

The Life Processes of Unicellular Eukaryotes in Pond Water



Lesson Focus & Goals

Students will recognize unicellular microorganisms as living organisms with seven life processes that function in only one cell. Students will formulate a hypothesis and construct a diagram that shows the importance of unicellular eukaryotes in the continuation of life on Earth.

Overview

Students will recognize unicellular microorganisms as living organisms with seven life processes that function in only one cell. Students will formulate a hypothesis and construct a diagram that shows the importance of unicellular eukaryotes in the continuation of life on Earth.

Document what these organisms need most to maintain their life processes—**water**.

Students should already understand:

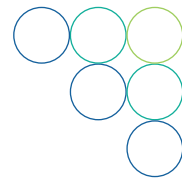
- Cells are the basic unit of life
- The process of photosynthesis in plants
- What a food web and food chain are (in the included vocabulary list)

Teacher Notes:

1. Be prepared to introduce *osmosis* and *mitosis*, if not already taught (vocabulary list).
2. Be prepared to introduce *sexual reproduction* and *asexual reproduction*, if not already taught (vocabulary list).
3. Introduce prokaryotes and eukaryotes. (See the guide to prokaryotic and eukaryotic cells.)
4. Before using microscopes, students should be familiar with microscope parts and microscope safety. (See the resources Learning Parts of the Microscope and Safety with the Microscope.)

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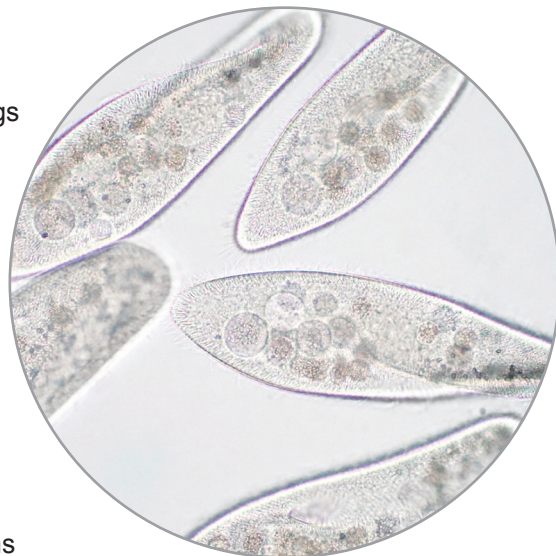
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NGSS Standards*

Molecules to Organisms: Structures and Processes

- **MS-LS1-1** Conduct an investigation to provide evidence that living things are made of cells; either one cell or many different numbers and types of cells.
- **MS-LS1-2** Develop and use a model to describe the function of a cell as a whole and ways parts of cells contribute to the function. (Eukaryotic Cell Diagram)
- **MS-LS1-6** Construct a scientific explanation based on evidence for the role of photosynthesis in the cycling of matter and flow of energy into and out of organisms



Ecosystems: Interactions, Energy, and Dynamics

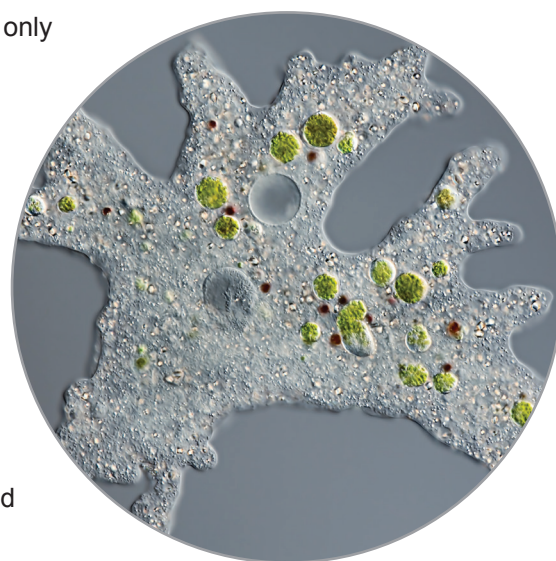
- **MS-LS2-2** Construct an explanation that predicts patterns of interactions among organisms across multiple ecosystems
- **MS-LS2-3** Develop a model to describe the cycling of matter and flow of energy among living and nonliving parts of an ecosystem

Grade Level

Middle School, Grades 6–8

Lesson Objectives

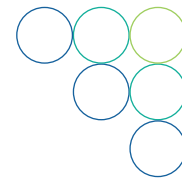
- Understand that unicellular, or single-celled organisms, are made up of only one cell that performs all life processes.
- Describe how unicellular organisms perform the 7 life processes: nutrition, movement, respiration, homeostasis, growth, excretion, and reproduction.
- Label the cell components of 3 single-celled eukaryotic microorganisms (grade- and student-dependent).
- Show the importance of single-celled microorganisms in the food web/food chain.
- Explain how unicellular eukaryotes contribute to the continuation of life on Earth.
- Use a compound student microscope, recognize brightfield and darkfield as well as focus, and adjust the stage.



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Materials

- [Accu-Scope EXM-50 Monocular Student Microscope](#) or [Accu-Scope EXM-160-C Monocular Microscope](#).
- Living Specimens: [Euglena](#), [Paramecium](#), [Amoeba](#)
- [Sterile Transfer Pipets](#)
- [Slides](#) and [Coverslips](#)
- Notes and Observation Notebook

Safety and Disposal

For specimen disposal, see our [care guides for living organisms](#)

- [Care Guide: Protists](#)

PPE

- Gloves



Additional Resources for Live Specimens

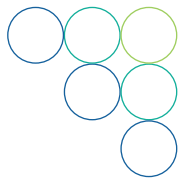
- [Amoeba, Paramecium, and Euglena Review Set](#)
- [Care Guides for Living Organisms](#)

Teacher Preparation

1. Prepare discussion questions about cells (the basic unit of life) and the seven life processes functioning in one single cell, unicellular microorganisms. Use the included guide to prokaryotic and eukaryotes cells as student background material. It is important that students recognize these organisms as living and meaningful. They will recognize them as living while observing their life processes and documenting how they function. Teachers and students will bring meaning to them through discussion, research, and creation of visuals. During this discussion, ask students what they believe the importance of these organisms is to the world we live in.
2. Set up your microscopes and make certain they are clean and in full working order for students. (See the resource Taking Care of the Microscope.)
3. Supply students with a sample of protists in pond water, 2–4 clean microscope slides with coverslips, and a transfer pipet.
4. [Demonstrate how to make a wet mount slide.](#)



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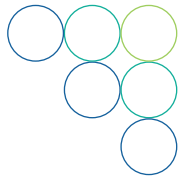
Student Procedures

1. Prepare a wet mount slide with pond water. Squeeze the transfer pipet, insert it into the pond water sample, then slowly add 2–3 drops of pond water to the center of the slide.
2. Place the cover slip over the pond water sample, being careful not to trap air bubbles.
3. Observe and identify all the organisms on the slide. Record your observations on the data table below.
4. Repeat the procedure with several pond water samples.

Pond Water Data Table			
Sample No.	Organism Sketch	Organism Behavior	Organism Identification

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Data Analysis

1. What was the most common organism in your samples?

2. What noticeable behaviors did you observe?

3. Identify and explain the life processes you observed.