



Water

THE CATTAIL LESSON: PHYTOREMEDIATION

PROCEDURE:

Collect cattails (including the root system) from the local environment. Fill a jar with water and add some food colouring. Place the cattail into the jar and wait for at least an hour (but overnight is even better). Remove the cattail from the jar and cut its stem open. Observe any changes in colour. Use this opportunity to discuss bioaccumulation and phytoremediation.

REVIEW:

The purpose of the following activity is to provide students with the opportunity to put their knowledge to the test. One of the below paragraphs is correct, and the other has some inaccurate information and vocabulary. Provide students with a copy of the inaccurate paragraph and give them a chance to read it and correct it. For an extra challenge, you can avoid telling them that there are any inaccuracies and see if they are confident enough to correct it. Once they've had time to review the paragraph, put the correct paragraph up on an overhead to review.

This activity is best used once the students already have some prior knowledge of food webs, bioaccumulation, and phytoremediation. The cattail is the vegetation used in this activity, due to its ability to phytoremediate heavy metals from the environment. Cattails are also used for food (both animals and humans). Rat root is another plant that can be alternatively used in this lesson.

Inviting a local Elder or knowledge keeper to share their experiences with cattails/rat root is another way to enhance this lesson.



CORRECT PARAGRAPH:

The Cattail is a plant that grows along the edges of waterways and wetlands throughout North America. It was selected for this lesson because of its ability to absorb water-soluble metals and organocompounds from the water and store it in the spongy tissue of the roots and stem. Being part of the local ecosystem, it belongs to many food chains and is called a **producer** because it has the ability to trap the sun's energy through a process called **photosynthesis**. The fleshy/spongy parts of the plant provide food for many animals including muskrats, beaver, and even human beings. Consequently, a food web is a better description/model of how trapped energy and nutrients are passed along through a maze of producers and consumers. Typically, a **herbivore** must eat many cattail plants in order to gain the nutrition required for survival . . . and a **carnivore** must eat many **herbivores** . . . and so the story goes. Consequently, any chemicals that are consumed at the **bottom** of the energy pyramid accumulate in **greater** concentrations along the food chain. This is called **Bioaccumulation or Biological Amplification**. Connected to this ability of plants to absorb certain concentrations of certain toxic metals is the strategy of Phytoremediation that is used to clean up polluted waterways and wetlands.

INCORRECT PARAGRAPH:

The Cattail is a plant that grows along the edges of waterways and wetlands throughout North America. It was selected for this lesson because of its ability to absorb water-soluble metals and organocompounds from the water and store it in the spongy tissue of the roots and stem. Being part of the local ecosystem, it belongs to many food chains and is called a consumer because it has the ability to trap the sun's energy through a process called cellular respiration. The fleshy/spongy parts of the plant provide food for many animals including muskrats, beaver, and even human beings. Consequently, a food web is a better description/model of how trapped energy and nutrients are passed along through a maze of producers and consumers. Typically, a carnivore must eat many cattail plants in order to gain the nutrition required for survival . . . and a herbivore must eat many carnivores . . . and so the story goes. Consequently, any chemicals that are consumed at the top of the energy pyramid accumulate in decreasing concentrations along the food chain. This is called Biohazardment or rock n' roll amplification. Connected to this ability of plants to absorb certain concentrations of certain toxic gases is the strategy of Phytoremediation that is used to sanitize polluted waterways and wetlands.

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