

Assignment # 1 UNIT CONVERSIONS
Due Tuesday January 24, 2017

1. A liquid sample has an iron concentration of 5.6 mg/L. The density of the liquid is 2,000 g/L. What is the iron concentration in ppm?
2. Concentrations of nitrate exceeding 44.3 mg NO₃⁻/L are a concern in drinking water due to the blue baby disease. Nitrate concentrations near three rural monitoring wells were reported to be as follows:

Well #	mg NO ₃ ⁻ /L
1	0.01
2	1.3
3	20.0

Do any of these wells exceed the limit of nitrate-nitrogen in drinking water?

3. Mirex (MW 540) is a chlorinated pesticide that was manufactured to control fire ants. It was also used as a fire retardant and in pyrotechnics. Mirex is very unreactive and persists in the environment. Lake Erie water samples indicate Mirex concentration of 0.002 µg/L. What is the concentration of Mirex in units of ppb, ppt and µmoles/L?
4. Lake trout samples in Lake Erie indicate a Mirex concentration of 0.002 µg/g. What is the concentration of Mirex in fish in units of ppm and ppb?
5. The concentration of formaldehyde in a mobile home was found to be 0.7 ppm. If the inside volume of the home is 800 m³, what mass of formaldehyde vapor is inside the home in units of grams? Assume T=298°K, P = 1 atm and MW=30.
6. The Michigan Department of Environmental Protection has indicated that toxaphene concentrations in soil cannot exceed 60 µg/kg. If a 100 g soil sample contains 10-5 g of toxaphene, what is the toxaphene concentration in this soil sample in µg/kg and ppb? Does this value exceed the Michigan limit?
7. The concentration of lead collected in rain water was found to be 9.5 µg/L. What is the concentration in nmole/L?
8. The concentration of toluene (C₇H₈) in a soil sample after an underground storage tank was removed was found to be 5 mg/kg. What is the concentration in ppm?
9. The concentration of ozone in Los Angeles on a hot summer day (T=30°C P=1 atm) is 125 ppbv. What is the ozone concentration in µg/m³?
10. 4-Methylimidazole, abbreviated 4-MEI is a heterocyclic organic chemical compound found in caramel color used for food and beverage coloring. Concern has arisen about the presence of 4-MEI typically at a dose of 360 mg/kg of body weight.

A certain [cola](#) drink bottle contains 200 µg of this compound per 20 fluid-ounce serving (591 mL). If the average weight of a Rowan student is 65 kg and the student drinks 10 bottles of cola/day. What is the annual 4-MEI dose in mg/kg for the student? Is there any cause for alarm?