# *Activity name: Serial Dilution & PPM*

This activity is meant to provide a real-world application of the ATEEC Recommended Core Curriculum's math, science, technical, communications, or critical thinking knowledge and skill concepts identified by ATEEC Fellows as necessary preparation for environmental technology occupations.

---

*Appropriate for which course(s)?* Biology, Chemistry (HS)

*Concept/skill learned (i.e. from K/S Tables):*Perform lab procedures. Translate real world problems into math relationship. Apply ratios and proportions to solve problems, manipulate and substitute variables to solve formulas. Demonstrate safe practices.

*Approximate time to complete activity:*A - 30 min B-1 hr

*Source of idea or activity (for published source, please include author, title, publisher, date):*unknown

*Learning objectives:* Students will perform dilutions and mathematically evaluate dilutions.

*Materials/resources needed (equipment, print media, electronic media, videos, supplies, etc.):*10 test tubes + rack, 10 ml graduated pipette, 1 ml graduated ppette and food coloring solution

*Primary instructional methods:* Lab

*SCAN skills:*Reading, writing, mathematics, problem solving, and reasoning. <u>All</u> using information section except computers.

*Description of activity/Instructional events:*

1. Accurately place 9 ml of distilled water into each of 10 test tubes.
2. Place one ml of food coloring into tube #1 and mix the solution.
3. Flush the pipette with distilled water.
4. Place one ml of the solution from tube #1 into tube #2 and mix the solution.
5. Again, flush the pipette with distilled water.
6. Repeat steps 4+5 for the rest of the tubes 3-10.
7. Calculate the % dye concentration in each tube - mL day/total mL x (100%) = %
8. Convert the concentration from % to parts per million (PPM) - %/100 = pphundred/10,000 = ppm.

*Extension Activity:*
Using the serial dilution technique above, design an experiment that measures the effect

that dilution has upon the pH of an acid and a basic solution. Determine acid, base concentrations in ppm.*Extension Activity:*
Calculate ppm in other areas of everyday use:
declorinator used in aquarium water
liquid soap/bleach in washing machine
liquid cleaning solutions
lemon juice in iced tea
liquid fertilizer
cream in coffee
*Assessment Recommendations:*
Lab write up - title; purpose; procedure; data; and conclusions.

*Activity submitted* by: Babe Willey

*Return to http://www.ateec.org/ > Learning Resources > Instructors > Environmental Tech Activities*