

Parts Per Million

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Get a small tray with 10 spaces _I use a trays of white plastic with 12 depressions which can hold about 20 drops of water each; ice cube trays (white) or many other readily available containers will work. I have them work in groups of 2 to 3.

I always find students amazed at the results from a simple experiment. At what point can they no longer see the dye? How many dilutions of 10 does it get to be 1ppm of a chemical. Can you see this with your eye? What was the last dilution 1 part in a _____ion?

This leads right into whatever testing you want them to do or demonstrate in air & water quality and even salinity and density in varied marine environments.

This idea shows how quickly appearance changes with dilution and is a great segway into air/water quality issues. It also helps remind students how easy the math can be.

Space 1- place 10 drops of food color (red or blue or green works best - yellow is to pale) = 10 parts of ---

Now in all the other spaces 2 through 10 place 9 drops of water

Have the students copy the instruction and leave blanks for the math. They can fill in the math columns at the end, You may need to help them with the first set or 2 together as a class.

Next take 1 drop of space 1 & add to space 2- this = a 1 in 10 solution or 10% or _ 100000_ppm

Next take 1 drop of space 2 & add to space 3- this = a 1 in 100 solution or 1% or __ 10000_ppm

Next take 1 drop of space 3 & add to space 4- this = a 1 in 1000 solution or 0.1% or _ 1000_ppm

Next take 1 drop of space 4 & add to space 5- this = a 1 in 10,000 solution or 0.01% or 100_ppm

Next take 1 drop of space 5 & add to space 6- this = a 1 in 100,000 solution or 0.001% or 10_ppm

Next take 1 drop of space 6 & add to space 7- this = a 1 in 1,000,000 solution 0.0001% or 1_ppm

Next take 1 drop of space 7 & add to space 8- this = a 1 in 10,000,000 sol. or 0.00001% or 0.1 ppm

Next take 1 drop of space 8 & add to space 9- this = a 1 in 100,000,000 sol. or 0.000001% or 0.01_ppm

Next take 1 drop of space 9 & add to space 10- this = a 1 in 1,000,000,000 sol.or 10% or 0.001ppm= 1 ppb

There are several variation using indicators from tests you may have such as adding a mild acid to the food color and using a pH meter to analyze the acidity