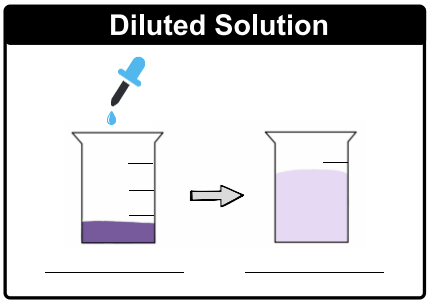
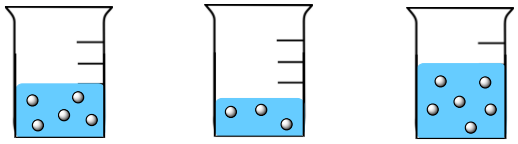
CONCEPT: DILUTIONS

- A standard (stock) solution is a _____ solution that will be *diluted* for some later laboratory use.
  - □ **Dilution**: The addition of more solvent (usually water) to a **solution** in order to create a _____ **concentration**.



EXAMPLE: If each sphere represents a mole of solute from the images provided below, arrange the solutions from least concentrated to most concentrated.



Solution A (1.0 L) | Solution B (2.0 L) | Solution C (3.0 L)

Dilution Calculations

- Dilution can be expressed by the equation:

Dilution Formula

$$M_1V_1 = M_2V_2$$

- □ M_1 and V_1 represent the Molarity and Volume _____ dilution while M_2 and V_2 are _____ the dilution.
  - M_1 is before a solvent is added so M_1 is always _____ than M_2.
  - V_2 represents the final Volume: V_2 = _____ + $V_{\text{Solvent Added}}$.

EXAMPLE: What volume (in mL) of 5.2 M HBr must be used to prepare 3.5 L of 2.7 M HBr?

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PRACTICE: To what final volume would 100 mL of 5.0 M KCl have to be diluted in order to make a solution that is 0.54 M KCl?

PRACTICE: If 880 mL of water is added to 125.0 mL of a 0.770 M $HBrO_4$ solution what is the resulting molarity?

PRACTICE: A student prepared a stock solution by dissolving 25.00 g of NaOH in enough water to make 150.0 mL solution. The student took 20.0 mL of the stock solution and diluted it with enough water to make 250.0 mL solution. Finally taking 75.0 mL of that solution and dissolving it in water to make 500 mL solution. What is the concentration of NaOH for this final solution? (MW of NaOH:40.00 g/mol).