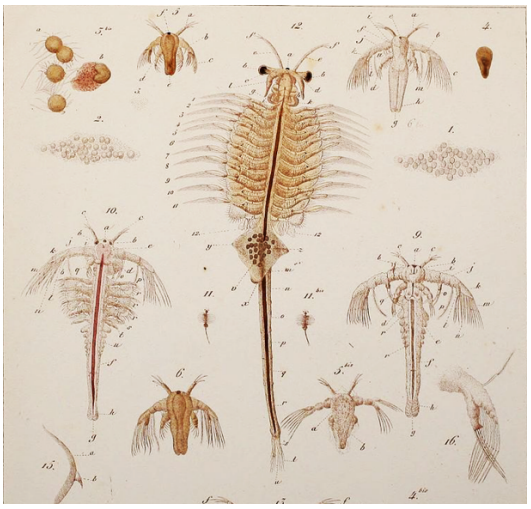
Hatch a batch of tiny brine shrimp and study their development and behavior!

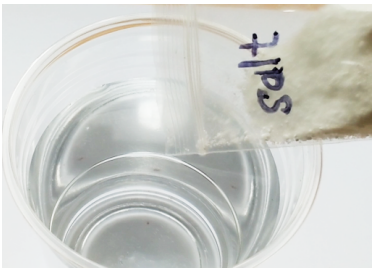
Materials needed:

Brine shrimp eggs
Salt ("Instant Ocean" or Kosher salt)
Spring water or distilled water
Food (spirulina algae or baker's yeast)
Plastic or glass containers
Spoon
Pipette
Magnifier
Bright white light source
Colored cellophane

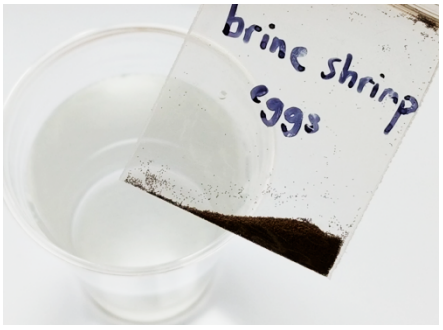


YouTube **VIDEO INSTRUCTIONS** at SciWorkshop.org/KITS

1. Put 2 Cups (16 oz) of water in a clear plastic or glass container. Use Spring or Distilled water.

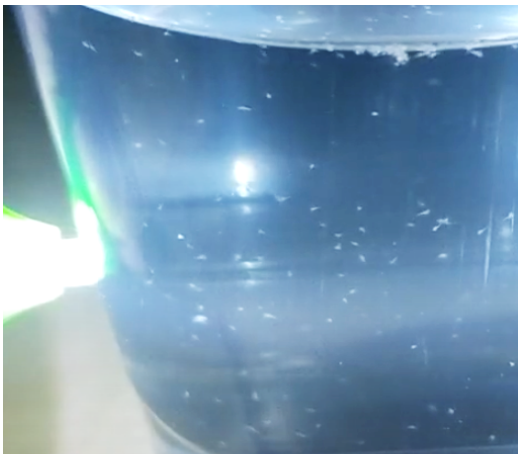


2. Add 1 Tablespoon of salt and stir well until it is completely dissolved.

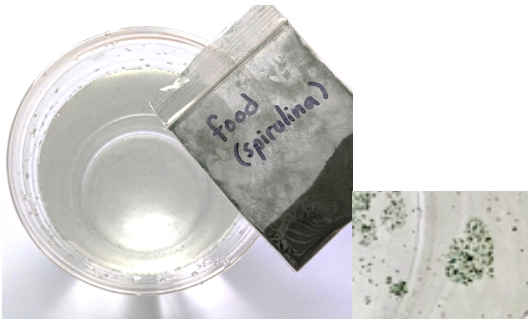


3. Add a TINY pinch of the eggs and stir. Find a safe place to put the cup and wait. The brine shrimp will hatch in 1-3 days. They hatch faster in a warm room with bright light.

4. At least twice everyday use your pipette to push air into the water. Lots of bubbles add oxygen which is good for the brine shrimp.



5. Newly hatched brine shrimp are so small you might not notice them! Look for teeny tiny creatures swimming around. Shine a light on one side. Do they react?



6. A day after they hatch put a *tiny* pinch of algae powder in the water, and stir. Wait a day or two and the water is clear (all the food is eaten) before feeding again. Too much food pollutes the water.

8. Mark the starting level of the water. It will go down over time because of evaporation. Add spring water or distilled water to bring it back up to the starting level.

