The Bottled Ecosystem

Annotation
Students investigate the interactions that take place among several variables of a closed ecosystem simulation. The activity described herein will cover the day of the ecosystem setup. Instruction is given in concepts, hypothesis formation, building the ecosystem and data collection preparation. The following lesson, given one to two weeks after this part, will cover data presentation, comparative analysis of results and hypothesis confirmation/rejection.

Hypothesis
A self-sustained ecosystem is dependent on all biotic and abiotic interactions.

Primary Learning Outcomes
At the end of this lesson, students will be able to:

- Describe the role each biotic and abiotic variable plays within the ecosystem.
- Observe, record, and interpret how different components of an ecosystem change as they interact with each other and the environment.

Assessed GPS
SCSh3. Students will identify and investigate problems scientifically.

a. Suggest reasonable hypotheses for identified problems.
c. Collect, organize and record appropriate data.
e. Develop reasonable conclusions based on data collected.
f. Evaluate whether conclusions are reasonable by reviewing the process and checking against other available information.

SCSh7. Students analyze how scientific knowledge is developed.
Students recognize that:

b. Universal principles are discovered through observation and experimental verification.
d. Hypotheses often cause scientists to develop new experiments that produce additional data.

SCSh8. Students will understand important features of the process of scientific inquiry.
Students will apply the following to inquiry learning practices:

a. Scientific investigators control the conditions of their experiments in order to produce valuable data.
b. Scientific researchers are expected to critically assess the quality of data including possible sources of bias in their investigations' hypotheses, observations, data analyses, and interpretations.
e. The ultimate goal of science is to develop an understanding of the natural universe which is free of biases.

SB4. Students will assess the dependence of all organisms on one another and the flow of energy and matter within their ecosystems.

a. Investigate the relationships among organisms, populations, communities, ecosystems, and biomes.
c. Relate environmental conditions to successional changes in ecosystems.