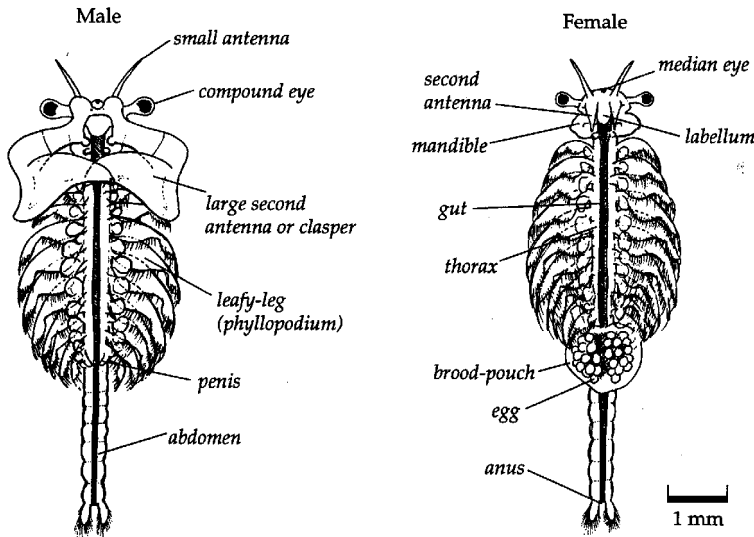


# Brine Shrimps

## Ecosystems made easy!

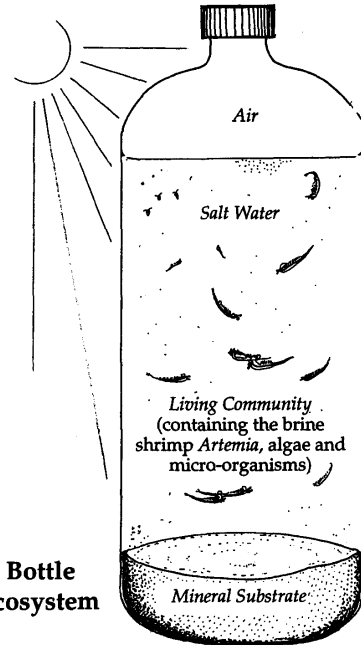
Have you ever heard of **brine shrimps**? You may have seen them in pet shops or even in some toyshops. These tiny shrimps (about 5 mm long) live in very salty lakes (e.g. the Great Salt Lake in Utah, USA). Using brine shrimps, you can set up a living community in a bottle. All sorts of biological processes can be seen in action before your very eyes! The bottle contains **primary producers** (microscopic algae), **primary consumers** (the brine shrimps) and **decomposers** (micro-organisms). All that is needed is a source of **light energy** to keep the system going.

In the bottle, algae grow by photosynthesis and multiply. The brine shrimps eat the algae. When shrimps grow old and die, the decomposers break down the remains, returning the nutrients to the water. The shrimps **respire**, using oxygen and giving out carbon dioxide. The algae **photosynthesise**, using up the carbon dioxide and giving back oxygen. Because everything is **recycled** so efficiently, the system can keep going for a very long time.



**Know your brine shrimp anatomy**

Use a large (1.5 litre), well-washed lemonade bottle to make your own mini-environment.



**Bottle ecosystem**

You also need:

- Tap water which has been left in an open beaker for 2 days (to allow any chlorine to escape – chlorine would kill the decomposer bacteria in your tank)
- Sand and crushed limestone (to represent the minerals at the bottom of the lake)
- Some Baby Bio liquid fertiliser

### Setting up your ecosystem:

Mix equal quantities of clean sand and powdered limestone and put about 2cm depth in the bottom of the bottle.  
Add 30g of salt (sodium chloride).  
Add 2 drops of Baby Bio fertiliser.  
Add 1 litre of tap water that has been left to stand long enough for any chlorine to escape.  
Shake the bottle very well.

### Starting the cycle:

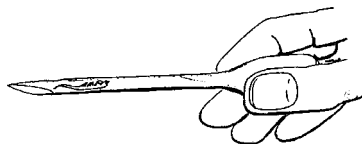
Take one or two dessertspoonfuls of the sand from the bottom of an established tank. This will contain the microbes needed as decomposers and some algae. Close the bottle and leave it in a warm sunny place. The algae will begin to grow.

