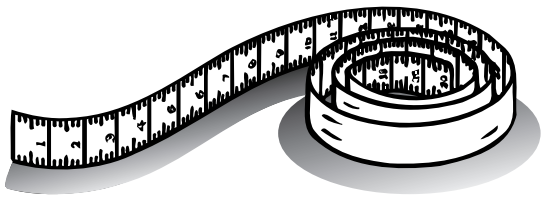
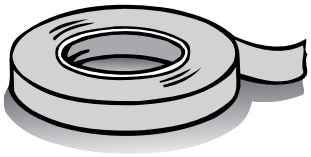
Chapter Science Investigation Name _____

Cell Processes

What You Need


boiled egg

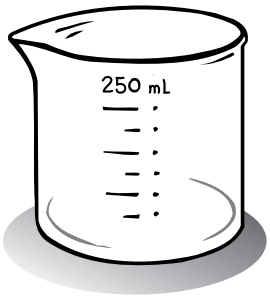

measuring tape


masking tape

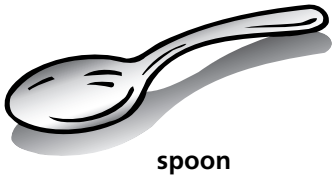

two glass jars with lids


white corn syrup

white vinegar



250-mL beaker


spoon

Find Out

Do this activity to see how a cell membrane allows a cell to take in and remove materials.

Process Skills

Measuring
Communicating
Observing
Inferring
Experimenting

Time

- 30 minutes on the first day
- 20 minutes two days later
- 20 minutes four days later

What to Do

1. Label the jars "A" and "B." **Measure** 200 mL of vinegar into jar A and **record** this amount of vinegar.

2. Place the measuring tape around the center of the egg to find the circumference of the egg. **Record** the measurement.

3. Carefully place the egg in the vinegar. Put the top on the jar and leave it for two days.

Safety! ***Wash hands well after handling the egg.***

4. After two days, remove the egg from the vinegar with a spoon and carefully rinse it with water. Use the measuring tape to find the circumference of the egg. **Measure** the vinegar remaining in the jar by pouring it into the beaker. **Record** your measurements.

5. **Measure** 200 mL of syrup into jar B. Place the egg in the jar of syrup. Put the lid on the jar and leave it for two days.

6. With the spoon, carefully remove the egg from the syrup. Rinse it with water. Use the measuring tape to find the circumference of the egg. **Measure** the syrup remaining in the jar by pouring it into the beaker. **Record** your measurements.

Modeling Cell Processes				
	Jar A Vinegar		Jar B Syrup	
	Starting Measurement (Beginning Day)	Ending Measurement (After Two Days)	Starting Measurement (Beginning Day)	Ending Measurement (After Two Days)
Circumference of the Egg	Measurements will vary.			
Amount of Liquid Left in the Jar	Measurements will vary.			

Conclusions

1. What happened to the shell of the egg?
The shell of the egg dissolved.

2. What happened to the size of the egg after remaining in vinegar?
It increased in size.

3. What happened to the size of the egg after remaining in syrup?
It decreased in size.

4. What part of the egg controlled what could enter and leave the egg?
The egg membrane controlled what entered and left the egg.

New Questions

1. The egg was being used as a model of a cell. Explain what this experiment shows about the working of a cell.
Answers may vary. Answers could include the following: The cell tries to stay in balance with its environment. The cell membrane controls what enters and leaves the cell.

2. Based on what you know about diffusion, **infer** why the liquids moved into and out of the egg by explaining the differences in the concentration of the liquids on each side of the cell membrane.
When the egg was in the vinegar, there was a higher concentration of liquid outside the cell. Diffusion occurred when the liquid moved inside the cell. When the cell was in syrup, there was a higher concentration of liquid inside the cell than outside of it. Diffusion occurred when the liquid moved out of the cell and into its environment.

Name _____

ACTIVITY

Investigating Pond Water Organisms

Predict what kind of organisms you might find in the pond water.

Answers will vary. Students may find unicellular organisms, such as euglena, and may find multicellular organisms, such as leaves from plants.

