

FAIRY SHRIMP GROWING INSTRUCTIONS

Inside your Fairy Shrimp Kit, you will find a white envelope. Inside the envelope is a folded coffee filter. It contains a small amount of what looks like dust or dirt. In this dust are some of the most amazing structures you can find on earth – the “cysts” of the vernal pool fairy shrimp. Each cyst contains a baby shrimp, an embryo in suspended animation. In its drought resistant casing, it waits patiently for the right time to hatch out and begin its life cycle!

The cysts in this kit are from The Versatile Fairy Shrimp (*Branchinecta lindahli*). This Fairy Shrimp is a common, non-endangered, freshwater shrimp that normally lives in the vernal pools of California and other western United States.

To grow these fascinating little creatures indoors, you will need to create a small artificial vernal pool to mimic their natural environment. These instructions will guide you through the steps of growing healthy, happy critters.

- 1) **TIME** – These fairy shrimp will do best when hatched in the wintertime, between Halloween and Valentines Day. Their hatch rate will be the greatest in cool water (50-65 degrees), which is hard to maintain during warm weather. School classrooms in the winter are perfect for growing fairy shrimp, as they are often poorly heated during the day and are unheated at night.
- 2) **LOCATION** – Choose a level, stable surface, away from heaters and incandescent lights. Try to find a place where your shrimp pan will not be bumped or spilled. Pick a spot with sufficient room to allow students to observe the shrimp with their faces close to the pan. A window ledge is a perfect place as long as they are not in direct sunlight at any time of the day.
- 3) **LIGHT** – Your fairy shrimp will grow bigger and healthier if they are brightly lit with a light that mimics springtime sunshine. This will also encourage the growth of the algae and bacteria that they feed on. If your classroom windows will provide 12 hours of light and 12 hours of dark each day, that should be sufficient. Alternatively (and more reliably), you may hang or support a fluorescent light fixture about 18” above your shrimp pan. An old aquarium hood, or fixture designed to mount under counters will work fine. A simple way to simulate a day/night cycle is to plug your light source into an appliance timer, set to come on at 6:00 am and go off at 6:00 pm.
- 4) **CONTAINER** – A clear glass baking/lasagna pan makes a great tank for your shrimp. The 3-liter size is the best. They have a high heat capacity that helps to stabilize the water temperature. They are also easy to clean. Wash your pan with a very diluted bleach solution. This will clean and sterilize it. Be sure to thoroughly rinse and dry your pan. Do not use any soap or detergent, as even a little residue is very toxic to baby shrimp.
- 5) **WATER** – The best and most economical water for your fairy shrimp to live in is Arrowhead Mountain Spring Water. Make sure the label says **Spring Water**. Spring water mimics the clean but slightly mineralized and alkaline water of a vernal pool. Other brands of spring water could work as well, but Arrowhead works for sure. Do not use tap water, as the chemicals and chlorine are toxic to the shrimp.

- 6) CYSTS – When everything is set up and ready, carefully take your coffee filter out of the envelope, and hold it over your pan. Open it slowly, and gently dump the “dust” (cysts) into the water. Rub the sides of the filter against one another to release all the dust. If you still see a soiled area on the filter, carefully cut out the area with scissors, and float it soiled side down in the pan. (You can remove the filter paper when the first baby shrimp appear). The dust will just float on the water, and does not need to be stirred or shaken. Now you are ready to watch and wait!
- 7) HATCHING – The cysts will immediately begin to absorb water, but the baby shrimp will not come out until they are convinced that the water will last. This will take about 24 to 48 hours, sometimes longer, depending on conditions. The baby shrimp will start swimming right away, in fast jerky movements. They are extremely tiny and easily missed at first. One way of viewing them is to darken the room and shine a flashlight into the side of the pan. They are “phototropic,” meaning they are attracted to bright lights. Leave the flashlight on for several minutes, and the baby shrimp will swim toward the light. A magnifying glass is very helpful in viewing them at this stage.
- 8) FEEDING – The day after you first see your baby shrimp swimming around, you may start feeding them. In the wild, fairy shrimp are filter feeders. They strain tiny particles out of the water for food, mostly bacteria, algae, and fungal spores. In captivity, they will live quite happily on a diet of “yeast soup”.

