Unit 9 Study Guide: Name_____KEY_____Per___

Solutions, Concentrations, Dilutions, Acids & Bases

1. Complete the table below for Acids & Bases:

	Acids	Bases
PH range	0-6.99	7.01-14
taste	sour	bitter
properties	Molecular formula usually starts with H, Conducts electricity	Molecular formula usually ends with OH, Slippery, conducts electricity
List 5 or more examples	Vinegar, aspirin, citrus fruits, fertilizers, car batteries	Deodorant, drain cleaner, soap, household cleaners, laxatives
Arrhenius definition	Increases the amount of H+ ions in water	Increases the amount of OH- ions in water
Bronsted-Lowry definition	Donates protons	Accepts protons
Ways we identified these in the lab (experiments we performed and observations we saw)	Turned blue litmus paper red Phenolphthalein stays clear Methyl red stays red Bromothymol blue turns yellow	Turned red litmus paper blue Phenolphthalein turns pink Methyl red turns yellow Bromothymol blue stays blue

2. When you mix an acid with a base, what is formed? What is this reaction called?
Salt and water are formed in a neutralization reaction.

3. Explain what acid rain is, where it has an impact, and why international agreements are important.
Acid rain is rainfall made severely acidic (low pH) due to atmospheric pollution. The main causes are burning of coal and other fossil fuels, which combine with atmospheric gases to form acids. It can be harmful to plants, aquatic animals, and structures. International agreements are important because acid rain does not only affect the locations where coal and fossil fuels are produced. Due to Jet Stream winds, pollution drifts across states and countries, polluting areas as far as thousands of miles away from the pollution source.

4. What are the formulas for Molarity and molality?

Molarity = moles of solute/Liters of solvent

molality = moles of solute/kg of solvent

5. What letters (uppercase or lowercase?!) do we use to represent Molarity? _M___ molality? _m__ and _μ___

6. How did you determine the amount of powder and the amount of water needed to make the 3 Kool-Aid concentrations?
We used the formula for Molarity to determine the number of moles of Kool-Aid powder needed for each concentration. We then used the molar mass of Kool-Aid to determine how many grams of powder to weigh for each concentration. We then added water to the correct volume.

7. How would you make 300mL of a 1.5M Kool-Aid solution? The molecular formula for Kool-Aid is $C_{12}H_{22}O_{11}$.

x moles/.300L = 1.5M

x moles = 0.45 moles

0.45 moles x 342g/mol = 154g

I would add 154g of Kool-Aid powder to 300mL water.

8. How would you dilute this solution (from #7 above) to 1.0M?

$(1.5M)(300mL)=(1.0M)V_2$

V_2= 450mL

450mL - 300mL = 150mL

I would add 150mL to the original 1.5M solution.

9. What is the **Molarity** of a solution that contains 100g Sodium Chloride (NaCl) dissolved in 458mL water?

100g NaCl / 58.5g/mol = 1.7moles NaCl

1.7moles/.458L =**3.7M**

10. What is the **molality** of a solution that contains 8 moles of solute dissolved in 1280g solvent?

8 moles/ 1.280kg = **6.25m**

11. How many moles of ammonia are in 650mL of a 2.3M solution?

X moles / .650L = 2.3M

X moles = **1.5 moles ammonia**

12. What is the volume of a 8.9M solution that contains 7 moles of solute?

7 moles / x L = 8.9M

X L = **0.79 L**

13. How much water needs to be added to 25L of a 6M solution to dilute it to 4.5M?

$(6M)(25L) = (4.5M)V_2$

V_2=33.3L

V_2-V_1 = 33.3L - 25L = 8.3L

You need to **add 8.3L** of water to the 6M solution to create the 4.5M dilution.