



Protozoans—*Vorticella*

## Activity 9: Methods of Locomotion in Pond Water

Back in Activity 2, you explored some of the diversity of microscopic life found in pond water. In this activity, you will again explore the life in pond water, this time looking specifically for movement and various forms of locomotion.

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### Purpose:

To look for and compare various forms of locomotion, considering how different structures achieve a similar function

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### Overview:

Students examine a drop of pond water and try to discern different forms of locomotion. They then share their findings across groups. They identify and discuss specific methods—flagella, pseudopods, and cilia.

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### Time:

One (50 minute) session

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### Materials:

- *Swift* Digital Microscopes
- Computers
- Pipettes or eyedroppers
- Textbook and other references that provide information about various microorganisms
- India ink
- Microscope slides and cover slips
- Projector (for one computer)
- Pond water (see *Preparation*)

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### Standards:

- Texas: 10A

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### Textbook Matching:

#### **BSCS Biology: An Ecological Approach**

- *Chapter 12: Eukaryotes: Protists and Fungi, 12.5 — Flagellates May Be Consumers or Producers, 12.6 — Many Sarcodines Use Pseudopods, 12.8 — Ciliates Have Two Types of Nuclei*
- *Chapter 14: Eukaryotes: Animals; 14.1 — Animals Are Adapted to the Demands of Their Environment, 14.12 — Muscles and Skeletons Provide Support and Locomotion*

**Glencoe Science Biology (National Geographic)**

- *Chapter 7: Cellular Structure and Function; Section 7.3 — Structures and Organelles*
- *Chapter 18: Bacteria and Viruses; Section 18.1 — Bacteria, Prokaryote Characteristics*
- *Chapter 19: Protists; Section 19.2 — Protozoans—Animal-like Protists*
- *Chapter 24: Introduction to Animals; Section 24.1 — Animal Characteristics*

**McDougal Littell Biology (Stephen Nowicki)**

- *Chapter 18: Viruses and Prokaryotes; 18.4 — Bacteria and Archaea*
- *Chapter 19: Protists and Fungi; 19.2 — Animal-like Protists*

**Prentice Hall Biology (Miller and Levine)**

- *Chapter 19: Bacteria and Viruses; 19-1 Bacteria, Identifying Prokaryotes*
- *Chapter 20: Protists; 20-2 Animal-like Protists: Protozoans*
- *Chapter 26: Sponges and Cnidarians; 26-1 Introduction to the Animal Kingdom*

Background:

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There are three methods of locomotion for single-celled organisms: flagella, pseudopods, and cilia. There are also single-celled organisms that have no method of locomotion.

Preparation:

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Use your samples from Activity 2, if they are still viable. Otherwise, collect new samples of water from a pond or other rich body of water. Look for water that appears greenish or contains dead and decaying vegetation. Also, as possible, collect samples from different locations and/or depths within the body of water, as different organisms will live in different places. For example, *Amoeba* are more likely to be found near the bottom of a pond.

Procedure:

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1. Have students work in pairs or small teams to complete the activity.
2. Lead a discussion about the various forms of locomotion observed, and the structures and the speeds affiliated with each.
  - Point out that these organisms are all trying to achieve the same function—motion. They accomplish it using different structures.
  - As appropriate, discuss various forms of macroscopic motion and related them to the microscopic motion observed in the activity.



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## Student Sheet

### Activity 9: Methods of Locomotion in Pond Water

*Back in Activity 2, you explored some of the diversity of microscopic life found in pond water. In this activity, you will again explore the life in pond water, this time looking specifically for movement and various forms of locomotion.*

1. Revisit your organism movies from Activity 2 and consider the following questions: *Are any of these organisms moving? Does an organisms' movement seem to be caused by the organism itself? What structures seem to be responsible for the movement?*
2. As in Activity 2, prepare a slide of pond water for one sample.
  - Using a pipette or eyedropper, place one drop of pond water on the slide.
  - Add a small drop of India ink, as in Activity 8. This will enable you to observe the currents within the samples, as distinct from organism movements. (Warning: India ink can stain clothing, skin, etc.)
  - Add a cover slip.
  - Label the slide with information about its source.
3. Examine the slide at 40X, 100X, 400X, and 1000X searching for organisms that are in motion.
  - Whenever you think you've found an organism that is in motion, take a short movie.
  - Draw the structure(s) that seem to be responsible for the motion.
  - Try to find as many different organisms in motion as possible. Look, in particular, for different methods of locomotion—different ways that the organisms are moving themselves.
4. Prepare and examine slides from the other samples, finding and recording as many different methods of locomotion as you can.
5. Try to categorize your movies by the methods of locomotion you see.
  - *How many different methods of locomotion did you observe?*
  - *How many and which types of organisms did you see using each of these methods?*
6. Compare your method-of-locomotion categories and organisms with those of another team.
  - *Did they come up with the same methods of locomotion that you did?*
  - *For any organisms that you both observed, did you agree on method of locomotion?*
  - As a larger team, try to agree on method-of-locomotion categories.
7. Discuss the methods of locomotion you observed and the structures used in each.

**REMEMBER** to practice proper safety techniques in all science laboratory activities!