### Adding the shrimps:

When the water in the bottle begins to show the green colour of algae, it is ready to add the shrimps.  
You can add shrimp eggs, or catch some shrimps from an established tank and transfer them to your bottle

### Sucking up shrimps!

To catch lots of shrimps, use a small sieve. To catch one, use a pipette. The most suitable ones are made of soft plastic. Cut off the pointed end at an angle, so that it is wide enough for the shrimp to enter.  
To catch a shrimp, squeeze the pipette bulb, hold the tip near the shrimp, and release the bulb. Some water and the shrimp (if you are lucky) will be sucked in.



### Shrimps on a slide!

Use a clean, dry slide. Use the pipette to put a shrimp and some water on the slide. Suck up excess water so that there is just enough left to cover the shrimp. The shrimp must be kept moist – be quick, and add more water if necessary!  
Look at the shrimp under a low power microscope, then gently return it to its tank after not more than 5 minutes.



**Wear eye protection. Wash your hands after each session.**

# Brine Shrimps

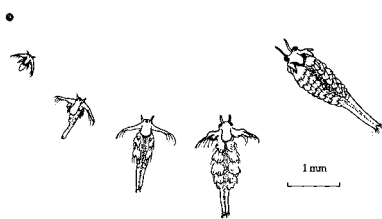
## Some things you might like to investigate about brine shrimps

Your main bottle acts as a convenient supply of shrimps. For each experiment you do, you can set up beakers or bottles with all the necessary ingredients, and then add shrimp eggs, baby shrimps or adult shrimps depending on what tests you want to do.

### How much do brine shrimps vary in size?

A low-power microscope would help with this study. You might have two tanks, and measure each shrimp as you transfer them one by one from one tank to the other.

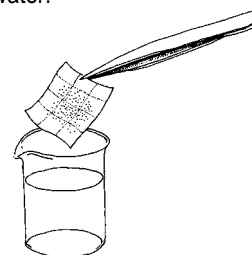
You could also transfer one newly hatched shrimp to a separate small tank and measure it every day to see how fast it grows.



### What sorts of conditions are needed for brine shrimps to hatch?

What sort of factors might affect the hatching of shrimp eggs? You could study the effect of different concentrations of salt in the water – make up small bottle tanks using water with different concentrations of salt. You could test the effect of temperature – if you can find a way of keeping bottles at different temperatures! You could try the effect of changing the pH of the water by adding very tiny amounts of acid or a base such as sodium carbonate. You will need to know exactly how many shrimp eggs you put in each bottle, so you can work out the proportion that have hatched.

Counting shrimp eggs:  
Put a tiny pinch of shrimp eggs on a sheet of white paper. Cut out a piece of graph paper, which will fit into the top of your test bottle or beaker. Wet it with a few drops of water. Dab it onto the eggs. Cut with scissors to give the number you want (use a magnifier). Put the paper egg-side down into your test container and shake gently until all the eggs wash off into the water.



A useful tip: To make it easier to count or catch shrimps, shine a bright light at one side of the 'pond'. The shrimps all swim towards the light, so they are all in one place!

### Here's another question – do shrimps prefer the top or the bottom of their pond?

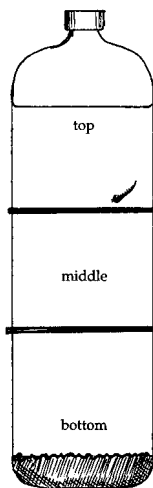
Make a pond in a tall, thin bottle. Fit rubber bands to mark one-third and two-thirds of the depth (this divides the pond into three zones, top, middle and bottom). Put in just one shrimp. Allow a few minutes to get used to the new tank. Turn a piece of lined paper sideways to record your results. Every ten seconds, note down which zone (T, M or B) the shrimp is in. Keep counting for ten minutes.

Your results might look like this:

**T T T M T B B M ...**

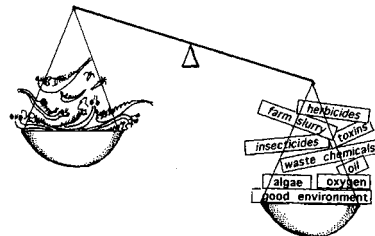
You can see how much time the shrimp spends in each zone, and how often it moved.

Does it make any difference if the shrimp is male, female or a very small baby?



### What about pollution?

Gardeners use herbicides to kill plants they do not want in their gardens. What happens if these wash off into ponds? You will need beakers or small bottles containing 'shrimp pond' water, which has gone a nice green colour because of algae growing in it. Take a ready diluted solution of Simazine weed killer (care – read the safety instructions on the bottle) and add 5 drops to one beaker. Put young (half-grown) shrimps into each beaker and watch for several days. Note the colour of the water and how well the shrimps are growing.



**Wear eye protection. Wash your hands after each session.**