Biology Core Experiment

Standard ## 3520-01 or 3520-08Summarize the function of	Topic:
atoms and molecules in the chemistry of cells. Or, Investigate	Cells
the interdependence of organisms with each other and their	
environment	3520-
Objective ## 3520-0102 or 0801Investigate and explain the	01
relationship of water to organisms. Or, Predict how changes in	or
part of an ecosystem affect the system.	3520-
ILOs: Predict how changes in part of a ecosystem affect the	08
system. Make observations. Identify variables and describe	
relationships between them. Plan controlled experiments.	
Collect and record data using procedures designed to	
minimize error. Analyze data and draw warranted inferences.	
Seek and weigh evidence before drawing conclusions. Report	
results honestly. Include a full description of nay negative	
findings. Construct tables, graphs, charts, and diagrams to	
describe and summarize data. Share results with others.	

Description of Activity

Activity Title: Where will brine shrimp eggs hatch?

Activity Overview: Students will investigate the effects various saline concentrations on the hatching of brine shrimp eggs.

Duration: Five days.

Background Information

Brine Shrimp have adapted to live in very harsh, changing environments. The brine shrimp maintains a steady internal osmotic pressure by secreting excess salt through its gills. In this way, brine shrimp can accommodate large changes in saline concentrations. Salt water concentration in the Great Salt Lake fluctuates for various reasons. This may influence the hatching of brine shrimp eggs in the Great Salt Lake. The brine shrimp produce many fertilized eggs. The eggs are capable of drying out and remaining viable for many years. During their life cycle, the brine shrimp molt fifteen times. Use rock salt or non-iodized salt only. DO NOT USE iodized salt. If you use tap water, let it dechlorinate for 24 hours in a open container. Sampling the brine shrimp after hatching can be accomplished by pouring the shrimp into a test tube or by pouring them into a petri dish. If the shrimp are small, students can use a hand lens. Teachers should evaluate student's hypotheses and experimental set-up before students proceed with their experiment.

Teaching and Learning Strategies

It is recommended that this activity be presented as an inquiry-based project. Students should be encouraged to formulate their own ideas to explain their observations. The teacher should not provide any information regarding any potential outcomes. Students need to be reminded that all life should be treated with respect. Students should share the results of their experiment with other groups in some sort of formal setting.

Development of Laboratory Skills and Tools

The teacher should explain and demonstrate the procedure for mixing different concentrations of solutions. If needed, teachers could set up a simple lab to practice creating solutions of different concentration. Mix the different percent salt solutions by adding <u>X</u> grams of NaCl per 100ml H2O (X=%). Example: 15g NaCl + 100ml H2O = approximately 15% salt solution. Students should already be familiar with the steps involved in scientific research.

Invitation to Learn

What concentration of salt water is most favorable for the hatching of brine shrimp eggs? Design and carry out an experiment that will answer this question. (See the attached Lab Report sheets.)

Materials, Facilities and Resources:

brine shrimp eggs test tube racks salt test tubes graduated cylinder triple beam or electronic balance hand lens or dissecting microscope aged tap water or distilled water

A regular classroom with a sink is adequate for this lab. Brine shrimp eggs can be obtained from scientific supply companies such as Carolina Biological Supply, Sargeant-Welch, Flinn, Frey, or from local pet stores.

The following "Student Designed Experiment - Laboratory Report" may prove useful for students during the inquiry session.

Student Designed Experiment - LABORATORY REPORT

Name_____ Period _____

1.State the problem:

2.State your hypothesis:

3.Describe your procedure in detail and sketch your experimental setup:

4.List the materials you will use

5. Identify the control and variables for your experiment.

6.Results: TABLE (If needed)

GRAPH

7. Analysis of data.

8. Conclusion.

9.Were any problems encountered in carrying out the procedure?

10.Were any problems involved in taking data?

11.Did any ideas develop that can be used in future investigations?

Summary of Learning

1.According to the results of your experiment, which of the following solutions would be the best to hatch brine shrimp eggs in?

- A.1% salt solution
- B.5% salt solution
- C.10% salt solution
- D.20% salt solution

2.To make a 17% saline solution you need to mix **** grams of salt in **** liters of water.
A.0.17, 0.1
B.1.7, 0.5
C.17, 0.1
D.170, 1

3.Describe the advantage of brine shrimp being able to tolerate changes in salt concentration.