To make yeast soup, dissolve one packet of dried yeast (either bakers or brewers yeast), one teaspoon of sugar, and a big pinch of crushed fish food flakes in 1/3 cup of hot water (around 100 degrees, microwave some of your spring water). Mix well, and let it sit for about an hour to activate the yeast. Be sure to use a container tall enough to allow the yeast to bubble up. (An old plastic frosting container works well.) Store your “soup” in the refrigerator or another cool place. This will be enough food to feed your shrimp for weeks.

To feed your shrimp, stir or shake the mixture thoroughly. (It settles out quickly.) Use an eyedropper or pipette to drip a few drops of the soup into the water. The baby shrimp are still extremely tiny and need very little food. You can determine how much food is enough by using this rule of thumb: The water should be slightly hazy, but not cloudy. You should be able to see through it. If it becomes cloudy, stop feeding for a day or two until it clears up. If it becomes extremely clear, feed a little bit more. Increase their food as they grow. At about 2 weeks, the shrimp will need approximately 1 ml per day. When they are fully grown, they will need up to 3 mls daily.

- 9) GROWTH – Your little fairy shrimp will grow very quickly. In a couple of days they will look like a small crescent. At about 1 week old, they will begin to elongate. They will reach adulthood when they are about ½ inch long. By four weeks old, they will be close to 1 inch long. The Versatile Fairy Shrimp have a live span of about 6 to 8 weeks, at which time they will start to die off from old age.

10) MAINTENANCE – You should try to keep the water level fairly constant in the pan. As the water evaporates, you will need to top it off with fresh spring water. You might notice a “scum” developing on the surface of the water. While this film might be unsightly, it is not dangerous in any way. It can be removed by dragging a piece of paper towel gently across the top of the water.

11) REPRODUCTION – Your shrimp will have a one-track mind when they reach adulthood. Their only job is to make new cysts. The females will begin to make eggs as soon as they are big enough. The bright white eggs are stored in a transparent cigar shaped pouch that is attached to their abdomen. This brood pouch makes the female easy to identify.

The male shrimp constantly swim around looking for a suitable female. When he finds one, he will grab her with his large antennae. The antennae look like walrus tusks attached to his face. He will quickly fertilize her eggs and swim off to find another suitable mate. You can tell when the eggs have been fertilized because they will get larger and turn a pale tan color. They begin to develop a cyst coat.

Once the cysts are fully coated, the female will push them out of her pouch, where they will sink to the bottom of the pan. The little embryos inside will grow and develop for about a day or two. When they reach the point of about 4,000 cells they will shut down and become dormant. They will not hatch until they are completely dried out, chilled and re-wetted.

12) HATCHING THE NEXT GENERATION – After about 6 to 8 weeks, your shrimp will die of natural causes. There is nothing you can do to change that, as this is the life span of these seasonal creatures. If all went well, you should have more shrimp cysts than you had on your first filter paper.

The best way to save cysts for future cultures is to harvest them from the bottom of your pan. Use a turkey baster to suck up the “gunk” from the bottom of the pan. Your pan should produce about 10 times the number of cysts that you started with. You don’t need all of the gunk, just about 2 to 3 baster-fulls. (You can make extra shrimp packets for other teachers, friends or other interested folks.) Pass the gunk through a coffee filter, and allow the filter to dry out completely for several days. Carefully fold the filter, label it, and store it in the freezer until you are ready to start the process again.

If you are tempted to simply store your pan (and all the gunk) until next year, please beware. Adding water to a “dirty” pan often leads to a lethal bloom of algae and bacteria that can smother the delicate baby shrimp. Many people have had poor results with this technique. For best results, use a clean bleached pan for each new batch of Versatile Fairy Shrimp.