Draw the organisms you see on your slide.

Students should see and draw small organisms in the water.

Name _____

Conclusions

1. Compare your prediction with your observations.
Answers will vary according to the predictions made. Students will likely see tiny organisms that move within the water.

2. How many cells made up the organisms you observed?
Answers may indicate that organisms observed were made up of one or many cells.

3. What parts did these organisms use for movement?
Answers may include flagella, cilia, or a pseudopod.

Asking New Questions

1. Would you expect to see the same kinds of organisms in tap water as you did in the pond water? Why? What kinds of further information would be helpful to support your conclusion or to answer new questions that you have?
Answers will vary depending on the students' conceptions of where tap water comes from and how it is treated. Answers will vary.

2. Based on the kind of microscope that you used, did you view cells more like Janssen, Leeuwenhoek, or Hooke did many years ago?
Answers may vary but are likely to include Leeuwenhoek because both the students and Leeuwenhoek used compound light microscopes.

Name _____

ACTIVITY

Comparing Plant and Animal Cells

Predict how the onion skin cells will be similar to and different from cheek cells.

Answers will vary.

Draw what you see in each type of cell. **Label** the cell parts.

Slide A **Slide B**

Answers will depend on the power of the microscopes, but students should see and label the cell wall in the onion skin cell and the cell membrane in the cheek cell, as well as the nucleus and cytoplasm in both cells.

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Conclusions

1. Compare your prediction with your observations.
Answers will vary according to the predictions made. Students should see that some similarities and differences exist between the animal and plant cell.

2. Did slide A contain plant or animal cells? Slide B?
Slide A contained onion skin cells, and slide B contained human cheek cells.

3. How could you tell you were looking at plant cells?
Answers should indicate that plant cells have cell walls, chloroplasts, and large vacuoles.

4. How could you tell you were looking at animal cells?
Answers should indicate that animal cells do not have cell walls or chloroplasts and have small or no vacuoles.

Asking New Questions

1. What are the functions of the cell parts that you labeled?

Answers may include: cell walls support and protect the cells; cell membranes allow materials into and out of the cells; vacuoles store food, water, and other substances; mitochondria supply energy to cells; chloroplasts allow plants to make their own food; nuclei control the cells' activities and hold the cells' genetic material.

2. Based on your observations of the plant and animal cells, how might lettuce cells compare to cat cells?
Lettuce cells would contain chloroplasts, cell walls, and large vacuoles. Cat cells would not.

Name _____

ACTIVITY

Investigating Osmosis

What do you **observe** about the texture and color of the potato slices?

The potato slices are firm and white.

Predict what will happen in each of the beakers. **Record** your predictions in the chart.

Answers will vary.

What happened to the color and texture of each potato slice? **Record** your results in the chart.

	Prediction	**Observations**
Beaker 1	Answers will vary.	Potato slice remained white but became limp.
Beaker 2	Answers will vary.	Potato slice remained white but became limp (less limp than slice in Beaker 1).
Beaker 3	Answers will vary.	Potato slice remained white and its texture did not change.

Name _____

Conclusions

1. Compare your prediction with your observations.
Answers will vary depending on the predictions made. Students should observe that the texture of the potato slices in beakers 1 and 2 changed.

2. Did osmosis occur between the cells in the potato slices and their environment in each beaker? How do you know?
Students should know that osmosis occurred in beakers 1 and 2 because the potato slices became limp.

3. Was there a higher concentration of water in the potato cells or in the salt solution in beaker 1? How do you know?
There was a higher concentration of water in the potato cells. Water moved out of the potato cells and into the solution because the solution had a lower concentration of water. Students should infer that the potato slice became limp because it lost water.

Asking New Questions

1. Develop a testable question based on your observations in this activity.
Student-developed questions will vary.

2. Plan and conduct a simple investigation based on your question and write instructions that others can follow to carry out the procedure.
Investigations and instructions will vary.

3. Prepare a report of your investigation that includes the tests conducted, data collected, or evidence examined, and the conclusions drawn.
Reports will vary but should be well organized and clearly written.