

11. Water will flow from Column A (high water concentration, low sugar concentration) to Column B (low water concentration, high sugar concentration).
12. The water in the mist is at a higher concentration than that in the vegetable cells. The water will land on the vegetables and enter the cells by osmosis. This will keep the vegetables crisp and firm.

Pause and Reflect Answer

Students' answers may vary but should address the following points:

- the kinds of materials that will be passing through the dome in both directions
- how the process of osmosis pertains to this transport
- what protective abilities the material should have against the environment

Other Assessment Opportunities

- BLM 1-27, Chapter 1 Quiz
- Assessment Checklist 1, Making Observations and Inferences
- Assessment Checklist 3, Designing an Experiment
- Assessment Checklist 18, Data Table
- Process Skills Rubric 2, Hypothesizing
- Process Skills Rubric 3, Controlling Variables
- Process Skills Rubric 4, Problem Solving
- Process Skills Rubric 5, Fair Testing
- Process Skills Rubric 6, Designing Experiments
- Process Skills Rubric 8, Interpreting Data
- Process Skills Rubric 10, Measuring and Reporting
- Assessment Rubric 6, Design Your Own Investigation Rubric
- Assessment Rubric 10, Presentation Rubric
- Assessment Rubric 11, Communication Rubric

CHAPTER 1 ASSESSMENT, p. 50-51

PREPARE YOUR OWN SUMMARY

Student summaries should incorporate the following main ideas:

1. Characteristics of Living Things
 - There is an immense variety of life forms on Earth.
 - Living things respond to their environment, need energy, grow, reproduce, and get rid of wastes.

2. The Microscope
 - Early microscopes were built 400 years ago.
 - The image you see through a compound light microscope is magnified, inverted, and reversed.
 - The magnification power is found by multiplying the power of the objective lens by the power of the eyepiece lens.
 - The resolving power is the ability to distinguish between two objects that are very close together.
3. Cell Organelles
 - You can use an analogy to help understand new ideas by making a comparison.
 - Organelles are cell structures in which functions are carried out to ensure the cell's survival.
 - There are similarities and differences between prokaryotic and eukaryotic cells.
 - There are similarities and differences between plant cells and animal cells.
4. Cell Theory
 - Cell theory was based on observations over several hundred years.
 - Cell theory states that the cell is the basic unit of life; all organisms are composed of one or more cells; and all cells come from other living cells.
5. Diffusion and Osmosis
 - Particles move from an area of higher concentration to an area of lower concentration.
 - The cell membrane is a selectively permeable membrane.
 - Diffusion and osmosis occur in your body.

CHAPTER REVIEW ANSWERS

Note: You may want to hand out BLM 1-28, Chapter 1 Review, Question 27, for students to use in answering question 27.

Checking Concepts

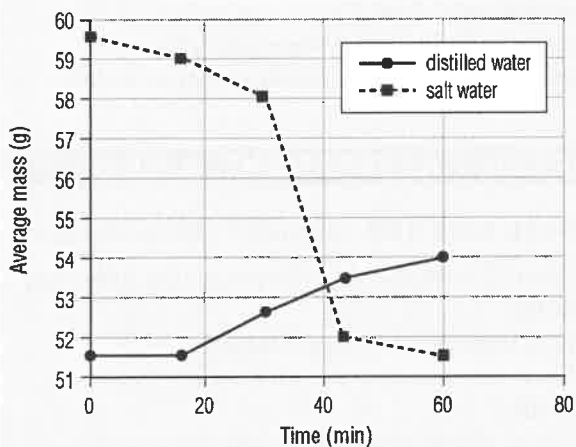
1. Living things respond to stimuli, grow, reproduce, produce wastes, and require energy.
2. Students' answers may vary but could include that the stentor and paramecium are examples of unicellular organisms, while mosquitoes and fir trees are examples of multicellular organisms.
3. Living organisms require energy, produce wastes, reproduce, grow, and respond to stimuli.
4. All organisms must eventually die. Living things must reproduce to replace themselves.
5. The coarse focus knob should be used only on low or medium power.

6. As the slide moves toward you, the object that you are viewing appears to move away from you.
7. The objective lens could crack the slide when adjusted. Also, there is a chance of some debris from the sample getting on the lens.
8. A wet mount slide is made by adding a drop of water to the sample before putting on the cover slip.
9. Robert Hooke was the first scientist who used the term "cell."
10. Robert Hooke thought cells looked like the rooms in a monastery. These rooms were called cells.
11. Plants have both chloroplasts and cell walls. Animal cells have neither.
12. The vacuoles store food and waste material.
13. Mitochondria provide energy for the cell.
14. "A" indicates the nucleus of the cell, which controls the cell's life functions.
15. A eukaryotic cell has a membrane surrounding organelles such as a nucleus. A prokaryotic cell does not.
16. Both osmosis and diffusion refer to the movement of particles from areas of high concentration to areas of low concentration. Osmosis is a form of diffusion that involves the movement of water molecules across a selectively permeable membrane.
17. Water enters and leaves the cell through the process of osmosis.

