

## Dilution

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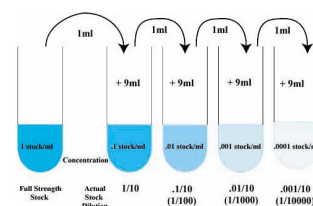
- ▶ **Dilution** consists of adding more solvent to a solution so that the concentration of the solute becomes lower.
- ▶ The total number of solute particles in the solution remains the same after dilution, but the volume of the solution becomes greater, resulting in a lower concentration (molarity-M).

## Dilution Example

- ▶ For example: When we did the penny lab, we used 3M HCl (3 moles of HCl, per 1 L of solution). The school orders HCl as a 12M stock solution.
- ▶ I had to dilute a specific amount of 12M so that we had a certain amount of 3M to use in the lab.



## Dilution



## Dilution Formula

$$M_1V_1 = M_2V_2$$

- ▶  $M_1$  = the stock solution concentration in molarity (M)
- ▶  $V_1$  = volume of the first solution
- ▶  $M_2$  = final solution concentration in molarity (M)
- ▶  $V_2$  = volume of the final solution

## Dilution Example # 1

- ▶ How much 12M HCl should I mix with water to make 900 milliliters of 3M HCl?

$$M_1V_1 = M_2V_2$$

### Dilution Example # 2

- ▶ You have 1 L of a 0.125 M aqueous solution of table sugar. You want to dilute the solution to 0.05 M. What do you do?

$$M_1V_1 = M_2V_2$$

### Dilution Example # 3

- ▶ If I add water to 100 mL of a 0.15 M NaOH solution until the final volume is 150 mL, what will the molarity of the diluted solution be?

$$M_1V_1 = M_2V_2$$

### The End

$$M_1V_1 = M_2V_2$$



Safety First: Remember when diluting acids, always pour the acid into the water!