Freshwater Food Chains

Strand Life Systems

Topic Investigating energy relationships in pond water

Primary SOL LS.6 The student will investigate and understand that organisms within an ecosystem are dependent on one another and on nonliving components of the environment. Key concepts include
- b) interactions resulting in a flow of energy and matter throughout the system;
- c) complex relationships within terrestrial, freshwater, and marine ecosystems.

Related SOL LS.8 The student will investigate and understand interactions among populations in a biological community. Key concepts include
- a) the relationships among producers, consumers, and decomposers in food webs.

Background Information

Review the components of a freshwater community. Make sure students are aware that the micro-organisms they see are only a small piece of the pond ecosystem. Review or introduce food chains and food webs, making sure students understand the difference between them. Show sample pond water food webs to increase understanding and engage students in the activity. Review or introduce energy pyramids.

Materials

- Samples of pond water
- Slides
- Cover slips
- Gloves
- Droppers
- Microscopes
- Field guides to pond life
- Copies of the attached Pond Water Activity Sheet

Vocabulary

consumer (first-, second-, and third-level), energy pyramid, food chain, food web, interdependence, producer

Student/Teacher Actions (what students and teachers should be doing to facilitate learning)

1. Review basic microscope skills, including how to make a wet mount slide. Select a sample of pond water containing many green, scummy algae. Preview the pond culture to make sure you are familiar with the organisms present. While identifying the organisms may be useful, the main point of the activity is to analyze the relationships present.

2. Have students make a wet mount slide of a sample of pond water. *CAUTION: Have students use gloves.* Remind students to include some of the green algae in their sample because, just as animals hide among plants in the woods, animals also take shelter in the plant material in the pond water.
3. Have students observe their pond water sample through the microscope. Encourage students to view multiple locations on their slide or more than one slide.
4. Distribute copies of the attached "Pond Water Activity Sheet." Have students take notes on and make field-view drawings of the organisms they see in the pond water. Field guides may be used to identify the organisms present, or students may use short descriptions of organisms they cannot identify.
5. Have students determine what energy relationships would be possible among the organisms and then analyze this information to develop food chains. If enough data is available, students can generate a food web from it, or they may share information with classmates to gain more data.

Assessment

- **Questions**
  - What organisms are present in the sample of pond water?
  - Which organisms are producers? Which are consumers?
  - What are the possible relationships between these organisms?
  - What are examples of interdependence in the sample?
  - Which organisms are more numerous?
  - What is the relationship between a population's position in a food web and its size?
- **Journal/Writing Prompts**
  - Explain how much energy is available at the producer level of the food chain as compared to the top of the chain, and explain in detail how and where the energy moves.
  - Based on what you learned from this freshwater food web, make connections to terrestrial food webs and marine food webs.

Extensions and Connections (for all students)

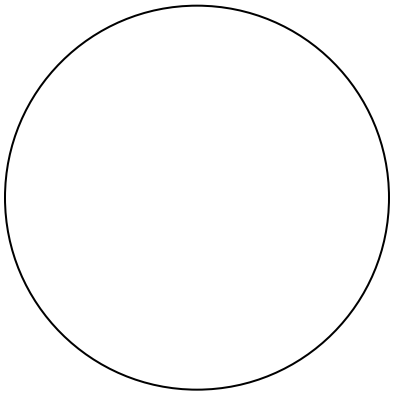
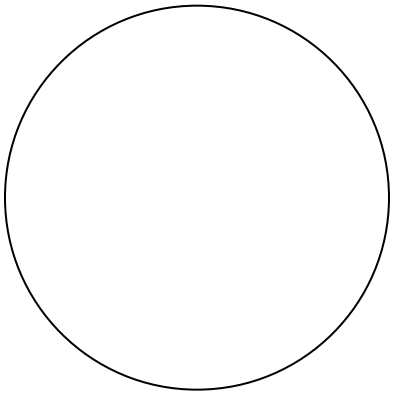
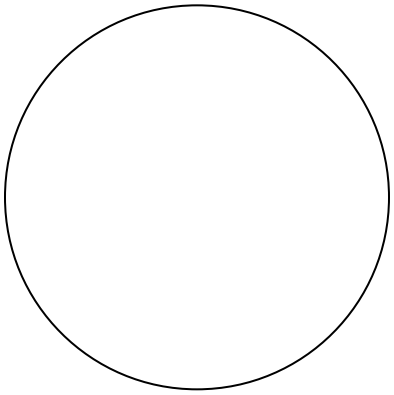
- Students could create a visual representation of the freshwater food web observed in their pond water sample. Using that food web as an example, a few groups of students could illustrate a terrestrial food web commonly found in their community, while other groups depict marine food webs. Pair a terrestrial group up with a marine group to describe similarities and differences among these webs.

Strategies for Differentiation

- Use prepared slides of pond life, with algae, rotifer, spirogyra, etc.
- Create a basic producer→1st level consumer→2nd level consumer→3rd level consumer food chain or a more detailed food web depicting pond life.
- Use a simplified pond organism identification sheet if the field guide appears difficult to interpret.

Pond Water Activity Sheet

Name: _____ **Date:** _____

Field View	Identity of Specimen	Description
	**100 × ____**	
	**100 × ____**	
	**100 × ____**	

Conclusion

What are the energy relationships among the pond water microscopic organisms?