

Inquiry Activity #1 on Biodiversity: Lana Hays

Title: What is a lichen?

Lesson Summary: Students will investigate the biodiversity of lichens soaked in spring water.

General Goal: The purpose of this activity is for students to investigate lichens through inquiry to first introduce them to biodiversity.

Duration: 1 class period

Specific Learning Objectives:

Content Goal: A lichen is an ecosystem that contains a variety of microorganisms.

Process Goals: Students will first observe samples and then show evidence of their findings through written observations and drawings. Through class discussion and questioning they will make conclusions.

State Core Content Standard: The great diversity of organisms fills niches with life forms.

Prerequisite Knowledge/Skills: There are no prerequisites for the first lesson.

Background Information: Lichens are composed of a fungus and an alga that represent a symbiotic association. Other organisms such as rotifers, nematodes, protozoans, and tardigrades have also been found in lichens. They survive dry conditions in cyst form and become active when water is available. When water is added to lichens, various microorganisms should develop over 1-2 days.

Preparation for Lesson

Materials required – foliose lichens, petri dishes, spring water, microscope, scalpel or razor blade, slides and cover slips.

Preparation of materials – Using a scalpel or razor blade, scrape lichens from the bark and cover with spring water. It is best to get little or no bark in the water. Microorganisms will appear in 24 to 48 hours.

Instructional Strategy

This lesson will be done at the beginning of the year to introduce biodiversity.

1. The lesson will begin by asking the students to answer the question “What is this?” on a 3X5 card and turning it in.
2. Working in pairs, students will observe soaked lichens and asked to record what they see both as written observations and drawings.
3. Students will form new groups and observe different samples and repeat this process again for a total of 3 different samples and groups.
4. As a class, they will be asked to state their findings, compile the information on the board and discuss their results.
5. Students will again be asked the question “What is this?” and given another 3X5 card to state their answer.
6. The observations and drawings will also be turned in.

Assessment

1. Students will turn in both 3X5 cards with their answers to the question "What is it?"
2. Students will turn in their observations and drawings.

Inquiry Activity #2 on Biodiversity: Lana Hays

Title: What is a lichen.....revisited?

Lesson Summary: Students will observe and dissect lichens to identify the specific organisms that compose them.

General Goal: The purpose of this activity is for students to identify through investigation the organisms that compose lichens and their relationship.

Duration: 1 class period

Specific Learning Objectives:

Content Goal: Lichens are composed of a fungus and an alga that exist in a symbiotic association.

Process Goals: Students will observe whole and dissected lichens and then show evidence of their findings through written observations and drawings. Through class discussion and questioning they will make a connection to the individual organisms that compose a lichen and then conclude the relationship through synthesis of previous work.

State Core Content Standard: Organisms cooperate in ecosystems.

Prerequisite Knowledge/Skills: This lesson requires that students are familiar with microscope use and will have studied fungi, algae, and ecology.

Background Information: Lichens are composed of a fungus and an alga that represent a symbiotic association. Other organisms such as rotifers, nematodes, protozoans, and tardigrades have also been found in lichens. They survive dry conditions in cyst form and become active when water is available. When water is added to lichens, various microorganisms should develop over 1-2 days.

Preparation for Lesson

Materials required – fresh foliose lichens, dissecting needles, microscope, slides and cover slips.

Instructional Strategy

This lesson will be done at the end of the year after the study of organisms and ecology.

1. The lesson will be introduced as revisiting the lichen activity at the beginning of the year.
2. The lesson will begin by asking the students to answer the question “What is it?” on a 3X5 card and turning it in.
3. Working in pairs, students will begin observing foliose lichens by using hand lens/dissecting scopes and recording written observations and drawings.
4. They will continue observing by dissecting the lichen apart and using a microscope to view.
5. Questions that might help guide students are “What is the texture/color, what do you know about these structures, where have you seen them before, how many organisms are present?”

6. As a class, they will be asked to state their findings, compile the information on the board and discuss their results.
7. After the identification of a fungus and alga as the components of a lichen, students will then be asked to consider the relationship of those organisms. Questions that might help guide students are “What are the requirements for living organisms, how are they met here, and what is the relationship of the organisms?”
8. As a class, they will again be asked to state their findings, compile the information on the board and discuss their results.
9. Students will again be asked the question “What is it?” and given another 3x5 card to state their answer.
10. The observations and drawings will also be turned in.

Assessment

For each lesson:

1. Students will turn in both 3X5 cards with their answers to the question “What’s a lichen?”
2. Students will turn in their observations and drawings.