Hot or Cold: Paramecium Responses

Question: How does temperature affect the movement speed of a paramecium?

Kentucky Core Content:

SC-M-3.2.2 Regulation of an organism's internal environment involves sensing the internal environment and changing physiological activities to keep conditions within the range required to survive. Maintaining a stable internal environment is essential for an organism's survival.

Objectives: Students will be able to:

1. Use appropriate equipment (e.g. microscopes), tools (e.g. thermometer), techniques, and technology in scientific investigations.
2. Communicate designs, procedures, and results of scientific investigations.
3. Form and test a hypothesis.
4. Explain that environmental conditions affect the external responses of organisms.

Materials:

Each group:

1 microscope with slide base
1 jar of *Paramecium caudatum*
2 250 ml beakers
2 slide wells
1 dropper
2 thermometers
100 ml cold water
100 ml hot water

Procedure/Time:

Activity Time: Approximately 45 minutes

Procedure:

Instructor

Prior to Class:

- Students will need access to both hot and cold water for the experiment. A bag of ice purchased prior to class and then stored in a cooler will provide ample cold water. A beaker of water heated in a microwave or on a hot plate will provide hot water. Arrangements for each should be made before class.

During Class:

- The student worksheet provides instructions on how to complete the lab. To guide students perhaps give an example of a possible hypothesis to test. Emphasize that there are many possible hypothesis.
- Students may need instruction on how to operate the microscopes. Allow for extra time if students are unfamiliar with the equipment.

Student

- Instructions for completing the lab are included on the student activity sheet.

Assessment:

- Student activity sheet

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Name: _____ Class: _____

Materials:

1 x microscope with slide base
1 x jar of *Paramecium caudatum*
2 x 250 ml beaker
2 x slide well
1 x dropper
2 x thermometer

* Also available to you are ice water and heated water.

1. Form a **hypothesis** (*an educated guess*) about how water temperature will affect the movement speed of a paramecium.

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Procedure:

1. Remove the lid of the paramecium jar. Using the microscope, verify that there are live paramecium in the sample. Set the magnification to 40x and observe the movement of the paramecium.
2. Using the dropper and slide wells, put **three** drops of paramecium sample into each of the three largest wells.
3. Using the dropper, put **three** drops of **cold** water into one of the paramecium slide wells.
4. Using the dropper, put **three** drops of **warm** water into the other of the paramecium slide wells.
5. Using the microscope, observe each of the slides. Record your observations below.

Water Temperature	Paramecium Movement

Based on your observations, what can you conclude about how temperature affects paramecium movement? Did you prove you hypothesis true or false?

Conclusion:

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