

Whirling Disease

Whirling Disease activities are directly tied to the seventh spread - pages 13 and 14 of “Our Wetland Project”.

What is Whirling Disease?

How is it transmitted?

In this lesson students will participate in discussions, brainstorming and a learning game to discover what Whirling Disease is, how it spreads and how they can help prevent the spread of this parasite.

Levels

Grades 3 and up

Subjects

Language Arts, Science, Social Studies

Skills

Examining, Verifying, Analyzing, Discussing, Brainstorming

Concepts

Scientific investigation using observations, tools

Objectives: Students will be able to:

Define Whirling Disease

Explain the impacts of Whirling Disease on coldwater fisheries

Identify procedures to help prevent the spread of Whirling Disease

Time Considerations

Preparation - 45 minutes

Activity - 65 minutes

Lesson Overview

- **What in the “Whorld” is Whirling Disease?** (30 minutes)
- **Osprey, Trout, Spore Game** (20 minutes)
- **Build an Osprey Activity** (15 minutes)

What in the “Whorld” is Whirling Disease? Lesson Details - 30 minutes

Materials (20 student class-size) - What in the “Whorld” is Whirling Disease?

white paper

Whirling Disease puzzle pieces

envelope for puzzle pieces

glue

Background

In layman’s terms, whirling disease is the descriptive side effect produced by a complex relationship involving a non-native parasite and a common aquatic worm that exclusively impacts coldwater sportfish, specifically trout and salmon. The parasite becomes engulfed by a tubifex worm, which acts as an intermediate host for the parasite. Eventually, this relationship produces a new free-floating life phase of the parasite that attaches itself to trout and salmon. After coming into contact with the host fish, the parasite penetrates the head and spinal cartilage of fingerling trout where it multiplies very rapidly, putting pressure on the organ of equilibrium. This causes the fish to swim erratically (whirl) and have difficulty feeding and avoiding predators. It is this whirling effect that has provided the name for the disease that has significantly impacted coldwater fishery resources.

Whirling disease is having devastating impacts on coldwater fisheries in North America. All species of trout and salmon may be susceptible to whirling disease. Other members of the trout and salmon family, such as mountain whitefish are also at risk. Rainbow trout

What in the “Whorld” is Whirling Disease? Lesson Details - 30 minutes *(continued)*

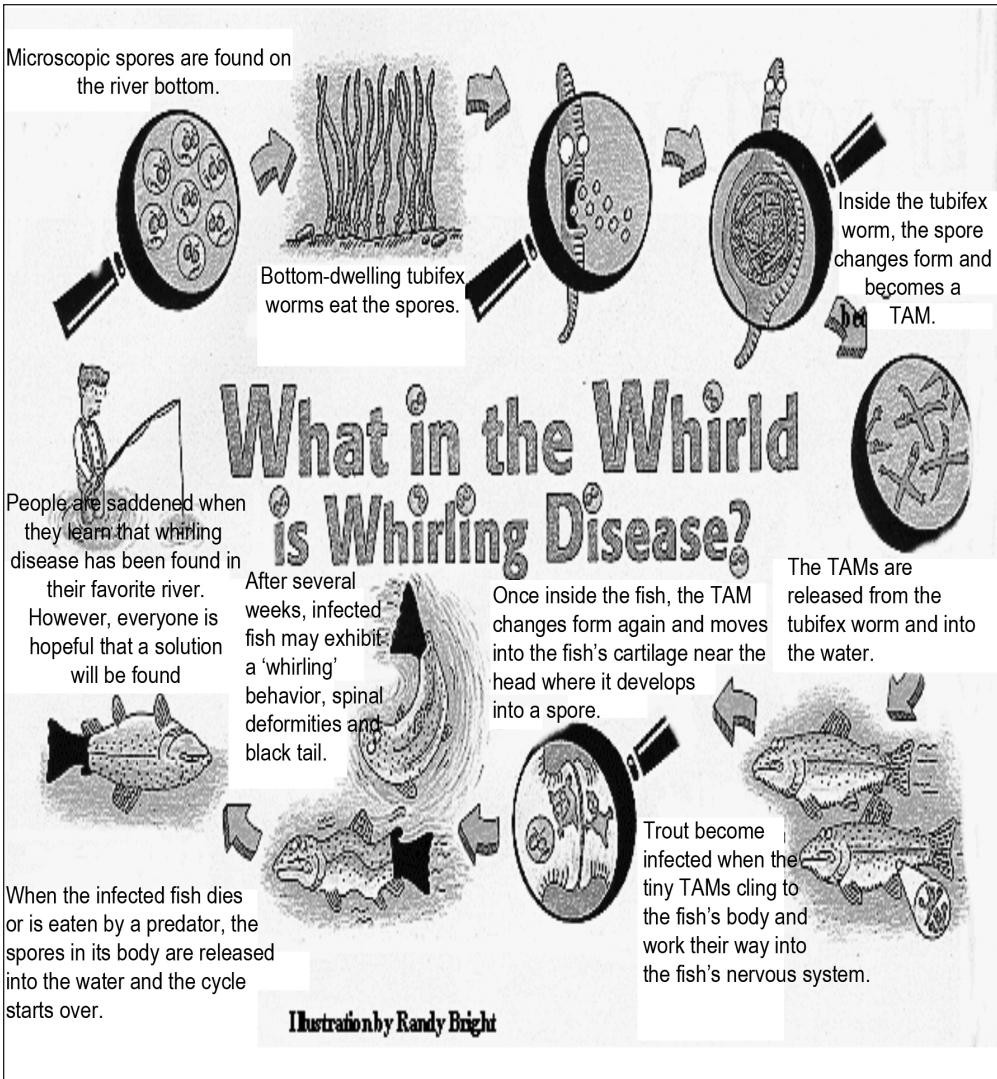
and cutthroat trout appear to be more susceptible than other trout species. Brown trout become infected with the parasite, but they appear to have immunity to the infection and have not been as greatly impacted as rainbow trout. Scientific studies demonstrate that grayling and bull trout are very resistant to infection. However, regardless of species, when each infected fish dies, many thousands to millions of the parasite spores are released to the water. These parasitic spores are virtually indestructible--they can withstand freezing and desiccation, and can survive in a stream for 20 to 30 years. The parasite is sure to continue to spread to drainages now clean, since it is so easily and unknowingly transported by animals, birds, and humans.

