

## Protist Discovery Lab

### **Task**

Introduction of the Problem/Context: In this activity, high school biology students will investigate the presence of protists in water that was collected in the local area.

### **Selected GPS:**

#### **Co-Requisite: Characteristics of Science**

#### Habits of Mind

**SCSh1. Students will evaluate the importance of curiosity, honesty, openness, and skepticism in science.**

- a. Exhibit the above traits in their own scientific activities.

**SCSh2. Students will use standard safety practices for all classroom laboratory and field investigations.**

- a. Follow correct procedures for use of scientific apparatus.
- b. Demonstrate appropriate technique in all laboratory situations.

**SCSh3. Students will identify and investigate problems scientifically.**

- c. Collect, organize and record appropriate data.

**SCSh4. Students use tools and instruments for observing, measuring, and manipulating scientific equipment and materials.**

- a. Develop and use systematic procedures for recording and organizing information.

#### Nature of Science

**SCSh8. Students will understand important features of the process of scientific inquiry.**

#### **Co-Requisite: Content**

#### Content

**SB2. Students will derive the relationship between single-celled and multi-celled organisms and the increasing complexity of systems.**

- b. Compare how structures and function vary between the six kingdoms (archaebacteria, eubacteria, protists, fungi, plants, and animals).
- c. Examine the evolutionary basis of modern classification systems.

## Classroom Materials: Lesson Outlines

### Protist Discovery Lab

Grade Level/Subject: High School Biology

Overview: In this activity, high school biology students will investigate the presence of protists in water that was collected in the local area.

#### Key Objectives:

- To exhibit curiosity, openness, and skepticism in this activity (GPS: SCSH1 a).
- To use proper safety procedures (GPS: SCSH2 a & b)
- To investigate a problem scientifically (GPS: SCSH3 c).
- To keep detailed and accurate records of data collected (GPS: SCSH4 a).
- To investigate the basic characteristics of protists and compare them with group discussed thus far (viruses and bacteria) (GPS: SB2 b & c).

#### Learning Outcomes:

- Students will know:
  - protists have both similar and different characteristics of viruses and protists.
  - how collect water samples and use both types of scopes to investigate the organisms living in the water
- Students will be able to:
  - investigate problems scientifically by appropriately utilizing micro and stereoscopes.
  - keep detailed records of observations using sketches and describing characteristics
  - make comparisons between and among viruses, bacteria, and protists

#### Possible Materials:

- Microscopes
- Stereoscopes
- Slides
- Cover slips
- Pipettes
- Petri Dishes
- Various Samples of Water
- Lab Notebook/[paper for Collecting Data

Task: The purpose of this activity is to introduce students to protists. In this laboratory lesson, high school biology students will investigate the presence of protists in water using microscopes and stereoscopes. Students will collect data about what they see observe and use this information to classify protists later in the unit.

### Sample Procedure:

1. Take a sample of water and place it in your Petri dish. Get 2-3 pipettes full. Using your stereoscopes, take a look at what might be in the water. You need to be VERY patient looking around. Find a spot where you see some “stuff,” be still and see if anything moves.
2. Now its time to look more closely. Make observations about the organisms you see. What size are they? Do they move? If so, how? Are they any particular color? If so, what might this tell you?
3. You may wish to look at your sample more closely. You can do this with a depressed slide and a cover slip. Use the x4 or x10 power on your microscope.
4. Prepared slides of some protists are available on the front table. Handle them with care and please return them when you are finished. Look at a minimum of 3 prepared slides. If needed, they may be used for your sketches if you were unable to find protists in your water samples.
5. To the best of your ability, sketch at least 3 protists.
6. Using your chart from yesterday (Kingdom comparison chart), collaborate with your group at your table to make comparisons between protists and bacteria. You may use your book as a reference, but try first to rely on your observations from today.

### Sample Questions:

- Did your organisms move? If so, how?
- Were your organisms a particular color? What does their color suggest in terms of how they obtain food?
- How do these organism compare with the other microorganisms we’ve studied thus far (viruses and bacteria)?

### Assessment Ideas:

- Teacher observation: are the objectives being met?
- Write a detailed summary that discusses what was done in this activity and the conclusions you can draw from the data.
- Student journals or science notebooks: is their evidence of student learning?
- Teacher-constructed test, based on observations made and discussed.

### Extension Ideas:

- Have hypotonic/hypertonic samples and ask if these organisms (protists) could live in salt water.
- In what ways do multi-cellular microorganisms in pond water vary?
- In what ways do multi-cellular microorganisms on land vary?
- Does difference in temperature affect the number of paramecium in a sample of pond water?
- Which species are found the most in pond water?

\*Sample procedure provided by Dr. Parlo