1. Equations

1.1 **Molarity:** the amount of a substance in a certain volume of solution, moles of a solute per liters of a solution

1M = formula weight per liter (g/L)

Molar Mass = (g/mol)

$$M = \frac{\text{moles of solute}}{\text{liters of solution}}$$

EX. Prepare 600 mL of 0.4 M sucrose

Step 1. Find formula weight on the chemical bottle – F.W of sucrose is 342.3 g/mol

Step 2. Set up conversions, write out unit labels, and solve by cancelling units

Molar Mass x Molarity x Amount needed

$$\frac{342.3 \text{ g sucrose}}{1 \cancel{\text{mol}}} \times \frac{0.4 \cancel{\text{mol}}}{1 \cancel{\text{L}}} \times 0.6 \cancel{\text{L}} = 82.2 \text{ g sucrose}$$

Add 82.2 grams of sucrose to 600 mL or 0.6 L of DH_2O

1.2 **Dilutions:** decrease the concentration of a solute in a solution

$$C_1 \times V_1 = C_2 \times V_2 \quad \text{OR} \quad M_1 \times V_1 = M_2 \times V_2$$

C_1 is the initial (stock) concentration (molarity)

V_1 is the initial (stock) volume taken

C_2 is the concentration (molarity) of the dilution

V_2 is the final volume of the dilution

1.3 **Percent Solutions:** amount or volume of chemical or compound per 100 mL of a solution

(Weight/Volume) = g per 100 mL of solvent

(Volume/volume) = mL per 100 mL of solvent

EX. Prepare a 5% $NaHCO_3$ (sodium bicarbonate) solution with a total volume of 500 mL

5% > 5g / 100 mL (w/v)

$$\frac{5\ \text{g NaHCO}_3}{100\ \text{mL DH}_2\text{O}} \times 500\ \text{mL} = 25\ \text{g NaHCO}_3$$

Add 25 g of sodium bicarbonate to 500 mL of DH_2O

2. Common Calculations

2.1. **CiDecon Disinfectant** (1:128)

2.1.1. Prepare 3 gallons using the conversion 1 oz. concentrated CiDecon to 1 gallon DH_2O

2.1.2. Fill gray spray bottles ¾ full and cap

2.1.3. Replace bi-weekly on Fridays in rooms 138, 139, 151, 152, 153, 243

2.2. **Amphyl Disinfectant** (1:200) or 1/2%

2.2.1. Prepare using the conversion table below

2.2.2. Pipette jars hold 6 liters (1.58 gallons) – add 31.6 mL Amphyl to 6 L DH_2O

2.2.2.1. 51 mL isopropyl alcohol/15 mL Amphyl can be added to maintain clarity if solution will not be used right away

2.2.2.2. Use proper PPE – gloves, lab coat, and safety glasses

2.2.3. Refill once a semester

Dillution Strength	Amphyl	DH_2O
(1:200)	5 mL	1 quart / 946.3 mL
(1:200)	20 mL	1 gallon / 3.785 L

2.3. **Liquid Descaler / Acid Bath** (1:124)

2.3.1. Prepare acid bath by using the conversion 8 mL descaler concentrate to 1 L DH_2O

2.3.2. Use to soak glassware after decontamination, clean dishwasher, and clear rust

2.3.2.1. Use proper PPE – gloves, lab coat, and safety glasses

2.4. **Ethanol Dilutions** from 190 proof / 95% ETOH

2.4.1. Use $M_1 \times V_1 = M_2 \times V_2$

2.4.1.1. M_1 = the concentration of ethanol you want to prepare, ex. 70 %

2.4.1.2. V_1 = volume of ethanol you want to prepare

2.4.1.3. M_2 = the concentration of stock ethanol, 95 % or 190 proof

2.4.1.4. V_2 = volume of stock ethanol, 95 % or 190 proof

2.4.1.5. Solve for V_2, subtract V2 from the total volume needed to determine final DH_2O volume