

## Dose Makes the Difference

Some organisms are more sensitive to changes in salt than others.

### Discussion

**Key Idea: Dose makes the difference. Some organisms are more sensitive to changes in salt than others.**

**Question:** At what level does salt start to affect non-saltwater organisms in the forest? In a freshwater pond? Is it a small or large amount and which organism is most affected?

**Answers:** Pine trees are affected by 67.5 mg/L of salt, which is a very small amount of salt. The Mountain Holly and Tamarack plants cannot grow in salt levels higher than 170 mg/L and small freshwater plants and animals that are the basis of the food web will begin to die at salt levels of 226 mg/L.

**Question:** Pine trees are hurt by salt levels as low as 67.5 mg/L, but people are allowed to drink water with more salt than that level. Why is that?

**Answers:** People are able to flush out the extra salt in urine, sweat, and tears, while pine trees cannot.

**Question:** Why is it okay for people to drink water with some salt, but bad for people if they drink water that is too salty?

**Answers:** The water will taste bad and the water may not be healthy because if a person drinks too much saltwater they will die from dehydration. Human blood has a very narrow salt range. Drinking sea water will cause the blood to take water from the cells to keep the correct blood salt levels. This loss of water will cause the cells to die and eventually the organs and the body will fail.

**Question:** Some of the organisms that are most affected by salt are the small plants and animals that are lowest on the food chain. How will their death affect other biotic factors in a freshwater ecosystem?

**Answers:** If plants and animals that are the basis of the food web disappear, the animals that eat them will also suffer because they have less to eat.

**Question:** How does the dose or amount of the salt affect freshwater ecosystems?

**Answers:** The larger the dose of salt, the saltier the water and the larger the negative effects.

**Question:** How is it possible for a freshwater swamp to turn into a salt marsh without trees? What happened to the trees? How can this occur?

**Answers:** The Hackensack River was dammed, cutting off the flow of freshwater to the swamp. The water became saltier, killing trees and only allowing the salt tolerant reedy marsh grasses to grow.

**Key Idea:** Salt does not necessarily cause problems in ecosystems. It is *changing* salt levels that cause problems.

**Question:** But do high amounts of salt always negatively affect ecosystems? Why is salt in stream water so bad, when a great white shark lives in saltwater with no problems?

**Answers:** Organisms are adapted to live in a specific habitat, so great white sharks are adapted to living in salt water, but would not be able to survive for long in a freshwater ecosystem. The same is true of a freshwater fish that is moved to a saltwater ecosystem.

**Question:** What would happen to a great white shark if it was put in a freshwater tank?

**Answers:** It would not survive.

**Question:** Please summarize the role of salt in all ecosystems and explain why if high salt is good for an ecosystem, why it is also sometimes bad for systems.

**Answers:** Different systems depend on different levels of salt. Salt isn't per say bad, but *changing* salt levels can harm ecosystems.