Science and Tech Environment
Pretest 1.1

1. What is the difference between a toxic and a lethal dose?

A toxic dose is the amount in mg of substance per kg of weight that causes illness.
A lethal dose is the concentration that kills.

2. Which of the following substances is the most toxic?

SUBSTANCE	Toxic dose(mg/kg)
Urea =$(NH_2)_2CO$(component of pee)	**300**
Nitrite = NO_2^-(added to hot dogs)	**4**
Nitrate= NO_3^- (found in fertilizer)	**5**

NO_2^- = the less it takes to cause illness, the more dangerous it is.

3. Calculate the LD_{50} in each of the following cases. Express in mg/kg.

a)A dose of 1500 mg of salt killed 50% of 5000 g rabbits.

1500 mg/5 kg = 300 mg/kg

b) A 75 kg man was killed because in drinking 1000g of booze, he experienced a LD_{50} for alcohol. The booze was 53% alcohol.

0.53*1000 000 mg/75kg = 7066 mg/kg

c) Many 300 g rats were killed by a minimum of 0.015mg of nicotine.

0.015 mg/0.3 kg = 0.05 mg/kg

4. Which of the substances in #3 is the least lethal? alcohol

5. How many 500 mg vitamin tablets would a 100 kg patient have to swallow in order to experience a lethal dose if the LD_{50} is 11.9 g/kg?

11.9 g/kg * 100 kg = 1190 g

1190g/ 0.5 g/tablet = 2380 tablets

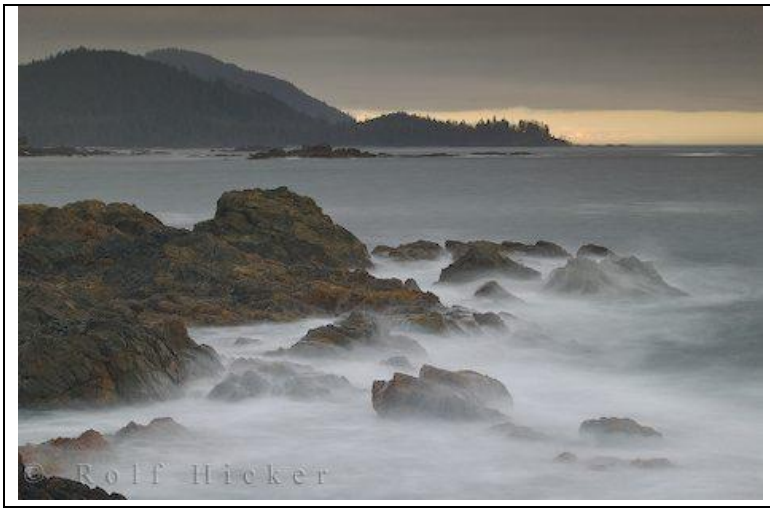
6. a) A certain type of green algae have a cadmium concentration of 0.10 parts per million. But an analysis of the algae reveals that the concentration of cadmium contaminant in the water is 0.01 ppm. Calculate the BCF factor.

0.10/0.01 = 10

b) Explain why there is more contaminant in the algae than there is in the water.

Bioconcentration occurs when an organism cannot excrete all of the toxin contained in the environment. If it binds to body fat it will eventually build up in the body.

7. The following are chemical substances found in a sample of ocean water. Which three are contaminants?



Oxygen
H_2O
Paint thinner
Baking soda ion
Strontium radionuclide
Herpes virus

8. Discuss three ways by which a citizen can modify his lifestyle so that he creates a *smaller* ecological footprint.

(1) Less consumption of energy. (turn off lights, drive less)
(2) Recycle more. Compost green waste.
(3) Do not overeat. Eat less or no meat. Growing animals consumes more energy than growing plants.

9.

100 kg(0.50 mg/kg) = 50 mg
50 mg is 0.25% of what mass of leaves?
50 = 0.0025x
X = 20000 mg = 20 g
20g (leaf/3.0g) = 6.7, almost 7 leaves

Also see http://www.emsb.qc.ca/laurenhill/science/ExtraToxicology.pdf