

Blackfoot River Fish Identification Lesson

Background Information

For the past three years I have been working with Laura Burns, a fish biologist from the Forest Service in Lincoln. We have been taking the sixth graders to the Blackfoot River to electro-fish. We shock and net fish that are stuck in isolated pools where the river flows underground in the fall. We then transport the fish downstream to where the river flows aboveground. We have secured funding for the next five years so I wanted to write a lesson plan for this activity. This lesson is part of an ongoing curriculum that I teach throughout the entire school year. The students do water monitoring with WEN on Spring Creek, a tributary of the Blackfoot. We also study water safety, CFS, macroinvertebrates, fly-tying, and fly-fishing. My ultimate goal is to get students to understand and appreciate where they live. I want them to take care of the Blackfoot Watershed. I also want them to enjoy and help preserve the recreational opportunities here that so many tourists pay thousands of dollars to enjoy themselves.

Background Knowledge

Prior to teaching this lesson, we will review what the Blackfoot Watershed is. We will look at maps of the watershed. We will make paper models of a watershed and spray them with water to simulate how water flows throughout the watershed and is connected.

Time Needed: Approximately 3+ hours in class and 4 ½ hours in the field

Day 1 :(**45 minutes**) Hand out Blackfoot River Fish Quiz. Then lecture on the connectivity of the Blackfoot River to its tributaries and to the Clark Fork River. Follow the river using Google Earth from the Landers Fork to Milltown. We will look at the Columbia Basin later. I just want to focus on the local area at this point.

Day 2: (**30 minutes**) Assessment: Ask students to get on Google Earth and navigate from the Landers Fork to the Clark Fork.

Day 3: (**45 minutes**) Lesson on Native and Introduced fish in the Blackfoot Watershed. Pre-assess using fish ID cards asking the students if they can name the fish being shown.

Day 4: (**15 minutes**) Lecture on river safety and taking a field trip on private land.

(**4 ½ hours**) Field Trip from **10:00-2:30**.

(**45 minutes**) Report and analyze data from field trip and discuss findings

Day 4: (**30 minutes**) Create Excel graphs depicting data collected on fish.

Day 5: (**20 minutes**) Blackfoot River Fish Quiz-post assessment

Lesson Topic

Students will study native and non-native fish in the Blackfoot River. They will practice identifying the different species. They will also learn how the river system of a watershed must be connected to enable fish to migrate. Students will travel to the Blackfoot River with a fish biologist to electro-fish (shock) fish and move them from isolated pools in the dried up river bed to the main flowing river downstream. They will identify and count the live fish as they release them. They will record the data and present it in an Excel graph.

Objectives

1. Students will understand the importance of connectivity in a river system.
2. Students will understand the difference between native and non-native species.
3. Students will correctly identify fish. (Objective will be reassessed during the fly fishing unit in the spring of 2008.)
4. Students will handle live fish correctly. (Objective will be reassessed during the fly fishing unit in the spring of 2008.)
5. Students will understand why you should never transfer aquatic life to a new body of water.
6. Students will see that the Blackfoot flows underground near town and understand how that impacts fish migration and survival through the winter.
7. Students will collect and analyze data alongside of a biologist.
8. Students will create Excel graphs of the data collected.

Material/Equipment/Resources Needed

- Map of the Blackfoot and Clark Fork Watersheds from their headwaters to Milltown Dam
- Aerial photo of Milltown Dam (Montana Fish Wildlife and Parks (2004)
- Computers with Google Earth and Microsoft Excel
- Fish of Montana CD-ROM from Montana Fish Wildlife and Parks (2001)
- Fish ID cards printed from the Fish of Montana CD-Rom from Montana Fish Wildlife and Parks

Copies/Handouts Needed

Student copies of the Blackfoot Fish Quiz for pre and post-assessment
Copies of data collected from the fish survey the last two years.

Prior Knowledge Assessment

The pre-assessment quiz will help me to see what they know. I will also use the Fish ID cards with the entire class to see what they can identify prior to studying the fish.

