



#3583

THE BIOLOGY OF CILIATES

Grade Levels: 10-12

30 minutes

ENVIRONMENTAL MEDIA CORPORATION 1997

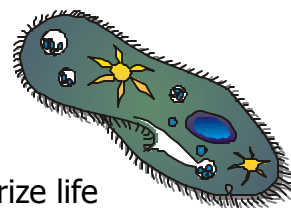
DESCRIPTION

Microphotography and graphics allow a close-up look at familiar ciliates, those protists that play such an important role in aquatic ecosystems. Shares an intimate look at the paramecium, vorticella, and stentor, while briefly mentioning several others.

ACADEMIC STANDARDS

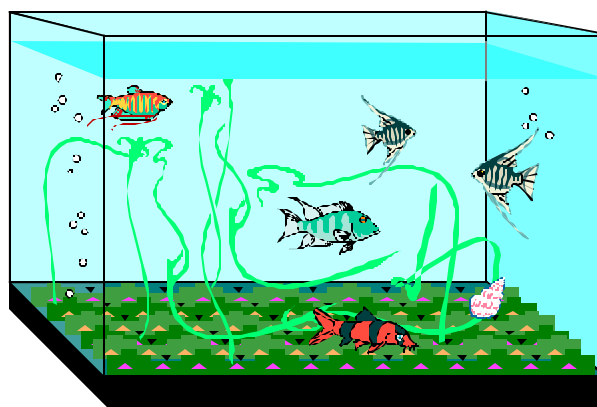
Subject Area: Science

- ◆ Standard: Knows about the diversity and unity that characterize life
 - Benchmark: Knows different ways in which living things can be grouped (e.g., plants/animals; pets/nonpets; edible plants/nonedible plants) and purposes of different groupings
 - Benchmark: Knows that plants and animals progress through life cycles of birth, growth and development, reproduction, and death; the details of these life cycles are different for different organisms



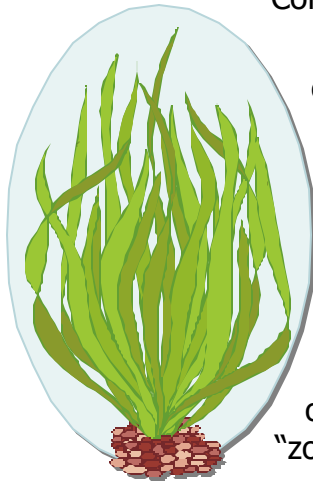
SUMMARY

Paramecium is a bacteria feeder. To culture these remarkable cells for study, create a "stinking brew" culture by allowing some aquatic vegetation to decompose. In these stagnant environments, paramecium will often multiply, forming a ring below the surface.



Paramecium has evolved behavioral responses that keep it close to its food supply. In the lab, compare paramecium's response to a bubble of CO₂ versus a similar bubble of air introduced under the cover glass.

Neutral red stains acidic portions of the cell—food vacuoles and lysosomes. Solid wastes are eliminated through an "anal pore," other waste products are crystallized, keeping them out of circulation.



Contractile vacuoles rid the cell of excess water entering by osmosis.

Cilia beat in waves, propelling paramecium, or creating feeding currents. ATP-powered protein "paws" pull on adjacent microtubules, causing a cilium to flex. Paramecium's day-to-day reproduction is accomplished by asexual division. Periodically, conjugation takes place resulting in the exchange of micronuclei. The pristine DNA in the micronucleus reestablishes the genetic integrity of the macronucleus. Tip: To stimulate conjugation, starve a natural population of paramecium.

Paramecium bursaria, the green paramecium, hosts hundreds of green algae belonging to the genus Chlorella. These "zoochlorelli" live symbiotically, sharing products with their host cell.

Didinium preys exclusively on paramecium, a classic example of predator/prey relations, whereby each regulates the others' population.

Look for Vorticella in pond water samples, on the walls of aquariums, in dogs' water dishes, and just about all other aquatic habitats. Tip: Mitochondria are often difficult to see in living cells. Examine vorticella's clear stalk under high magnification to see them in abundance. To our knowledge, this is the first documentation of a vorticella migration. The population was living in a wooden outdoor trough under our lab window, where we observed the "noonhour migration" every day for several weeks.

RELATED RESOURCES



Captioned Media Program

- Biology: Ecology of the Human Body #3343
- The Biology of Flagellates and Amoebas #3584
- The Biology of Nematodes, Rotifers, Bryozoans, and Some Minor Phyla #3585

World Wide Web



The following Web sites complement the contents of this guide; they were selected by professionals who have experience in teaching deaf and hard of hearing students. Every effort was made to select accurate, educationally relevant, and "kid-safe" sites. However, teachers should preview them before use. The U.S. Department of Education, the National Association of the Deaf, and the Captioned Media Program do not endorse the sites and are not responsible for their content.

• CILIATES RESEARCH

<http://www.ifm.uni-kiel.de/pl/microloo/default.htm>

From the Department of Marine Planktology. "Microbial Loop/Ciliates." Hot-linked research abstract sample, and activities and projects suggestions.

- **AQUATIC PLANTS**

<http://www.aquatic.uoguelph.ca/plants/index.htm>

Learn about the aquatic plants that inhabit the ecosystems under study.

- **WATERWORLD AT THE MICROBE ZOO**

<http://commtechlab.msu.edu/sites/dlc-me/zoo/zwmain.html>

A visit to the often unseen worlds of microlife.

- **LIFE SCIENCE INTERNET RESOURCES**

http://www.wcsu.ctstateu.edu/library/life_microbiology.html

A list of professional hotlinks to journals, societies, research findings, and more.

- **LIVING THINGS**

<http://www.fi.edu/tfi/units/life/life.html>

Hundreds of living things links (plants, bugs, animals, ecosystems, etc.) from the Franklin Institute of Science online. Buttons include: "Individuals," "Families," "Neighborhoods," and "Circle of Life."

- **MS. OLSEN'S HOME PAGE**

<http://clab.cecil.cc.md.us/faculty/biology1/bio.htm>

Choose from a variety of related biology and microlife topics.

- **BIOLOGY4KIDS**

<http://www.kapili.com/biology4kids/>

Check out the "Aquatic Biomes" and "Food Chain" sections. Then browse for additional information.

- **PLANTAE: LIFE HISTORY AND ECOLOGY**

<http://www.ucmp.berkeley.edu/plants/plantaelh.html>

Plants in ecosystem, "dealing with life differently from animals." Comparative microlife and water life information.