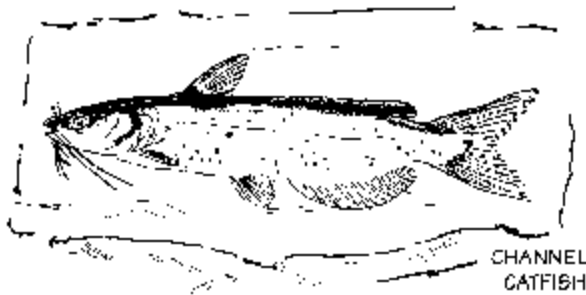


# WILD Math: How Many Fish are in This Lake?



**SUGGESTED GRADE LEVELS:** 5-9

**SUBJECTS:** mathematics

**SKILLS:** computation, graphing

**CORRELATION TO ILLINOIS LEARNING**

**STANDARDS:** mathematics 6B, 10A

## 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 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 the 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 fish to a lake or

pond to increase the variety of species found there, or to be able to catch particular types for dinner or for sport. Adding fish in this way is called stocking. In Illinois, some of the most popular fish that are stocked in ponds and lakes include bass, bluegill and crappie. Some species are put in when they are quite small, known as fingerlings, while others are stocked when they are almost half grown. They are then left to grow to full size before being caught.

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 community. 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 sometimes happens 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.

## A WILD Math Problem

The following math problem is an actual example of just such a situation that occurred on 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' common complaint was 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 fish that would re-establish a healthy community. During this renovation, biologists determined the lake's total poundage of fish or standing crop. The standing crop is usually expressed in pounds per acre (lbs./acre). The table below lists the species and weights of the fish removed from the lake.

Using the information in the table, calculate:

± The total weight of all fish removed from Lake Jacksonville.

± The standing crop of each species listed expressed as lbs./acre.

± The standing crop of Lake Jacksonville.

Construct a bar graph that shows the weight (in pounds) of each species.

SPECIES	WEIGHT (LBS.)	STANDING CROP (weight÷# acres)
carp	90,725	
gizzard shad	74,100	
bullheads	12,825	
yellow bass	12,350	
bluegill	3,325	
lg. bass	3,325	
channel catfish	2,375	
green sunfish	1,900	
white crappie	1,425	
<b>TOTAL</b>		

### BONUS QUESTIONS:

1. What percentage (by weight) of the community was made up of largemouth bass, crappie and channel catfish, the anglers' favorite species to catch?
2. The weight in pounds removed was equal for both bluegill and largemouth bass. Would this mean that equal numbers of these fish were removed? Why or why not?

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

ANSWERS: 202,350 lbs.: carp (191); shad (156); bullheads (27); yellow bass (26); bluegill (7); largemouth bass (7); catfish (5); sunfish (4); crappie (3); total (426); BONUS #1: 7+3+5/426=.035 (3.5%) or 3325+1425+2375/202350=.035 (3.5%)