make the dilution.

$V_1 = (C_2V_2)/C_1 = (0.125 \text{ M} \times 80 \text{ mL})/0.5 \text{ M} \approx 20 \text{ mL}$. Transfer the stock aliquot and dilute to 80 mL final volume.

8. Calculate the volume of 5 M stock solution needed to prepare 1000 mL of 0.25 M final solution. Explain how to make the dilution.

$V_1 = (C_2V_2)/C_1 = (0.25 \text{ M} \times 1000 \text{ mL})/5 \text{ M} \approx 50 \text{ mL}$. Transfer the stock aliquot and dilute to 1000 mL final volume.

9. Calculate the volume of 2.5 M stock solution needed to prepare 125 mL of 0.5 M final solution. Explain how to make the dilution.

$V_1 = (C_2V_2)/C_1 = (0.5 \text{ M} \times 125 \text{ mL})/2.5 \text{ M} \approx 25 \text{ mL}$. Transfer the stock aliquot and dilute to 125 mL final volume.

10. Calculate the volume of 0.4 M stock solution needed to prepare 100 mL of 0.05 M final solution. Explain how to make the dilution.

$V_1 = (C_2V_2)/C_1 = (0.05\text{ M} \times 100\text{ mL})/0.4\text{ M} \approx 12.5\text{ mL}$. Transfer the stock aliquot and dilute to 100 mL final volume.

11. Calculate the volume of 1.25 M stock solution needed to prepare 250 mL of 0.25 M final solution. Explain how to make the dilution.

$V_1 = (C_2V_2)/C_1 = (0.25\text{ M} \times 250\text{ mL})/1.25\text{ M} \approx 50\text{ mL}$. Transfer the stock aliquot and dilute to 250 mL final volume.

12. Calculate the volume of 9 M stock solution needed to prepare 300 mL of 0.9 M final solution. Explain how to make the dilution.

$V_1 = (C_2V_2)/C_1 = (0.9\text{ M} \times 300\text{ mL})/9\text{ M} \approx 30\text{ mL}$. Transfer the stock aliquot and dilute to 300 mL final volume.