Anticipatory Set

I will show the class the Fish of Montana CD-ROM on the big screen with the projector so that they can see all of the fish in the state. I will ask them to tell me which fish live in the Blackfoot River. I will also ask them if that fish is native. We will then click on the fish on the CD-ROM to check its range to see if they were correct. They will earn class rewards for each fish that they get correct.

Teacher Input (Refer to list of Objectives)

Objective 1 and 6:

Using the maps and aerial photos of the Blackfoot, Clark Fork, and confluence at Milltown Dam, show the students how the rivers and the tributaries are all connected. Briefly talk about how a dam can impact the connectivity of a river system. Discuss how fish need to migrate to spawn and survive. Mention how biologists in the Blackfoot tracked cutthroat swimming over 25 miles to spawn. Point out important spawning tributaries in the Blackfoot like Chamberlain Creek and the North Fork of the Blackfoot. Then look at Google Earth and follow the Blackfoot River from the Landerss Fork to Milltown. Point out the spot through Lincoln where the river flows underground. Talk about how a dam or a dried up river bed are impediments to the migration of fish. Ask the students to brainstorm anything else that could interrupt the connectivity of a river system i.e. different types of dams (irrigation, mining, beaver). Talk about why humans have changed river and stream routes in the past i.e. (flood prevention, irrigation, mining, grazing, power).

Objective 2 and 5:

Using the Milltown Dam aerial photo show the students how the flows of the Clark Fork and the Blackfoot are interrupted by the dam. Show the students the large stagnant body of water that sits behind the dam. Talk about the human caused introduction of Pike into the Clearwater chain of lakes. Explain to students that people think that the Pike were put in the lakes by a person who wanted to establish a population for recreational fishing. Explain to the students the voraciousness of this type of fish. Also explain its ability to mass produce in a habitat of slow moving lake water. Show the students the connection between the Clearwater chain of lakes and the Blackfoot River on the map. Then show them the connection to the Milltown Dam and ask the students what they think lives in that water? Explain the impact the pike have had on the native fish of the Blackfoot River. Show the students using the Fish of Montana CD-Rom that the pike is native to Montana, but it is not native to the Blackfoot Watershed. Explain the difference between native and non-native species. Talk about how the Brown trout, Rainbow trout, and Brook trout are also non-natives to the river but do not impact the fishery the way a Pike could. Then explain hybridization. Use the mule as an example and explain to the students that the Cutthroat and Rainbow hybridize as well as the Bull trout and Brook trout. Ask the students how this could impact native species over time.

Objectives 3 and 4:

Using the Fish of Montana CD-ROM and the Fish ID cards, teach the students the characteristics of the native and non-native fish of the Blackfoot River. Continue to practice identifying the fish throughout the school year. Really focus on the characteristics of the Bull trout and Cutthroat trout since they are a threatened species and a species of concern. Also point out the characteristics of the Bull trout/ Brook trout hybrid. Practice handling fish correctly as they are released on the field trip. Include wetting hands prior to contact, holding softly, and releasing quickly and carefully. Also show students how to revive a stressed fish by essentially teaching it to swim again while moving water swiftly through its gills.

Objectives 7 and 8:

Monitor the students as they collect the fish count data by the river during the release. Assign 3 data collectors with notebooks. Tell them to use tally marks. Share the data with the class and assign students to enter the data into the Excel spreadsheet and create a bar graph. Students have already learned Excel in math class.

Field Trip Agenda

10:00 A.M.	Leave School
10:30-10:45	Biologist gives talk about safety and shocking fish. She talks about why we have special permission from the state to transport fish and special permission to access private land. She also talks about fish habitat and migration.
10:45-12:00	Electro-fish
12:00-12:20	Lunch
12:20-1:30	Electro-fish
1:30	Leave for main river at Dalton Mountain Bridge
2:00-2:30	Reiterate how to handle fish. ID and release fish.
2:30	Return to school
2:45-3:15 P.M.	Share and discuss data collected.

