# Molarity and Dilution Worksheet

1. 20.0 mL of 0.200 M NaOH solution is diluted to a final volume of 100.0 mL, calculate the new concentration.

2. 15.0 mL of a solution of NaOH is diluted to a final volume of 250.0 mL, and the new molarity is 0.0500 M. Calculate the original molarity of the base.

3. 50.0 mL of 0.025 M NaOH solution is added to 150.0 mL of water. Calculate the new molarity.

4. 45.0 mL of a solution of NaOH is diluted by adding 250.0 mL of water to produce a new molarity of 0.0500 M. Calculate the molarity of the base.

5. A 0.125 M solution is concentrated by evaporation to a reduced final volume of 100.0 mL and molarity of 0.150 M. Calculate the original volume.

6. 850.0 mL of 0.280 M KOH solution is diluted to a final volume of 1000.0 mL. Calculate the new concentration.

# Molarity and Dilution Worksheet

<span style="color:red">Answers</span>

1. 20.0 mL of 0.200 M NaOH solution is diluted to a final volume of 100.0 mL, calculate the new concentration.

   $M_1V_1 = M_2V_2$

   $\Rightarrow (0.200)(20.0) = M_2(100.0)$

   $\Rightarrow M_2 = 0.0400$ M

2. 15.0 mL of a solution of NaOH is diluted to a final volume of 250.0 mL, and the new molarity is 0.0500 M. Calculate the original molarity of the base.

   $M_1V_1 = M_2V_2$

   $\Rightarrow M_1(15.0) = (0.0500)(250.0)$

   $\Rightarrow M_1 = 0.833$ M

3. 50.0 mL of 0.025 M NaOH solution is added to 150.0 mL of water. Calculate the new molarity.

   $V_2 = 50.0$ mL $+ 150.0$ mL $= 200.0$ mL

   $M_1V_1 = M_2V_2$

   $\Rightarrow (0.025)(50.0) = M_2 (200.0)$

   $\Rightarrow M_2 = 0.0063$ M

4. 45.0 mL of a solution of NaOH is diluted by adding 250.0 mL of water to produce a new molarity of 0.0500 M. Calculate the molarity of the base.

   $M_1V_1 = M_2V_2$

   $\Rightarrow M_1(45.0) = (0.0500)(45 + 250)$

   $\Rightarrow M_1 = 0.328$ M

5. A 0.125 M solution is concentrated by evaporation to a reduced final volume of 100.0 mL and molarity of 0.150 M. Calculate the original volume.

   $M_1V_1 = M_2V_2$

   $\Rightarrow (0.125)V_1 = (0.150)(100)$

   $\Rightarrow V_1 = 120$ mL

6. 850.0 mL of 0.280 M KOH solution is diluted to a final volume of 1000.0 mL. Calculate the new concentration.

   $M_1V_1 = M_2V_2$

   $\Rightarrow (0.280)(850.0) = M_2(1000)$

   $\Rightarrow M_2 = 0.238$ M