Toxic Contamination in the Bay of Quinte

NAME:_____ /20

The worst contaminants in the Bay of Quinte are mercury and PCB's (poly chlorinated byphenyls). These toxins tend to store in the fat tissues and magnify as they cycle up the food chain. The concentration is measured in parts per million (ppm). A bioaccumulation factor is used to compare the organisms within a food chain/web.

$$\text{Bioaccumulation factor} = \frac{\text{Toxin concentration in animal}}{\text{Toxin concentration in water}}$$

Note: Water has a PCB concentration of 0.0005ppm and a Mercury concentration of 0.000003ppm

Questions:

1. Determine the bioaccumulation factor for each species from the data given and record the factors in the table below. **(3 marks)**

Species	Concentration (ppm)		Bioaccumulation Factor		Ranking	
	PCB	Mercury	PCB	Mercury	PCB	Mercury
Sculpin	1.7	0.07	3400	23333		
Mysis	0.09	0.013				
Herring gull (eggs)	60	0.54				
Smelt	1.8	0.09				
Phytoplankton	0.01	0.004				
Lake trout	5.6	0.17				
pontoporeia	0.32	0.014				

2. Show your work with one sample calculation **(2 marks)**

BF= Toxin in animal/toxin in water
=0.09ppm/0.0005pm
=

3. Rank the species in the table from the lowest to the highest according to each bioaccumulation factor recorded.**(2 marks)**

4. On a separate piece of paper create a simple food web for the predator-prey relationships given to the right (hint: phytoplankton is the producer). Include both bioaccumulation factors in a set of brackets (PCB/Mercury) below the organism's name in the food web. Be sure your food web is complete (decomposers) (**5 marks)**

Predator	**Prey**
Herring gull	Lake trout, smelt, sculpin
Lake trout	Smelt, sculpin
Smelt	Mysis, pontoporeia
Sculpin	Mysis, pontoporeia
Mysis	Phytoplankton
Pontoporeia	Phytoplankton

5. Use your food web to answer the following questions: **(4 marks)**

   a. # of producer (s) _____
   b. # of consumer (s) _____
   c. # of food chain (s) _____
   d. Highest trophic level _____
   e. # of herbivore(s) _____
   f. # of omnivore(s) _____
   g. # of carnivore (s) _____
   h. Top carnivore is _____

6. How is bioaccumulation related to position in the food chain? **(2 marks)**

7. Which species has the highest level of contaminants in the Bay of Quinte? Speculate why this is the case? **(2 marks)**