

Notes for Power Point for Lesson 3 Biomagnification

Slide	Notes	Additional Notes
1	<p>Sport and commercial fishermen catch blue crabs in the Hudson River. For many years, the NY State Department of Health (DOH) placed restrictions on consumption of blue crabs because of their high cadmium levels. Now, DOH regulations say that it's safe to eat blue crab six times a week! However, many fish that live in the Hudson have severe consumption restrictions placed on them, mostly due to PCBs.</p>	
2	<p>In this lesson, students will focus on four species of organisms that live in Foundry Cove: cattails, mud worms, grass shrimp, and blue crabs. Ask students to find the three that are shown here. Blue crabs move in and out of Foundry Cove with the tides. They can be carried for miles up or down river by tides. Grass shrimp are brackish water creatures that are found in Foundry Cove and nearby Hudson River areas only when the salt front has moved north due to dry conditions and low freshwater flow from rivers and tributaries of the Hudson. Mud worms are resident organisms in the cove and were the most common benthic organism here both before and during the cadmium contamination. After the Superfund clean up, their numbers were greatly reduced and another type of worm became the most common benthic organism.</p>	
3	<p>Dots represent DDT. Arrows show small losses of DDT through respiration and excretion.</p> <p><u>Biomagnification</u> is the process of a toxin that passes through a food chain, with the tissue concentration increases at each trophic level. Occurs with sufficient uptake and slow elimination of toxin.</p> <p>Similar, but slightly different terms:</p> <p><u>Bioaccumulation</u> – accumulation of chemicals in the tissue by any route, including respiration, ingestion, or direct contact with contaminated water or sediment. Uptake in an organism exceeds organism's ability to remove the substance from its body; substance sequestered in</p>	

	<p>organisms' tissues</p> <p><u>Bioconcentration</u> – similar to bioaccumulation but no dietary intake is involved; in fish, uptake directly from water is more important than uptake from food</p>	
4	<p>http://www.youtube.com/watch?v=MXSv0ifvDjc&feature=player_embedded.</p> <p>Since this video and the one shown on the next slide are from YouTube, you may have to download them in advance. This video of biomagnification in an aquatic food chain lends itself to narration by you or a student.</p>	
5	<p>http://www.youtube.com/watch?feature=endscreen&NR=1&v=E5P-UoKLx1A NOTE: You might want to turn the volume down for this video.</p> <p>This video shows biomagnification of a toxic pesticide in a terrestrial food chain. Notice the visuals that represent the increasing level of pesticide as it moves through the food chain.</p>	
6	<p>Cattails, and perhaps other plants take up cadmium as well. Benthic animals that take in sediments while eating can ingest and accumulate cadmium and other toxins as they eat. Organisms that feed on cadmium-contaminated mud worms may eat tens or hundreds of the worms, accumulating cadmium in their tissues. The biomagnification of cadmium continues up the food chain/web.</p>	
7	<p>Silent Spring, published 50 years ago (1962) raised awareness of harmful effects of DDT. Some large birds that are top predators or scavengers almost became extinct due to the biomagnification of DDT. The US banned DDT in 1972, though it is used in other parts of the world to control malaria mosquitos and other disease vectors. Discussion continues regarding when and if DDT or other similar toxins should be used in certain situations.</p>	
8	<p>PCBs, which are found in the Hudson River, and currently the focus of the largest Superfund project, accumulate in top predators through biomagnification. You may ask students what percentage increase is seen at each trophic level. For example, the PCB level in zooplankton is about 5x greater than in their food, the phytoplankton.</p>	