

ACTIVITY

5

SOME LIKE IT SALTY--SOME DO NOT! *A TEACHER-LED DEMONSTRATION THAT SHOWS HOW SALINITY MAY AFFECT THE DISTRIBUTION OF SOME AQUATIC ANIMALS.*

SCIENCE SKILLS:

- observing
- inferring
- predicting
- experimenting
- communicating

CONCEPTS:

- Two possible animal responses to low oxygen environments are: increased movement of water over the gills and moving to higher oxygen habitat.
- Animals experiencing low oxygen may be under stress.

SAMPLE OBJECTIVES:

- Students will be able to explain how adaptation to a particular salinity may affect where an aquatic animal lives.

INTRODUCTION:

This demonstration uses the two stratified systems made in Activity 4. It shows that animals may select a position in the water based on the distribution of salinities. Do this as a demonstration and **do not** substitute species of fish. The species suggested are tolerant to salt and will not be harmed by short exposure. If you cannot find adult brine shrimp, skip that part of the activity.

MATERIALS:

- both demonstration jars or tanks from Activity 4
- small dip net
- 2 very small goldfish (see Recipes)
- several dozen adult brine shrimp (see Recipes)

INFORMATION:

Salinity is an important factor in determining the distribution of living things in an estuary. Marine organisms inhabit the mouth of the estuary, where high salinity occurs. Traveling up the estuary along decreasing salinity gradients, marine populations decline and are replaced by organisms that can TOLERATE different ranges of salinities. Freshwater species are found at the mouths of tributaries leading into the estuary and in upper estuarine waters. In part, due to this wide range of salinities, there are many different habitats in an estuary.

Some species of animals and plants can TOLERATE wide ranges of salinities while others have NARROW requirements. In both cases, they will seek the water with salinities within their range of tolerance. In the case of plants and those animals like oysters which live attached as adults, their location is determined by salinities present when the seeds germinated or the animal larvae settled. Animals that can swim may move to remain in the OPTIMAL or best salinity. Other factors that influence habitat selection include temperature, food supply, predators and oxygen levels.

LESSON PLAN:

BEFORE CLASS:

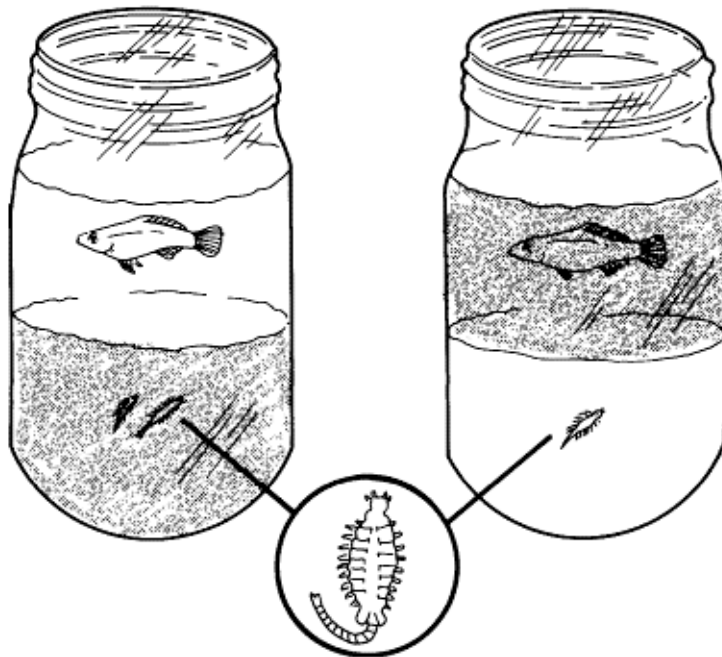
Order brine shrimp and fish. If brine shrimp are not available from a pet store or supply catalog, skip them. Do not use newly hatched brine shrimp as they are too small to see.

DURING CLASS:

METHODS: Begin by asking the students what would happen if animals were introduced to the estuarine model you have created. The amount of salt in the water might influence where the animals stay in the container. How might the stratification of salt/fresh water influence their behavior? Animals that live in fresh water normally might migrate to the top and stay there. Those that live in salt water might stay near the bottom.

Introduce the guppies or goldfish and adult brine shrimp. Have the students predict which part of the model estuary each might prefer. Since guppies/goldfish are freshwater animals, they might prefer fresh while the name brine shrimp might imply that these residents of salt lakes would do best in salt water. Using the net, gently transfer fish into each container and let the students observe their swimming pattern. The students must remain quiet and not scare the fish. Questions to get a discussion going might include: How many times does each animal swim the entire depth of the container? Where does it end up swimming most of the time?

Next drop adult brine shrimp into each container. Observe the behavior exhibited for several minutes, and ask the same questions. Did the addition of brine shrimp alter the fishes' behavior? They may try to eat the brine shrimp, indicating that food also influences distribution.



