

## Making Dilutions

**Dilute (verb)** - to make a solution less concentrated or weaker by adding water or another solvent to it

$$M_1V_1 = M_2V_2$$

$$M = \text{Molarity} \quad V = \text{Volume}$$

**Example:** If the initial molarity is 5.0M, the initial volume is 6L, and the final volume is 4L, what is the final molarity?

$$(5.0M)(6L) = (M_2)(4L)$$

$$M_2 = 7.5M$$

**Example:** If you add 2L to 7.6L of a 4M solution, what will the new molarity be?

$$(4M)(7.6L) = (M_2)(9.6L)$$

$$M_2 = 3.16M$$

If you start with 2L of a 15M solution, what does the new volume need to be to make it 12M?

2.5L

If you take 15.6L of a 32M solution and make it 28L, what is the new molarity?

17.8M

Dilute 1.0L of 5.0M HCL to 3.0M. What is the final volume?  
How much water would you need to add?

1.67L  
add 0.67L

Dilute 1.0L of 5.0M NaCl to 2.0M. What is the final volume?  
How much water would you need to add?

2.5L  
add 1.5L

How would you prepare 100 mL of a 0.500 M  $\text{HNO}_3$  solution if you have a 12.0M stock solution of  $\text{HNO}_3$ ?

Add 4.17mL of the 12.0M stock  
to 995.8mL of water

How would you prepare 575mL of a 0.34M NaCl solution if you have a 1.0M stock solution of NaCl?

Add 195.5mL of the 1.0M stock  
to 379.5mL of water