9. Watch the brine shrimp as they grow! Read below for more tips, facts, and things to try.

Any questions? Reach out to team@sciworkshop.org

Tips and Tricks:

Brine shrimp prefer a warm room-temperature environment (around 80°F or 26°C). A little cooler is fine but they will grow more slowly.

Don't hatch all of the eggs in a small container - they will be too crowded. A *tiny* pinch of eggs in a big glass of water is plenty. Each microscopic egg can grow into a much larger shrimp (adults are up to 1 cm in length)

It is easy to feed brine shrimp too much! Only feed a tiny amount so their water stays clean. The water will be a little cloudy right after feeding but should be crystal clear within a day or two.

If the water stays cloudy for more than a day or two you will need to do a water change. Suck out some of the cloudy salt water with your pipette and replace it with new salt water. Only change part of the water at a time (no more than ¼ of the container) to avoid sudden differences in salt content, pH, and temp.

Remember to aerate the water regularly with your pipette. Some people keep brine shrimp in a shallow dish with lots of surface area to increase the oxygen – if you try this method, you will need to replace evaporated water more often.

When water evaporates it leaves the salt behind. When you replace evaporated water, make sure to use spring water or distilled water, NOT salt water. Adding more salt might make it too salty for the brine shrimp.

Email team@sciworkshop.org if you have any questions, we are happy to help :)

Fun Facts

Brine shrimp are related to other crustaceans such as crabs, lobsters, and the shrimp people eat for dinner

Brine shrimp are more distantly related to spiders, scorpions, and insects, which are part of a larger group called arthropods (arthropod means “jointed feet”)

Brine shrimp reach adult form in 2-8 weeks and live for around 6 months. Their maximum size is around 1cm or half an inch

“Sea Monkeys” are actually brine shrimp that were popular pets in the 1960’s and 1970’s

Brine shrimp don’t live in the ocean. They live in salty inland lakes. Most inland predators can’t live in salty water, or eat very salty food. A bird that has special adaptations for eating brine shrimp is the Flamingo!

Brine shrimp eggs can dry out and sit dormant for years. Adding salt-water and light triggers them to grow and burst out of their eggs, alive again. Brine shrimp eggs were discovered after they had been buried in clay for around 10,000 years… and they still hatched!

To do and to notice

Try experimenting! Set up two identical brine shrimp hatcheries and change only one thing - for example, put one cup in the dark and the other in the light. Or put a different amount of salt in one (no salt, or double salt). What is the result?

Are they attracted to light? As soon as they hatch, bring them into a dark room and hold a small light up to one side of the tank. Try putting different colored filters over the light. Do they respond the same way to different colors of light? Try the light test again when they are older. Do they respond the same way?

Can you see how many legs they have? Try counting them. An adult brine shrimp has 11 pairs of legs that they use to paddle, filter food out of the water, and breath!

Like all arthropods shrimp shed their exoskeleton as they grow - this is called molting. They can molt over a dozen times as they develop. If you look closely, you might see this in action!

Can you tell the males from the females? Fully grown male brine shrimp have two large claspers to hold onto females. In good conditions, females produce up to 150 eggs at a time. These eggs are carried in a brood pouch under her tail and have thin shells that hatch quickly.

Deep dive – learn more!

The zoological term for most aquatic crustaceans when they first hatch is *nauplius*, plural *nauplii*. In its first larval stage a nauplius has a simple body and only one eye!

Brine shrimp have changed very little since the Triassic Period, 200 million years ago. Scientists are still figuring out the evolutionary history and relationships between groups within “Crustacea”. ←examples of Crustaceans

Brine shrimp have evolved a really neat adaptation to survive very harsh conditions, called *Cryptobiosis,* or secret life. This means they can dry out completely and enter suspended animation, and come back to life when reintroduced to water. When conditions are harsh females can lay eggs called cysts that have extra thick shells made of chitin, the same material that is in the exoskeleton of insects. Cyst laying is triggered when the environment is unfavorable (too cold or hot, the water drying up and becoming too salty, or not enough light for algae to grow). Their young will hatch out whenever the conditions return to being favorable.

Brine shrimp should be more responsive to blue light because lower-energy red and yellow light are more easily absorbed by the water, and higher-energy blue light can travel the deepest.

Resources

Illustrations and description of life cycle: https://learn.genetics.utah.edu/content/gsl/artemia/

Detailed brine shrimp anatomy: http://lanwebs.lander.edu/faculty/rsfox/invertebrates/artemia.html