Mars for Earthlings

LESSON 19: Extremophiles

Homework 1

Extremophiles_MFE

Sea Monkey Experiment

Starting thinking: What is an extremophile?

Resources:

On brine shrimp (see materials needed on these sites)

- http://wildlife.utah.gov/gsl/
- http://www.youtube.com/watch?v=kUN61qJtp6s (tutorial on raising brine shrimp)

On extremophiles

- http://www.spiritus-temporis.com/extremophile/types-of-extremophiles.html
- http://www.daviddarling.info/encyclopedia/E/extremophile.html
- Example: Deinococcus radiodurans can withstand 1,500,000 "rads". 500 rads can kill humans!

Introduction:

Sea monkey eggs (like Great Salt Lake brine shrimp) reportedly can survive dormant for > 20,000 years without water. They breathe through their feet and are born with 1 eye but develop 2 more. They are ideal for testing life's response to extreme conditions since they can survive (or remain dormant) in a wide variety of conditions (pH of 2-10, high salinity, various radiation environs, range of temperatures, etc.).

Experiment - Project Assignment:

1. Design a scientific experiment to examine some kind of extreme conditions (without destruction) on the revival and/or survival of dormant life forms (your brine shrimp eggs). You might bake the eggs, drown them in your favorite soda, soak them in acidic lemon juice, or subject them to other extreme conditions or combinations!
2. Carry out a scientific experiment following the scientific method. Record all condition information of time, methods, amounts, solutions etc.
3. After this we will do a "blind test" and your sea monkey eggs will be given to someone else to raise (so you are not tempted to bias the experiment).
4. Meet with the group that attempted to hatch your eggs. Discuss the results in terms of your hypothesis.
5. In a clear and concise write up of your experiment, discuss the results in the broader terms of astrobiology.

In-Class Discussion

Discuss the design of your experiment and outcomes with the class following the submission of your assignment.

Limits of the Brine Shrimp

Were there any conditions too extreme for the brine shrimp?