STEP ONE. Begin by developing a class Whirling Disease **KWL** chart on the board.

What I K now	What I W ant to Know	What I L earned

You could also have students make their own **KWL** charts. Once the chart is complete, share the background information with students or have them research Whirling Disease on line if access is available. As information is gathered, have them fill in the **KWL** chart and share their information with the class.

Provide each student with a blank piece of paper, glue and Whirling Disease puzzle pieces. Have students put the puzzle pieces together to create the information sheet below.



Osprey, Trout, Spore Game Lesson Details - 20 minutes

Materials

open playing field

Background

This game is similar to full body rock, paper, scissors.

STEP ONE. Establish signals for the following.

- osprey (tuck thumbs in arm pits and flap wings)
- trout (hands on each side of the face making gill movements)
- spore (put one arm in front of the body and one behind like you are ready to spin)

STEP TWO. Explain the rules similar to rock, paper, scissors.

- osprey beats spore - osprey eat infected fish
- spore beats trout - spore infects fish
- trout beats osprey - osprey depend on fish for food

STEP THREE. Play Osprey, Trout, Spore Game

Have the students stand on 2 imaginary lines on the far ends of the playing field facing away from each other. Quietly, have each team decide 1st and 2nd choice of creature they are going to be. Have students move toward the middle and have the two teams face each other about 6-8 feet apart. When leader says, “Whirl”, both groups show the symbol of their 1st creature choice. Whoever loses has to run back to their line before someone on the other team tags them. If a student gets tagged, they go and join the tagging team. If there is a tie, groups go immediately into their 2nd choice creature. If there is a 2nd tie, regroup and start over. Game ends when one team has all the people playing the game.

Build an Osprey Activity Lesson Details - 15 minutes

Material - Build an Osprey Activity

pictures of Osprey

Osprey costume

wings - cardboard wings with straps to attach to arms (glue on feathers)

sharp talons - cut talons from felt and hot glue them to a pair of white socks

spicules - glue black dots to the socks

eyesight - hang binoculars around neck for binocular vision

put on a pair of swim goggles for diving

hooked, sharp beak - cardboard beak with yarn to tie around head

white breast feathers - white t-shirt

Background

Even the older students like and benefit from this dress up activity. Discuss the term birds of prey with students.

Where do osprey live?

What role does the osprey play in the riparian habitat?

Discuss features of a bird of prey/raptor. Review the terms predator and prey, and discuss the differences and what makes osprey and Birds of Prey predators. Ospreys are unique in that they are the only raptor to feed almost exclusively on fish. An osprey has several adaptations that help it search, capture and transport slippery prey. This activity familiarizes students with osprey body parts and adaptations.

Build an Osprey Activity Lesson Details - 15 minutes *(continued)*

STEP ONE. Describe the osprey body parts.

- wings - used to fly (wingspan 4.5-6 feet)
- sharp talons - for catching and killing prey, reversible front talons (2 in front, 2 in back)
- hollow bones - makes osprey light in the air
- feathers - serve many functions: flying, warmth, and protection from water (feathers are dense and oily enough to be mostly waterproof)
- legs - usually long with fewer-smaller feathers, are used to penetrate water to reach fish for food. After picking up the fish, osprey position the fish head first before flying to decrease wind resistance.
- spicules - short, spiny bumps on osprey feet help grasp the slimy fish
- eyesight - osprey have excellent binocular vision (8 times better than humans)-- allowing osprey to spot fish from 120 feet in the air. Nictating membranes protect osprey eyes when diving underwater to reach fish.
- hooked, sharp beak - for tearing meat.

STEP TWO. Have students brainstorm how osprey, fish, and Whirling Disease are all connected. Infected fish and fish parts are the primary vector for transmitting whirling disease. It may also be transmitted by birds. Challenge students to come up with as many ways as possible to prevent the spread of Whirling Disease.

Whirling Disease prevention examples.

- never transport live fish from one water body to another
- do not use trout, whitefish, or salmon parts as cut bait
- dispose of fish entrails and skeletal parts properly
 - never discard fish parts in or near streams or rivers.
Infected fish may harbor tens of thousands of myxospores.
The simple act of disposing infected fish parts in a clean drainage could provide enough spores to start an infection.
 - do not discard fish parts in a kitchen disposal.
Whirling disease myxospores can survive most wastewater treatment systems.
Instead, discard in dry waste that would go to a landfill.
- rinse all mud and debris from equipment and wading gear (including wading boot felt), and drain water from boats and boots before leaving an infected drainage.
This is good practice for preventing transfer of other aquatic hitchhikers as well.