Biology with B. Clark **name _____ per.___**
Casa Grande High School **Fall 2025**

Makin' Bacon! *(o.k.. actually, making a copper solution and determining it's concentration)*

This lab introduces students to minerals with known composition dissolving into solutions. Since minerals contain different numbers of atoms in their crystal matrix, we must use introductory chemistry skills to determine the final concentration values.

Basic sequence is the following.

1. Determine the entire chemical formula for the mineral at hand.
2. Review the periodic table of elements to identify each elements respective atomic weight.
3. Review the chemical formula for the compound to determine integer-multipliers for each element.
4. Determine what percent of the total mass is due to the element of interest.
5. Use that mass value to determine the % mass of solution.

Examine the pile of blue crystals given to you by Clark. These are copper-sulfate penta-hydrate. Use this space to draw a sketch of the crystals and write down what the name and chemical formula reveal about its chemical composition.

_____determine the mass of your sample (weigh it!)

For the elements listed, write down actual name and the "atomic mass" for each.

Cu	S	O	H
(e.g. = Copper)__	_____	_____	_____
mass = 63.5			

Now, using the chemical formula as a guide, determine the atomic mass of the entire compound (one complete molecule)	Using this space, determine what fraction (as in percent of the whole) the mass of copper is. (i.e. % mass of copper to the entire compound).

Now we are going to make a solution and you are going to determine what the concentration of copper is in your solution (measured in parts per million).

1. Weigh the entire sample of copper sulfate crystals given to you and dissolve it into a beaker of hot water

Initial mass of crystals_____ initial mass of water_____ total mass of solution_____
(note: record values down to the tenth of a gram).

2. Use this space to determine the concentration of dissolved copper in your sample of solution. Show the math to determine both the mg/ml and p.p.m. .

3. How does the copper concentration in your flask compare to the maximum allowable concentration described on page 2 of the article: Impacts of Copper on Aquatic Ecosystems and Human Health. (note you have to convert units to matching units of mg/Liter to do this).

4. From the same article, what is the concentration of copper which causes juvenile salmon to lose their sense of smell? (olfactory sense) _____
    a. Convert that value into ppm _____
    b. And now to .ppb. _____

Now, as an exercise: lets create a predetermined volume of solution at a predetermined concentration FROM your original, random mixture

Target volume: 500 mL
Target concentration: 5 ppm.

Step 1: write out the decimal equivalent of 500 ppm.

Step 2: Determine how many grams total (of copper) would be present in 500 mL of solution *at this concentration.*

Step 3. Based on the concentration of copper in YOUR solution, determine how many milli Liters of your solution will contain the amount of copper you are looking for.

Step 4: With draw that amount of solution from your original flask and add to a new 500 mL Flask. Fill the remaining volume with regular water (to the 500 mark).

Step 5: See Clark for one of the test kits to see measure your new solution.