Biodiversity

Chris Kotila
Mission Montessori Academy
Monday, April 21, 2008

Overview:
Biodiversity is the different life forms that are located within an ecosystem, a biome and/or the entire world. The diversity within the system can be found in the life forms of the entire system or that within a species. It is what scientists use to measure the health of one of these three systems.

Biodiversity does not just mean the richness of a specific system; it also has three major benefits. The first is the resistance to catastrophe. The higher the diversity of a system, the less likely a disease will dramatically affect the system. In monoculture societies, the lack of diversity leaves the society vulnerable to disaster. The second benefit of biodiversity is the increase of food and drink for humans. The greater the diversity, the more options humans have. The final major benefit is the medicines available. Roughly 40% of medicine is created from some biological sources.

Purpose:
The purpose of this lesson is to help the students understand the importance of biodiversity and the affects a monoculture society would have in the world. Students will learn how the decrease of biodiversity will affect ecosystems and how the lack of biodiversity will put a system in danger of extinction..

Standards:
Arizona Science Standards: 7th grade.
Strand 2; Concept 2; P.O. 3 – Apply the following scientific processes to other problem solving or decision making solutions: communicating, comparing, classifying, organizing, identifying variables.
Strand 3; Concept 1; P.O. 1 – Analyze environmental risks (e.g. pollution, destruction of habitat) caused by human interaction with biological or geological systems.
Strand 4; Concept 3; P.O. 3 – Analyze the interactions of living and organisms with their ecosystems: limiting factors, carrying capacity.
Strand 4; Concept 3; P.O. 5 – Predict how environmental factors (e.g., floods, droughts, temperature changes) affect survival rates in living organisms.

Suggested Grade Levels:
4th – 8th

Lesson Times:
2 class periods for the overview of a food chain and food web. 1 class period for the execution of the exercise on food webs.

Materials:
Computer with internet, materials created by teacher, workbook, worksheet with definitions and background of the experiment.

Learning Objectives:

- Students will be able to understand the relationship between the different organisms/ animals within an ecosystem.
- Students will be able to understand the importance of biodiversity within ecosystems.
- Students will be able to analyze the interactions of the organisms within an ecosystem.
- Students will be able to understand the different impacts environmental factors will have on an ecosystem.
- Students will use communication, comparison, classification, organization, and identification to understand biodiversity.

Suggested Procedure:

Share the overview and background data on what biodiversity is. Inform the students of key terminology like:

- adaptation
- species
- diverse
- evolution
- monoculture
- ecosystem and biome

Discuss in detail the importance of biodiversity. Have the students come up with the different types of diversity within a Forest ecosystem and an arctic ecosystem. Also, stress the importance of the interdependence of an ecosystem.

1. Begin by dividing the students up into groups of 4.

2. Have the pairs discuss which of the key words are the most important to biodiversity.

3. Hand out the first set of packets (packets contain cut outs of the letters A thru Z and have different amounts of each letter) that contain letters of A – Z, which are more monoculture, and have them classify them how they think they should be.

4. Once organized, tell the students that the letters they have are an ecosystem and the letters represent the species within. Have the children do the following:
    a. Chart the diversity.
    b. Write down whether you feel that the "ecosystem" is diverse? And Why.
    c. Have the students compare their answers and discuss.

5. Continue by telling the students that specific letters (i.e. – letters A thru F) have contracted a disease and have died off. Repeat this for 1 more time.
   **NOTE - not everyone will have the same amount of the letters. Some might have more Q's than another so their Charts and Data are different representing how some ecosystems might still be considered healthy even after a mass extinction.*

6. Have the students chart the diversity of their ecosystem and calculate the amount of animals that died off. Share the percentages and discuss whether their ecosystems are still considered healthy.

7. Hand out the set of biodiversity packet to the students and have them organize their letters.
   **NOTE – In this packet the student will find a more stable mix of the different letters. There might be 1 or 2 dominate letters, but overall the letters will be a wide variety.*

8. Once organized, tell the students that the letters they have are an ecosystem and the letters represent the species within. Have the children do the following:
    a. Chart the diversity.
    b. Write down whether you feel that the "ecosystem" is diverse? And Why.
    c. Have the students compare their answers and discuss.

9. Continue by telling the students that specific letters have contracted a disease and have died off. Repeat this for 1 more time.

10. Have the students chart the diversity of their ecosystem and calculate the amount of animals that died off. Share the percentages and discuss whether the ecosystems are still considered healthy.

11. Discuss the difference of the two sets and have the students determine which one was a monoculture ecosystem and which was a biodiversity ecosystem.

12. Than have the students, in pairs, play the game and have the students tell whether it accurately portrayals biodiversity.

Assessment:
1. Understanding of the importance of biodiversity.
2. Written work in the work journal
3. Involvement and key points in the discussions.

Extensions:
1. Using the knowledge gained from the exercise, have the students come up with an example of biodiversity ecosystem.
2. Have students come up with the impacts humans might have on biodiversity.
3. Have the students come up with questions to ask the class about biodiversity.

Sources:
Wikipedia – Biodiversity
http://en.wikipedia.org/wiki/Biodiversity

Bio Bob
http://www.cimex.com/games/bio_bob/bio_bob.html

Biodiversity 911
http://www.biodiversity911.org/

Biodiversity Hotspots
http://www.biodiversityhotspots.org/Pages/default.aspx