RESULTS:

Record results. Ask the students in what water habitats they might look for these fish and brine shrimp in nature, based on their observations. Goldfish prefer fresh water while brine shrimp live in salt lakes and can tolerate very high salinity.

Why did you use two tanks, one with colored fresh water and the other with colored salt water? Coloring might have affected distribution. If you use too much food coloring, the fish may try to avoid it.

CONCLUSIONS:

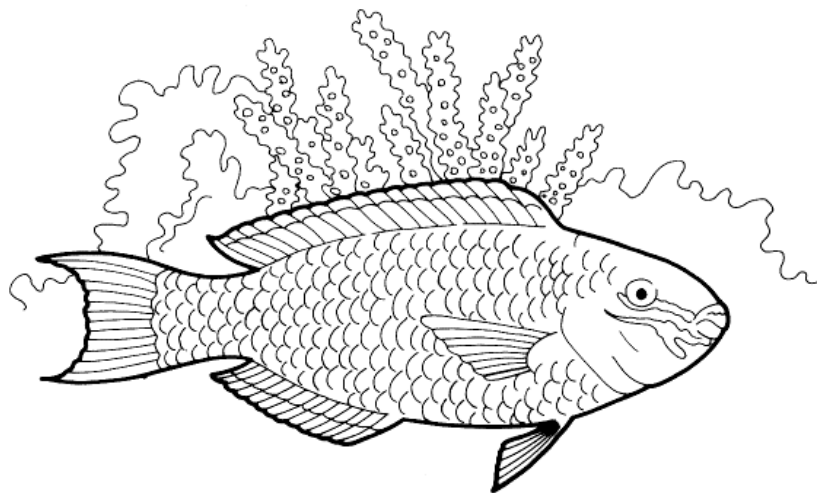
Aquatic animals that can swim choose the place where they live based on many factors, one of which is salinity. In a stratified system some species might always be at the surface while others are always at the bottom. Even though they are at the same spot on a map, in three dimensions they may be vertically separated and will not come in contact with each other. When possible, aquatic animals will avoid water in which the salinity is outside their range of TOLERANCE and will seek OPTIMUM situations.

USING YOUR CLASSROOM AQUARIUM:

The fish from this exercise may come from your aquarium and may return there when done. The brine shrimp will make welcome food for your tank's inhabitants.

EXTENSIONS:

1. What are the effects of too much salt or too little salt on an organism? You could study this by immersing plant tissue (potato) in very salty and in fresh water. Generally, tissue loses water (weight) in salt water and gains it in fresh. The causes of this are somewhat difficult to adequately discuss at the elementary/middle school level and require an understanding of the diffusion of water through membranes. The what is easy to see, but the why is not. You might also put leaves from an aquatic plant in both fresh and salt water if you have microscopes to study the results. Draw the before and after of each.



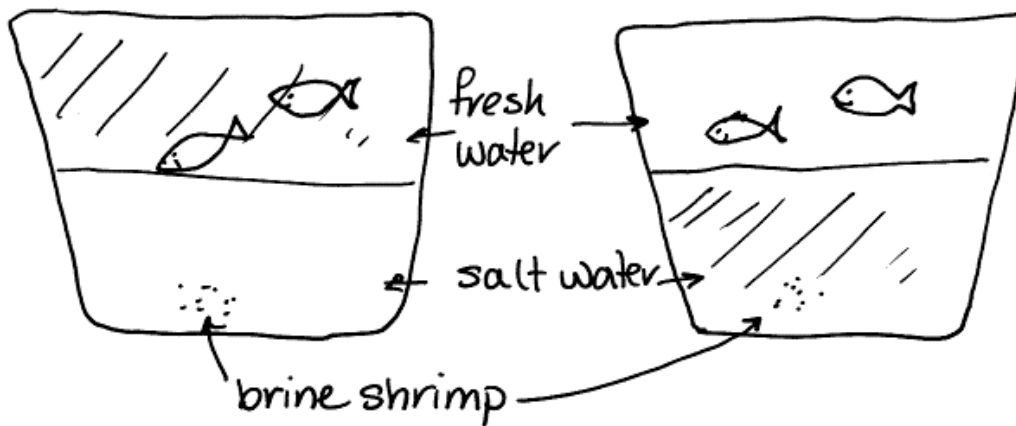
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Name Possible answers

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Predict which layer(s) the animals will prefer. Since my goldfish at home like water out of the top, I think they will like the fresh water at the top. I don't know what the brine shrimp will like.

Draw the two tanks. Label the salty and fresh water. Draw the animals in the locations they prefer.



Did the animals always stay in the same kind of water? If not, describe their behavior.

No. The goldfish tried swimming in the salt water but they went back up to the fresh water.