Fish Hotel Lesson Plans

Lesson 1: Fish Hotels: Trees in lakes that provide food, shelter and spawning areas

Lesson 2: How impervious surfaces impact fish survival

Lesson 1: Fish Hotel

Goal: Students learn about the role of trees in the water as part of lake and river ecosystems. Fallen trees provide shelter and food for fish, plus basking and hunting sites for many other animals.

Instructions:

1) Optional. Ask students whether they like fish, and if so why? This activity typically gets kids excited and talking. (5 minutes)

2) Facilitate a short class discussion about what fish need to survive:
   a. Food: plants, aquatic insects, smaller fish, etc.
   b. Shelter: trees, aquatic plants and crevices between rocks
   c. Water: suitable temperature and oxygen levels.
   d. Adequate spawning and nursery areas.

3) Read fictional hardcover Fish Hotel as a read-aloud. If you want to show the beautiful illustrations in a much larger format on a screen, read the book Fish Hotel from the PowerPoint with the same name or play it at www.youtube.com/watch?v=TjNYsRmvjc&feature=youtu.be (10 minutes to read + 5 minutes to discuss)

4) Have students read non-fiction softcover Fish Hotels. (10 minutes) Turn and Talk to a classmate to summarize what they learned. (2 minutes)

5) Optional. Watch one or more of the following videos
   a. Natural Shorelines: Living in Harmony at the Water’s Edge (7 minutes) by a fish biologist with the Michigan Department of Environmental Quality includes underwater fish footage and explains what people can do (or avoid doing) on land to help fish www.youtube.com/watch?v=566bd_c_Ooc&t=172s

Fish need oxygen to survive.
Warmer water holds less oxygen than colder water.
b. Engbretson Underwater videos (1 minute each or less) have very high quality footage of fish swimming through underwater trees
   i. Super Clear Muskie Underwater Video  
      www.youtube.com/watch?v=_DxsWtm76QE
   ii. Walleye Underwater #3  
       www.youtube.com/watch?v=Nit4NCVIt3U
   iii. Largemouth Bass Under Large Pine Tree  
        www.youtube.com/watch?v=HPCgN‐F_fto

c. Babe Winkleman’s show (2.5 minutes) features a Wisconsin fisheries biologist talking about projects that add trees to lakes for fish habitat  
   www.youtube.com/watch?v=7kURYFYxuSc

6) **Putting it all together:** Facilitate student discussion about whether fish could survive in the lake along the shorelines in *Waterfront Properties* PowerPoint (see notes sections) (15 minutes)
   a. Are there enough fish hotels (fallen trees) and aquatic plants for shelter?
   b. Are there trees along the shoreline that will become fish hotels in the future?
   c. Are there trees along the shoreline to shade the water, keeping it cool so there is enough oxygen for fish to survive?
   d. Review summary slide about what we can do to help fish

**Vocabulary**

**Aquatic:** living or growing in water

**Bask:** to lie or relax in a pleasant warmth or atmosphere

**Gamefish:** a fish caught for sport

**Habitat:** conditions required for an organism to complete its life cycle, and the population to sustain itself (adapted from Sass et al. 2017)

**Predator:** an animal that hunts other animals for food

**Prey:** an animal hunted by another animal for food

**Shoreline:** the line where a body of water and the shore meet

**Spawn:** to produce or deposit eggs

**Submerged:** under the surface of water

**Undeveloped shoreline:** shoreline with no houses

**Resources**

*A Second Life for Trees in Lakes: As Useful in Water as They Were on Land* by Michael Bozek. 2015. 8 pages.

UW Extension and Wisconsin Department of Natural Resources. learningstore.uwex.edu/A-Second-Life-for-Trees-in-Lakes-As-Useful-in-Water-as-They-Were-on-Land-P1801.aspx
Lesson 2: How impervious surfaces impact fish survival

**Goal:** Students learn how people impact fish when they build impervious surfaces on land.

**Introduction:** Water runs downhill. So, what people do on the land effects fish and other animals that live in the water. Fish breathe water, and water pollutants can harm fish.

Impervious surfaces are hard, manmade surfaces such as rooftops, driveways, roads, parking areas, and patios. Runoff from impervious surfaces carries soil, excess fertilizer, warm water and other pollutants into lakes and streams leading to decreased populations of fish.

Some fish do not survive when we build more impervious surfaces because:

- **More nutrients** result in less oxygen in the water, which fish need to survive
- **More sediments** and algae growth make it difficult for some predator species that hunt by sight to find their food
- **More sediments** cover spawning beds of fish such as smallmouth bass, walleye and crappie, potentially inhibiting reproduction
- **More runoff** coming from hot pavement and rooftops result in warmer lake and river temperatures. Coldwater fish like trout, and coolwater fish like northern pike and walleye can’t take the heat.

**Vocabulary:**

**Impervious surface:** a hard surface that prevents water from soaking into the ground to become groundwater. Examples include paved and gravel driveways and parking areas, rooftops, patios, etc.

**Runoff:** rain or snowmelt that flows off the land into lakes or streams
Shoreland zoning: Laws to protect lakes, streams and fish by guiding where buildings and other impervious surfaces may be built near lakes and streams.

Instructions:

1) Watch video about why and how impervious surfaces impact fish 7:43-10:57 at [https://www.youtube.com/watch?v=GKxMORINInw](https://www.youtube.com/watch?v=GKxMORINInw) or a longer 10-minute version at [https://www.youtube.com/watch?v=I-1DnoEhqu4](https://www.youtube.com/watch?v=I-1DnoEhqu4)

2) Open Impervious Surfaces PowerPoint. Ask students to come to the front of the room, give one fish card to each student, and have them stand where they can see the PowerPoint. Advance the PowerPoint slides to the various levels of imperviousness. At 10% imperviousness, we lose the fish species listed on the slide. Have the students with the lost fish hand in their fish card and go sit down. At 15% imperviousness, we lose more fish species. Have the students with lost fish hand in their fish card and go sit down. Fish that were eliminated died for different reasons: northern pike cannot survive high temperatures, whereas the eggs of hornyhead chubs don’t hatch due to lack of oxygen with sediment from high impervious levels. The remaining fish survive because they can tolerate high temperatures, muddy water and sediment on their eggs. The brook stickleback survives warm, muddy water by breathing air when needed. (15 minutes)

3) Have students discuss whether they think fish could survive in the lake along the shorelines shown in Waterfront Properties PowerPoint. (see notes sections) (15 minutes)
   a. Are there impervious surfaces? Are they far enough back from the lake or stream so the runoff will soak into the ground, or will it carry pollutants such as soil and warm water to the lake? Wisconsin research has found that during a one-inch rain runoff from buildings 75 feet back from the water runs into the lake.
   b. Are there trees along the shoreline to shade the water, to help keep it cool?
   c. Review summary slide about what we can do to help fish

Resources

Impervious Surfaces: How they impact fish, wildlife and waterfront property values


Does shoreland zoning work? Two pages summarize the effects on fish habitat in states with and without shoreland zoning. [www.uwsp.edu/cnr-ap/clue/Documents/Water/MaineVermontSLZoningresults.pdf](www.uwsp.edu/cnr-ap/clue/Documents/Water/MaineVermontSLZoningresults.pdf)

Fish Hotel lesson plans and printed materials available at [www.uwsp.edu/cnr-ap/clue/Pages/Fish-Hotel-Kit.aspx](www.uwsp.edu/cnr-ap/clue/Pages/Fish-Hotel-Kit.aspx)