

WILD Math: How Many Fish are in this Lake?



SUGGESTED GRADE LEVELS: MS

SUBJECT: Science

SKILLS: computation, graphing

CORRELATION TO NEXT GENERATION SCIENCE

STANDARDS: MS-LS2-1, MS-LS2-4

Objective

Students will: 1) identify the value of stocking, a commonly used fisheries management technique; and 2) analyze the results of a fish-stocking project.

Method

Students will use a real-life example to perform calculations and explore the reasons that fishes are stocked in lakes and ponds.

Background

Lakes and ponds are types of ecosystems made up of complex food webs. All of the food webs can trace their beginnings to the process of photosynthesis in algae and green plants. Algae, along with the wind and the action of small waves, add oxygen to the water. Many pond organisms need this oxygen to survive, and microscopic animals, such as zooplankton, also feed on algae.

Along the shoreline of a lake or pond are grassy, shrubby areas known as the littoral zone. Plants in this area provide homes for an abundance of insects, frogs, salamanders and small fishes. The plants and the seeds they produce also feed many ducks and geese.

The littoral zone is also important because it is where thousands of eggs are laid by fishes, insects and amphibians. These eggs and small animals provide a food source for larger fishes, frogs, turtles and birds like the great blue heron, as well as for small mammals, like raccoons and opossums.

Stocking a Pond or Lake

Often a landowner chooses to add fishes to a lake or pond to increase the variety of species found there or to be able to catch

particular types for food or sport. Adding fishes in this manner is called stocking. In Illinois, some of the most popular fish species that are stocked in ponds and lakes include largemouth bass, bluegill and crappie. Some species are stocked when they are quite small, known as fingerlings, while others are stocked when they are almost half grown.

Properly stocking a pond or lake is a science that takes into account the size of the water body and what species are already living in the fish population. Since bass are predators and will feed on bluegill, for example, there should be healthy populations of both species to keep the food web balanced. When there are too many bluegill and not enough bass to keep their number in check, the bluegill deplete the pond's food supply and prevent other fish species from growing very large. This situation sometimes occurs when a pond or lake has been heavily fished for bass by anglers. Eventually, the water body needs to be restocked again to bring it back into balance.

Materials

copies of the Student Activity Page

Procedure

1. Discuss with students the fisheries management technique known as stocking and why it is used.
2. Provide each student or team of students with a copy of the Student Activity Page.
3. Have the students read the information and provide the requested information.
4. Discuss the results.

Extensions

1. Invite a representative of your local Association of Illinois Soil and Water Conservation District office to speak to the class about how his/her organization's work contributes to the health of fish populations in the state.
2. Have students research other fisheries management techniques and how they are used.
3. Is stocking an aquarium the same as stocking a pond? Hold a discussion on this question.

Evaluations

1. Students should successfully complete the tasks assigned on the Student Activity Page.
2. Students should write a paragraph summarizing fish stocking and its value in fisheries management.

References

Adapted with permission from *WILD in the Woods*, Virginia Department of Game and Inland Fisheries, May 1995.



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STUDENT ACTIVITY PAGE | WILD Math: How Many Fish are in this Lake?

The following math problem is an example of what happened in Lake Jacksonville, owned by the City of Jacksonville and managed by the Illinois Department of Natural Resources (IDNR). The lake is located in west central Illinois. Special thanks to Dan Stephenson, IDNR Fisheries Biologist, for providing the information.

Lake Jacksonville is a 475-acre fishing lake. Because of the beautiful scenery surrounding Lake Jacksonville, a large number of anglers fished there each year, even though very few fish were caught. The anglers' most common complaints were that it took a long time to catch a fish and that they rarely caught largemouth bass, white crappie and channel catfish, their favorite species.

To correct this situation, fisheries biologists decided to remove all of the existing populations of fish and restock Lake Jacksonville with the correct numbers and species of fishes that would re-establish a healthy community. During this renovation, biologists determined the lake's total poundage of fishes, or standing crop. The standing crop is usually expressed as pounds per acre (lbs./acre). The table below lists the species and weights of the fishes removed from the lake.

Using the information in the table, complete these tasks.

1. Calculate the total weight of all of the fishes removed from Lake Jacksonville.
2. Calculate the standing crop of each of the species. Your answers should be expressed as lbs./acre.
3. Calculate the standing crop of Lake Jacksonville.
4. Construct a bar graph to show the weight in pounds for each species.
5. What percentage (by weight) of the community was made up of largemouth bass, crappie and catfish, the anglers' favorite species to catch?
6. The weight in pounds removed was equal for both bluegill and largemouth bass. Would this result mean that there were equal numbers of fishes of each of these species? Why or why not?

Species	Weight (lbs.)	Standing Crop (weight ÷ # of acres)
carp	90,725	
gizzard shad	74,100	
bullheads	12,825	
yellow bass	12,350	
bluegill	3,325	
largemouth bass	3,325	
channel catfish	2,375	
green sunfish	1,900	
white crappie	1,425	
Total		