Student Activities

Students will take notes on:

- Native and Non-Native fish of the Blackfoot
- Differences between Native and Non-Native species
- The proper way to handle fish

Students will observe:

- Navigating the Blackfoot on Google Earth
- Maps and Photographs
- Using the Fish of Montana CD-ROM

Students will participate in:

- Navigating the Blackfoot on Google Earth
- Electro-fishing
- Collecting Data
- Creating graphs using Excel

Guided Practice

Students will quiz each other in small groups using the Fish ID cards. I will orally quiz them as a class using the Fish ID cards. We will review the proper handling of fish during the fly-fishing unit in the spring. We will review and quiz on the native and non-native fish of the Blackfoot in the spring. On our fly-fishing trip in the spring, students will practice fish identification in the field while catching fish. We will review terms like hybrid and native in our science unit on ecosystems.

Independent Practice

They will practice the Fish ID cards on their own. They will navigate Google Earth on their own, following the path of the Blackfoot River. They will complete a graph in Excel that shows the data collected at the river.

Alternative Assignments

- Encourage students to practice what they learned while fishing in the valley
- Look at other rivers in the world on Google Earth and point out impediments and changes in stream flow
- Raise trout in the classroom in the spring with Trout Unlimited
- Discuss native and non-native species in Montana, including humans who have had to adapt to living in a new area
- Create a Power Point presentation on one fish that lives in the Blackfoot River

Closure

Before students leave for the day, I will hold up a Fish ID card and ask them to identify it before they can be dismissed. We will also write a two sentence summary and draw one picture in our science journals of what was discussed in class. Prior to the field trip day, I will review what they need to be prepared. We will talk again about behavior in an outdoor setting and on private land. We will review again that we have special permission to be moving fish in a river.

Assessment

First, I will observe them navigating the river using Google Earth. I will also give them the Blackfoot Fish Quiz before and after the lesson to check for improvement. They will take the post assessment quiz again in the spring during the fly fishing unit to see what they remembered. They will also be assessed on fish identification in the spring. I need them to know the fish of the Blackfoot before they go fishing.

I will also observe them during water monitoring on Spring Creek in the fall and the spring with the Watershed Education Network. We cover many similar topics, and I can easily see what they know by how they respond to WEN's written and oral assessment.

Homework

Students will take home a copy of the Fish of Montana CD-ROM. They will ask their parents to view the CD and have the parents write down one piece of information they learned from the CD. Students will return the parent response to me. My students all have computer access so this assignment is possible.

I will also expect them to be better stewards of the river. I will expect them to teach others what they have learned and to appreciate the river and the watershed in which we live.

References

Maps and Aerial Photo of Milltown Dam from Montanan Fish Wildlife and Parks (2004)
Google Earth
Fish of Montana CD-ROM-Montana Fish Wildlife and Parks (2001)

Notes

- Students need to know how to make a graph in Excel prior to doing this lesson. They also need to be familiar with how to use Google Earth.
- You need to have a fish biologist help coordinate the field trip. You must have special permission from the state to move fish.
- This lesson is part of a year long curriculum that we teach about the Blackfoot Watershed. It is a good lesson on its own, but way more meaningful as a part of a whole.

Blackfoot River Fish Quiz

Answer the following questions in **complete sentences**.

1. How many different species of fish live in the Blackfoot River?
2. Name as many fish that you can that live in the Blackfoot River.
3. What is the difference between a native and non-native species?
4. Explain why rivers and streams need to be connected to one another.
5. Describe what may happen to migrating fish if part of their river flows underground.
6. Explain why people shouldn't move fish from one river to another.

Lesson Strengths and Weaknesses

The major **strength** of this lesson is the kids working hands-on in the field. They get to work in the water alongside of a biologist collecting data that is all their own. I think it is important for the students to see what some careers are like. I also think they need to explore the place in which they live. Observing and collecting data right near their own town on their river helps them to understand and appreciate their surroundings better.

The major **weakness** of the lesson is the way we go about releasing the fish. The fish are usually too packed in the coolers. The kids have trouble getting a handle on the fish. They also get really excited to let them go. We need to work on a more structured release so that all of the students can see the fish and identify them without stressing the fish too much. I think next year we should spread the fish out into a few more coolers. We could invite a couple more volunteers and have each at a small station with a cooler and a transparent container. The adults could move each fish individually to the clear container. The small group of students could correctly identify it. Then one student could practice properly releasing the fish while the other students watched. Hopefully, that plan will make the release less chaotic and more educational.

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