STUDENT LAB SHEET

Environmental Monitoring Serial Dilution Lesson

The clothing dye we use in this lab will model pollution in Earth's waterways. The dye comes in a 10% solution which means that for every drop (part) of solute of solid dye, 9 drops (parts) water have been added. You will begin with the 10% solution and will dilute it each series by $1/10^{th}$ or 10%. This is achieved by using 1 drop of solution to which you add 9 drops of water. Use the data chart below to record your observations and to keep up with the amount of dilution.

Prediction: How many dilutions do you think it will take for you to be unable to detect any dye in the water? Predict how many dilutions it will take to appear clear.

Prediction: _____

Well #	Beginning Concentration	Dilution Factor	Final concentration	Color
1	$1/10^{th}$ or 10%	_____	1/10th	dark black
2	1/10	1/10	1/100	
3		1/10		
4		1/10		
5		1/10		
6		1/10		
7		1/10		
8		1/10		
9		1/10		

Questions:

1. How many serial dilutions did it take for the water to appear clear?

2. What is the ratio of parts solute to parts water at the point in which it appeared clear?

3. Do you think that there is any dye in the well that appears clear? Why or why not?

4. How does this lab model what happens in our waterways on Earth?

5. Mercury is a chemical that has received a lot of attention and study because when it enters our waterways it can kill fish and harm humans who eat the fish who have been in water with mercury. The EPA now regulates how much mercury is safe in rivers and lakes. Can you predict what that "safe ratio" (ppm, ppb) is?

6. Research levels of EPA and levels of mercury to test your prediction and write about your findings below.

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