

Observing Brine Shrimp

Lesson by Phyllis Schmitt, Santa Rosa, CA



Key Concept

1. Animals that live in a saltwater environment are well adapted for life in their habitat.

Background

The brine shrimp hatched in the activity, “How Hot Is Too Hot” can be used for this study. Live specimens can also be obtained from many pet stores, where they are marketed as fish food. Select the species that will grow the largest, for easier observations.

Brine shrimp are found world-wide in saline lakes and salt ponds. They can be found along the coast of California and in the Great Salt Lake of Utah; sometimes there are so many shrimp they make the water look red or brownish-red. Brine shrimp also live along the coast of North Africa. People collect the eggs which they use to make a paste.

The life cycle of the brine shrimp has three stages: egg, larva, and adult. Even as an adult the brine shrimp is less than one inch long. However, they make a wonderful feast for many birds, such as avocets, black necked stilts, willets, grebes, terns and phalaropes. They are also used as a fish food for pet fish.

A brine shrimp is a crustacean, like crabs and lobsters. All of its hard parts are on the outside of its body (exoskeleton). When its soft body grows too big for the outer shell, the brine shrimp molts (sheds the shell).

Brine shrimp have two compound eyes on stalks and a third small eye in the middle of their heads. A brine shrimp’s gills are located on each of its 22 legs. Just as you must keep breathing, a brine shrimp must keep water moving over its gills to supply itself with oxygen. Very salty water has less oxygen than fresh water. If a pond has very little oxygen, a brine shrimp must find a way to store oxygen in its body. To do this, it produces hemoglobin (same as in your blood), which makes it look red/orange.

Females are more commonly red due to the stress they are under while producing eggs; they cannot get enough oxygen through their gills.

For reproduction, the male has claspers to hold the female while he fertilizes the eggs in her egg sack. Usually the female releases the eggs before they hatch, although sometimes baby brine shrimp may hatch inside the mother's egg sack and be released. A baby brine shrimp has no tail or legs; these form later. Brine shrimp can live 2 - 3 months and eggs can develop when the female is 3 weeks old.

Materials

For each student:

- live brine shrimp
- yeast (food for the brine shrimp)
- saltwater solution mixed from *Instant Ocean* or a similar product (Distilled water works best for mixing saltwater solution.)
- petri dish or similar small, squat, plastic dish
- hand lens
- copy of student activity sheet, "Observing Brine Shrimp"

For an observing center for the class:

- copies of student activity sheet, "How Hot is Too Hot?"
- tripod magnifier, dissection microscope or Discovery Scope
- depression slide (for microscope)
- eyedropper

Teaching Hints

Brine shrimp eat bacteria and algae (microscopic plants in the pond). If you are using *Instant Ocean*, it has an algal culture in the mix, which the shrimp will use as food. Otherwise, try feeding the shrimp dried yeast. It is very important not to overfeed the shrimp. One or two grains of yeast every 3 days is enough food for several brine shrimp.

1. Have students use the small dipping container to scoop a sample of water and brine shrimp into their petri dishes. There should be enough water in the petri dish to enable the brine shrimp to swim. Distribute hand lenses for close observation. Facilitate students' observation skills by asking the questions on the activity sheet, or have them complete the sheet alone or with a partner.
2. After observing the brine shrimp with hand lenses, have the students prepare a slide for more detailed observations. Using an eye dropper, transfer a brine shrimp from the petri dish to the depression slide. View through the tripod magnifier or microscope. Discovery Scopes have a viewing box that will hold water, so there is no need for a slide. Students should complete the drawings on the activity sheet.

3. When students have completed the activity sheet, have them share their observations.

Key Words

antennae - jointed sense organs on the head; feelers

appendage - any external part or organ joined on to the trunk or main body, such as legs, tail . . .

claspers - long claws on a male brine shrimp's head

compound eye - an eye made up of many small eyes

development stages - periods of growth or change

egg sac - structure in female for holding a cluster of eggs

fertilize - to make the female egg cell fruitful by introducing the male sperm cell

gills - organ for breathing of animals that live in water

Extensions

Brine shrimp react to light. Demonstrate this response by shining a flashlight on a jar of brine shrimp. Demonstrate how to ask a question then do an experiment that may help answer the question.

