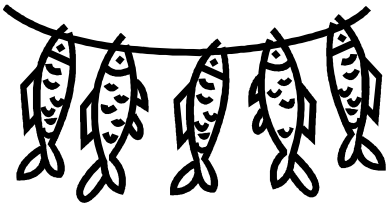
Fishing to Survive

A STEM Activity About Fishing



Objectives:

Students will: 1) investigate historic and modern methods of fishing; 2) develop a method to catch fish using found objects based on a scenario and 3) use an interdisciplinary approach to solving a problem/issue.

Background:

Fishing techniques from the earliest times has been a question of solving the issue of securing enough protein to meet the needs of the family and community. The process had to be energy efficient in order to feed the family, tribe or village.

Through trial and error, modern fishing methods have evolved, providing opportunities for recreation as well as a source of food. This activity engages students in a scenario where they need to catch a fish without traditional fishing gear. How might early men have caught fish? How could they have caught enough for their family to eat?

For early naturalists, being able to observe the natural world was a necessary skill in order to find food and survive. Watching where fish sought cover, what they ate, as well as watching other predators catch fish, provided important information.

Great blue herons wade slowly in the shallows, barely moving as fish swim around them. Early man may have tried to stand still and then grab a nearby fish with varying degrees of success. However, the small fish in the shallows wouldn't have fed many family members. Even a spider spinning a web to catch insects may have helped someone envision how they could weave a net to catch multiple fish. Learning from nature is a new field of science called **biomimicry**, although man has been observing, learning from, and duplicating nature for thousands of years. What other species may have contributed to man's development of fishing skills?

Fishing hooks have been found in archeological digs shaped from shell and bone from over 10,000 years ago. We can still see the outline of weirs that were created by Native Americans and were used to catch migratory fish in stream bottoms and shallow rivers.

Create a timeline with bare hands on one end and a modern recreational fishing boat on the other to compare early fishing techniques with more modern techniques. Use the internet to research fishing methods of early Americans as well as current fishing tools. Even in the past 100 years there have been vast changes in the gear used by recreational fishermen. We can't step back in time to determine how man engineered the perfect fishing gear. It was most likely different in various climates and ecosystems. In coastal areas, the spring migration of salmon,

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shad, sturgeon, and other anadromous fishes provided a seasonal feast, and methods of drying the fish for lean times were soon developed.

In the following activity students invent methods to catch fish using only "found" items and explore how they could catch enough fish to survive.

Materials needed:

- Assorted small balls that include those that float and those that don't (e.g., tennis balls, wiffle balls, ping-pong balls, etc.) These will represent different species and sizes of fish.
- Tub or child's wading pool filled with water in which to place the balls.
- Assorted types of string and rope (e.g., string, yarn, fishing line, shoe laces, twine, etc.)
- Sticks or dowels
- Items such as water bottles, washers, nails, old shoes, shells, etc. to represent things found in a location that might be used to create fishing equipment, see scenarios below.

Procedure:

Discuss the history of fishing, including conducting library and/or web research if time permits.

Go to www.dgif.virginia.gov/fishing and http://www.mrc.virginia.gov/regulations/swrecfishingrules.shtm to see what species are found and fished for in the Commonwealth. Students may also want to review fishing gear regulations for each species. Ask students if they have ever fished or eaten any of the species featured on the websites. Some species are easily caught, some are easily cleaned and some have a better flavor.

Divide the class into small groups. Give each group a scenario that includes them being stranded with no easily available food source. Not knowing what plants may be safely eaten; the group must rely on animals as their primary food source. Fish are abundant and are generally easier to catch and prepare than birds or mammals.

The goal is to catch enough fish to feed the group for three days. The fish are the balls floating or hanging out on the bottom of the tub filled with water. Larger balls (fish) will feed more students than a smaller ball. Teachers may assign a "food value" to each type of ball based on its size. Students will be able to graph their success at fishing for each "species".

Instead of using different size balls, collect different size water bottles to use as fish. Place colored sand mixed with a small amount of white glue inside the bottles; lay the bottles on their side to dry. Be sure to leave the lid off until the glue dries. By varying the amount of sand in the bottle, they will float at different levels of the water column as fish actually do. Another option is to work with the art teacher and paint the bottles using an oil based paint to look like fish.

Scenarios:

1) Your boat has capsized and you managed to make it to a small island. Your team doesn't recognize any of the plants and have heard that some plant species in the region are highly poisonous if eaten. The island is near a shipping channel so you are sure to be rescued within a few days or a week at the most.

There are plenty of fish in a small lagoon and in the sea that can be caught. One of the team has found a broken bottle, and using a piece of the broken glass, has managed to start a fire by magnifying the heat of the sun and lighting dried grasses. The fire will help the group signal passing boats as well as provide a way to cook the fish. After searching the beach, you have gathered an assortment of items that you may use to catch fish. You have found: a board with two nails in it, three plastic water bottles, a Mylar balloon with string still attached, and lots of shells and sea grasses. Someone has found some long sticks at the edge of the jungle. Let's go fishing!

2) You and some friends decide to go hiking in the forest. You forget to take extra batteries for your GPS unit and after a long day of hiking and talking, you realize you are lost, don't know what direction is out, and the trail is no longer visible. There is no cell phone coverage. You have told other friends where the group was starting from, but it may be days before your group is missed and the rangers realize the car has been in the parking lot for a while. After a day without food, your group members realize they need to find food. You have been lucky to find an old shack with some junk that may be useful and there is a stream nearby with trout. Pooling your resources from your day packs and what you were able to find in the shack, come up with a method to catch fish. You have four plastic water bottles, a tin can with a few screws and washers in it, a rusty saw blade, about six feet of rope, and an old shoe. Let's go fishing!

3) Develop your own scenario.

Decide ahead of time the number of fish that will need to be caught for one meal. This may be a combination of big and small fish or one large fish. Students should develop some "fishing regulations" such as:

- You must be three feet from the tub.
- You may not use hands or feet to snare (catch) the fish.
- Each team has three tries to catch their dinner.

After the teams have had some time to engineer their fishing gear, give them the opportunity to try it out. Teams can regroup after their turn at fishing to make changes to their gear. Teams should share what they "invented" as well as strategies for catching fish with the other teams. Teams can trade fishing gear and see if they are as successful with the other teams' gear.

Based on the success level of the groups, teachers may want to add to the "found" items that can be used.

After trying out the fishing implements made, share types of rods and reels available commercially. A local sporting goods store may be willing to bring in fishing equipment or students who do fish can bring in family gear. You may also contact the Department of Game and Inland Fisheries Angling Education program (http://www.dgif.virginia.gov/education/fishing/) to borrow tackle or for information on local fishing opportunities.

See Project WILD Aquatic activity *"Net Gain Net Effect"* that discusses commercial fishing methods for additional background.

Help us field test this activity,

we will send you a Fish of Virginia Poster as a thank you

Try out this activity with your students, answer the questions below and let us know what work and what didn't. When we receive your comments, we will mail you an 11" X 17" fish poster for your bulletin board.

What grade level / subject do you teach?

Did you use the lesson as written?

What changes would you make to the lesson or feel we should make to it?

Did your students enjoy the scenarios and creating the fishing gear? If you took any pictures please share them with us.

Will you do this activity again next school year?

Thank you. Email your comments to Suzie.Gilley@dgif.virginia.gov
Please provide us with a mailing address to send the poster.

Name:
School:
Address:

If you would like to review other lessons, please include your email address: