

Hand Out—Question Set for Activity A

Question Set for Activity A

- 1 Suppose a hawk eats 1800 rodents per year ([more info about hawks](#)), and suppose that the rodents have an average mercury concentration of $0.05 \mu\text{g/g}$ and an average weight of 20 g. How much mercury (total mass) would a bird of prey eat in a lifetime of 20 years?
- 2 If 5% of the mercury ingested is excreted from a bird of prey, and we assume that the bird weighs a kilogram at its death, what would be the concentration of mercury in that bird at that time? Please note that not all of the mercury in the prey is in the toxic methylmercury form, so this question is a hypothetical illustration of what would be a maximum accumulation.
- 3 Assume that the bird of prey dies because it was eaten by an owl. The owl then eats two more almost identical birds of prey. How many grams of mercury has the owl ingested in these three meals alone?
- 4 The Biodiversity Research Institute has done a substantial amount of research looking at the mercury burden in bald eagles in Maine. Here is a [link to a poster presentation](#) summarizing some recent work. The mercury levels sampled among eaglets ranged from 0.08 to 1.27 ppm, with an average of 0.59 ppm. The mercury levels sampled from adult eagles ranged from 0.94 to 93.5 ppm. For adults, the average amount of mercury sampled from eagles living along rivers was 27.7 ppm; for eagles living on lakes it was 42.6 ppm.
 - How does the mercury concentration measured in adult eagles compare to the concentration that we estimated as the maximum for our imaginary hawk? If it is different, what might explain the difference?
 - Why do the adult eagles have so much more mercury than eaglets? What might account for the wide range of values found in adult eagles?
 - Notice the higher levels of mercury in eagles living along lakes. What might explain this difference?
- 5 Give 3 examples of other food chains involving humans in which pesticides may enter. Discuss the consequences of these pesticides entering these food chains.
- 6 An ecologist studied the presence of a toxic chemical in a lake. She found the water had one molecule of the chemical for every billion molecules of water (1 ppb). The algae had one part per million (1 ppm) of the toxic chemical. Small animals, zooplankton, had 10 ppm. Small fish had 100 ppm. Large fish had 1000 ppm. How do you explain the increase in this toxic chemical to 1000 ppm for the large fish? Use a drawing to help support your answer. The ecologist found the chemical was mercury which had been emitted into the air many miles away from the lake. How did so much of it get into the lake?
- 7 Who would have a greater concentration of mercury in their body- a person eating fish daily? A person who eats fish weekly? A person who eats fish only every now and then?
- 8 Why is it recommended that you eat salmon, sardines, and smelt, but not swordfish, shark, or pickerel?