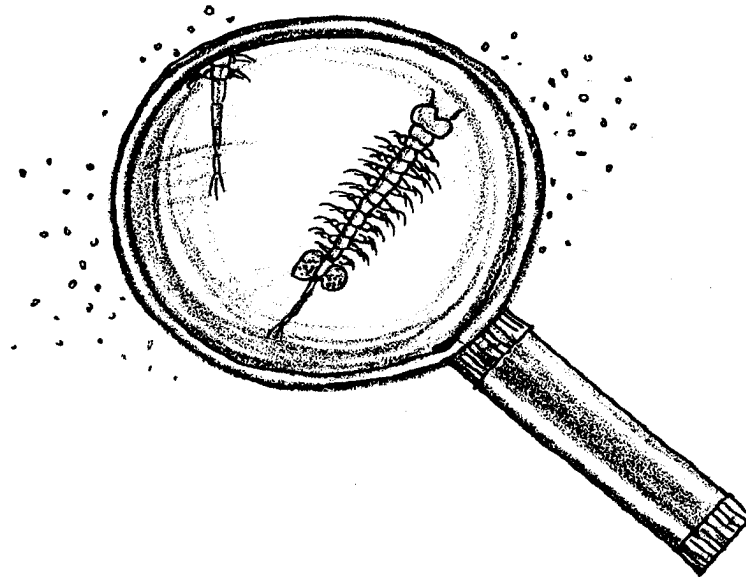
In small groups, help students investigate this response by asking their own questions about brine shrimp and light, then designing an experiment to investigate their question. Students should record their question and experimental design, conduct the experiment/s, and record results with stated conclusions. A format like this may be useful: This is what we asked This is what we did ... This is what we saw ... This is what we think ... Have each group share their investigation with the class. Conclude by writing a summary statement, regarding brine shrimp and their response to light, based on students' own investigations.

Answer Key

1. A brine shrimp has 11 pairs, or 22 legs.
2. Brine shrimp move by continuously beating their legs. This action helps to circulate the water which contains oxygen over their gills and also draws algae toward the shrimp.

3. Brine shrimp are crustaceans with many segments, sometimes up to 24.
4. Answers will vary. A female has a dark colored egg sack near the tail. A male has claspers on his head which are used to hold the female while fertilizing the eggs. The claspers look like long fingers.
5. Answers will vary depending upon experimental results.

Observing Brine Shrimp

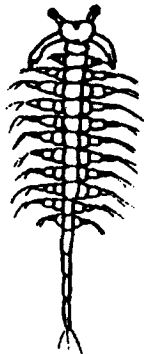


Part 1: Using a hand lens

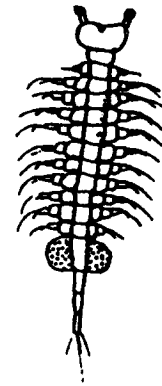
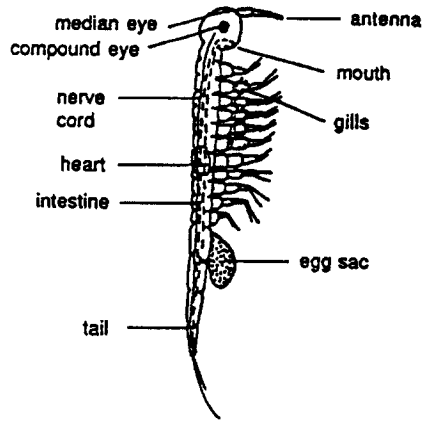
Look at the brine shrimp with a hand lens to observe:

1. How many legs does a brine shrimp have?
2. Describe the way brine shrimp move.
3. How many separate parts does the brine shrimp body have?

A female has a dark colored egg sack near the tail. A male has claspers on his head which are used to hold the female while fertilizing the eggs.



MALE

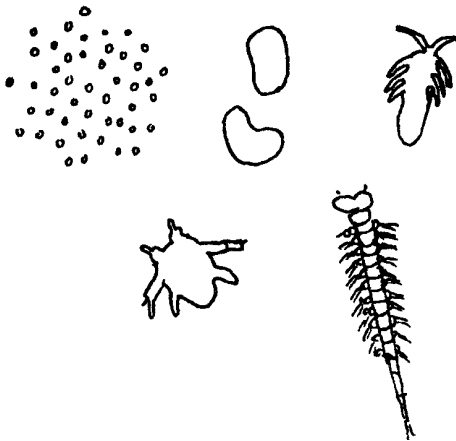


FEMALE

4. Are you observing a male or a female brine shrimp?

Look for brown eggs floating in the water and tiny brine shrimp that may have just hatched!

5. Underline the drawings for any development stages you see:



Part 2: Using a microscope

Observe adult brine shrimp through a microscope.

Draw a male and a female brine shrimp and label their body parts: