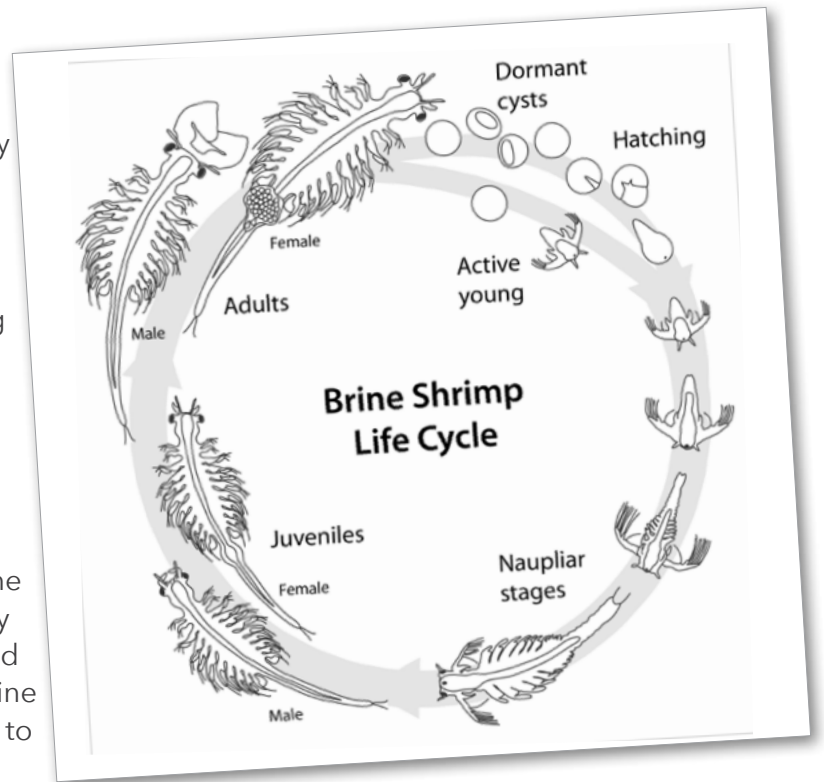


Hatch-A-Cyst

Background

Brine Shrimp (*Artemia franciscana*) are tiny crustaceans that live in saltwater environments such as Great Salt Lake.

When environmental conditions are good, females release actively developing embryos. But in stressful environmental conditions females release dormant cysts. Inside the cysts, the embryos can remain arrested in development for years while the surrounding shell protects them from the elements. When conditions improve, the embryo resumes development, and the life cycle continues. As is the case with any ecosystem, abiotic factors such as light and temperature shape the environment of brine shrimp, determining when they hatch and to what extent these organisms thrive.



In addition to being a vital part of Great Salt Lake's ecosystem, brine shrimp have an economic importance as well. Each fall, brine shrimp fishermen collect and sell cysts, an industry that generates about \$40-60 million dollars each year. The cysts can be stored dry on shelves until needed. Once hydrated, the embryos inside hatch quickly and the young nauplii are fed to fish and shellfish that are raised for human consumption.

What are the ideal conditions for hatching brine shrimp? Design an experiment to test how a particular abiotic factor affects a population of brine shrimp. Pool your results with the class to determine the overall best environment for hatching these resilient and hardy organisms.

Begin

1. List the abiotic factors brine shrimp are likely to encounter in environments such as Great Salt Lake:

2. Which of the factors listed above can you change in the laboratory?

3. Determine which abiotic factor you will test:

I will change (the variable):

I will measure: the percentage of cysts that hatch ($\frac{\# \text{ of hatched cysts}}{\text{total } \# \text{ of cysts}}$)

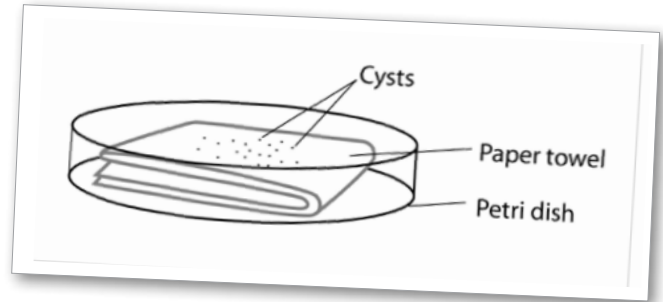
Design an Experiment

SET UP A CONTROL

Set up a group of brine shrimp cysts for which all abiotic factors will remain constant (or the same). This is your control group. Comparing your experimental group against your control group will tell you if the abiotic factor you change has any effect.

1. You will need the following materials:

- Small Petri dish
- Paper towel
- Scissors
- Pipet or dropper
- Microscope or hand lens
- 10 mL of 3% salt solution
- Beaker of hydrated brine shrimp cysts



- 2.** Cut off a piece of the paper towel and fold it to fit in the bottom of the Petri dish. You may trim the corners to help it fit. Label the lid of the dish with the following: Your name, "Control".
- 3.** Gently swirl the beaker of hydrated brine shrimp cysts. Use a pipet or dropper to collect a sample of cysts from the bottom of the beaker (you do not want the empty cyst cases that are floating on the top).
- 4.** Drop your cyst sample evenly over the paper towel-lined Petri dish by gently squeezing your pipet or dropper. Aim for 30 - 50 cysts per paper towel.
- 5.** Use the pipet or dropper to further hydrate the paper towel with 3% salt solution. Be sure the paper towel is completely wet, but not so wet that the cysts can float away.
- 6.** Using a hand lens or microscope, count the number of brine shrimp cysts present in your Petri dish and record the number on the lid.
- 7.** Place your dish in the designated area of the classroom.

You will compare how many brine shrimp cysts hatch in this group to the number that hatch in the experiment you design.

SET UP TEST GROUPS

Hypothesis

- 1.** Changing the abiotic factor of _____ will affect the hatch rate of brine shrimp cysts.
- 2.** List three things that will remain constant in your experiment:
 - A.
 - B.
 - C.

NAME _____ DATE _____

EXPERIMENTAL DESIGN

Materials I will need:

How I will set up the experiment: (*the cysts will hatch in 1 - 2 days)

Data I will need to record:

How I will record and display my data: (Include a chart, table, graph, picture or some other way to record your data while your experiment is underway.)

Obtain permission from your teacher to begin and set up your test groups.

RESULTS (create graph on the back)

CONCLUSION

What did you learn about the abiotic factor you tested and its effect on brine shrimp hatch rate?