

## 2. Lichen Morphology and Drawing

### Target Audience

Novice

### Estimated Time

2 hours

### Subject

Distinguish lichens from other non-vascular plants

### Objectives

1. The student will be able to contrast vascular and non-vascular plants.
2. The student will be able to distinguish lichens from mosses, fungi, algae.
3. The student will know the four basic lichen growth forms: crustose, squamulose, foliose, and fruticose.
4. The student will be able to differentiate between various substrates.

### Materials

Magnifying glass, microscope, knife, collection packets  
Samples, photographs, and drawings of moss, lichen, algae, and fungi

### Scientific Knowledge Needed by the Teacher

1. All plants, both vascular and non-vascular, make chlorophyll.
2. Lichens grow on various substrates: trees, rocks, old fence posts, cement and soil.
3. Know the four lichen growth forms: crustose, squamulose, foliose and fruticose.
4. Describe various substrates where lichens can be located in the field.
5. Review differences between vascular and non-vascular plants.
6. Review how non-vascular plants obtain nutrients.
7. Review physical characteristics of algae, fungi, mosses, and lichens.

### Vocabulary

Introduce terminology definitions – use *Resources and References* as needed

### Making Connections

1. Lichens, like vascular plants, must absorb nutrients and water in order to survive.

2. Lichens differ from vascular plants because they do not have roots, waxy cuticles or stomata.
3. Lichens are made up of a fungus and an alga or cyanobacterium. The fungus provides support and protection for the alga/cyanobacterium which in return can do its job photosynthesizing and provide energy for the fungus (and itself).

## **Detailed Lesson Plan**

### **Teacher Preparation Prior to Activity**

1. Find good examples of algae, fungi, lichens, and moss
2. Provide clear definitions of each organism.
3. Describe physical characteristics of each organism to students.
4. Describe the various substrates where one can find these organisms.
5. Review the differences between vascular and non-vascular plants and how each type of plant obtains nutrients.
6. Locate drawings and pictures of algal, fungal, moss, and lichen bodies to better illustrate the differences of these organisms. If possible, use pictures with words to describe parts of the organisms' body.

### **Activity (what the students will be doing)**

1. Using a magnifying glass, the students will examine a moss sample, including the parts that were shown in drawings of the moss body. If a microscope is available, use that to show more detail.
2. Show the students a fungus sample. Have the students feel the fungus and then compare its texture to a moss sample.
3. Discuss how a fungus obtains nutrients.
4. Have the students examine an algae sample, describing what they see and how it differs from the moss and fungus.
5. Show the students examples of crustose, squamulose, foliose and fruticose lichens. Have students look at the key characteristics of each type of lichen. Make sure they look at the lichens under a magnifying glass. Point out characteristics of lichens that are different or the same as fungi, moss or algae.
6. Explain how lichens obtain nutrients from their environment.
7. Have the students compare texture, color, smell, and habitat of the moss, fungi, algae and lichen. Have them inspect each type of specimen under a magnifying glass. Make sure they are able to point out key differences in each specimen.

## **Check for Understanding / Assessment**

- Why don't lichens have leaves?
- How do lichens get nutrients?
- Where do lichens grow?
- Can lichens live in water?

## Resources and References

Purvis, W. 2000. Lichens. The Natural History Museum, London. – has drawn diagrams of lichen bodies

<http://fresc.usgs.gov/products/fs/fs-154-02.pdf>

<http://mgd.nacse.org/cgi-bin/qml/usair/region6/area6.qml>

<http://mgd.nacse.org/hyperSQL/lichenland/index.html> - great resource for drawn diagrams of lichen bodies

<http://www.airlichen.nacse.org/cgi-bin/qml/usair/region6/area6.qml>

<http://www.lichen.com>

<http://www.proaxis.com/~mccune/center.htm>

<http://www.ucmp.berkeley.edu/fungi/lichens/lichens.html>