Who Just Swam By?

Overview:
Students will analyze the data collected from observations of fish that swim past the viewing window at the Bosher's Dam Fishway.

SOL Connections:
Math 7.18, 8.14, A.7, A.8
Science 6.1, 6.7, LS.1, LS.11, LS.12

Background:
Two hundred years ago, the need for hydropower resulted in the construction of dams on the James River. The water running over the dams produced the power needed to run the mills that supported the Richmond economy. The dams also blocked anadromous, or migratory, fish from reaching their historic spawning or breeding grounds upriver. Anadromous fish hatch in freshwater, and then swim out to the ocean where they grow and mature. When it is time to spawn, or reproduce, they return to the rivers and streams where they hatched years before.

Because the construction of dams reduced the number of uninterrupted linear miles between the ocean and the freshwater spawning grounds, the populations of *American Shad* and other species of migratory fish eventually declined. In an effort to recover these species, the dams had to be altered. Since most were no longer in use, they were either removed or had small notches cut into them that the fish could swim through. The largest dam in Richmond and the last to be altered on the James River was Bosher's Dam. Because this dam was still in use, it could not be completely removed. Instead, a fishway was placed in the dam. A fishway is a ladder-like system that directs water flow from one side of the dam to the other. To check on the effectiveness of the fish way, an observation window was constructed in order for biologists to watch the fish swim by.

During the migratory season, a video camera records all fish that swim past the viewing window. You can view the fish by visiting www.dgif.virginia.gov/shadcam/ . The "Shad Cam" is live only during those spring months when fish are migrating. Photos of the fishway and additional information about the shad and other migratory species are also available on this site.

American Shad is the target species for recovery since it is a valuable species in the Chesapeake Bay ecosystem. Other species of anadromous fish also use the fish way on their migration routes. In addition, freshwater species also use the fishway on their daily travels, including sunfish, large mouth bass and carp. Occasionally, a river otter will swim through in search of a dinner.

Problem:
Do any trends exist in numbers of fish swimming up the James River in a four year period?
In which species do you see a trend in the numbers?

Data table:

BOSHER OBSERVATION WINDOW DATA

Fish Species	1999	2000	2001	2002
American Shad	185	375	697	1066
Sunfish	1498	646	987	1184
Hogsucker	152	20	4	0

Based on the definition of anadromous fish, which species is most likely to be anadromous and why?
A list of fish species, their life history and other information about Virginia's fisheries is available at
www.dgif.virginia.gov/fishing

Extensions: Graph species from the table below and determine if any trends exist.

MORE BOSHER OBSERVATION WINDOW DATA

FISH SPECIES	1999	2000	2001	2002
Longnose gar	70	93	241	127
Channel catfish	671	835	1,100	201
Quillback	3,974	6,333	4,848	4,848
Flathead catfish	0	23	73	11

**For additional Math activities using actual Department of Game and Inland Fisheries
wildlife data visit: http://www.dgif.virginia.gov/education**