Understanding Key Ideas

18. The cell is the smallest unit of life capable of reproducing itself.
 19. Students' answers may vary but could include the following: A car requires gasoline (chemical energy) to run; it seems to respond to stimuli such as traffic lights; and it produces wastes, such as exhaust. The range of sizes of cars from sub-compacts to trucks might suggest growth and reproduction. I would suggest that the alien remove the driver from the car and see if the car is still capable of responding to a range of stimuli. Since the car would be unable to respond without its driver, the car could not be alive.
 20. The actual size of the organism is 0.56 mm.
 $\frac{1}{3} \times 1.7 \text{ mm} = 0.56 \text{ mm}$
21. The student might be seeing air bubbles. She could avoid trapping air bubbles by gently lowering the cover slip from a 45° angle.
 22. Respiration and photosynthesis both involve water, carbon dioxide, oxygen, and energy. In respiration, glucose is broken down using oxygen, producing energy, carbon dioxide, and water. In contrast, photosynthesis makes glucose and oxygen using carbon dioxide, water, and the energy in sunlight.
 23. The vacuole in plant cells contains water, which helps support the cell.
 24. The students are different distances away from the peeled orange. Those farthest away will smell the orange last because of the time the scent takes to diffuse across that extra distance.
 25. Yes, you can give a plant too much fertilizer. Fertilizer will dissolve in the water contained in the soil. This will reduce the concentration of water in the soil, perhaps to a level lower than that of the plant cells. If this happens, water will flow by osmosis into the soil from the plant.
 26. Since the cells of a saltwater fish likely have the same water concentration as the salt water, water will flow from the fresh water through osmosis into the fish. This could cause the cells of the fish to burst, killing the fish.
 27. (a) For salt water: 0 = 59.5; 15 = 59; 30 = 58; 45 = 52; 60 = 51.5
 For distilled water: 0 = 51.5; 15 = 51.5; 30 = 52.5; 45 = 53.5; 60 = 54
 (b)

Change in Mass of Potato Cubes Over Time in Distilled and Saltwater Solutions



- (c) The mass of the potato cubes increases in distilled water because water enters the potato cubes through osmosis. The mass of the potato cubes decreases in salt water because water flows from the potato cubes into the saltwater solution.

Pause and Reflect Answer

The students should be able to cover the following points as they describe the relationship between improved technology and understanding the cell:

- Early versions of the microscope led to the cell theory.
- Improved microscopes such as the compound light and electron microscopes led to the identification and understanding of the cell's organelles.

CHAPTER 2 OPENER, p. 52-53

■ USING THE PHOTO AND TEXT

This chapter is an opportunity to talk with students about the various organ systems that make up the human body. After an overview of all the body systems, the text focusses on several interrelated systems: the digestive and excretory systems, and the circulatory and respiratory systems. You can use the photograph of acrobats to illustrate the idea of a circus troupe being analogous to the parts of the body. Each member of the circus troupe has a particular role to play in the overall acrobatic performance. What makes the performance exciting to watch is how one member's specialty seamlessly flows into another's, leading to an experience that is greater than the sum of its parts. You can relate this seamless co-operation to the cell and the various organelles that carry out their tasks, or to the various organ systems working together in order for an organism to exist.

Another example that can show the importance of parts working together to ensure a smooth running whole would be a typical city. Have the students brainstorm what these parts would be and their role. Some ideas may be the transportation system, garbage disposal, water and sewage systems, etc.

More information on systems in general, and human body systems in particular, can be found at www.bscience8.ca.

■ USING THE WHAT YOU WILL LEARN/WHY IT IS IMPORTANT/SKILLS YOU WILL USE

Encourage the students to read the What You Will Learn/Why It Is Important. Refer back to Chapter 1 and the requirements of life. Have the students determine what functions the human body needs in order to survive. Their answers may include that it needs to acquire nutrients, excrete wastes, and fight disease. They can use their answers to suggest other points that could be included in the Why It Is Important.

■ USING THE FOLDABLES™ FEATURE

- As a life skill, guide students to understand how to plan and design their own folded tables. Encourage students to use tables in future projects or when collecting and reporting empirical data. Folded tables of any number of columns or rows can be made quickly and easily by folding instead of measuring and drawing lines. For example, students could fold a table with six rows and three or four columns and use it to record information about nutrients.

	Carbohydrates	Proteins	Fats	Minerals	Vitamins
Function					
Sources					

Nutrient	Function	Sources	Other Facts
Carbohydrates			
Proteins			
Fats			
Minerals			
Vitamins			

- Other Foldable Ideas: Students could make two miniature pocket Foldables, and glue them together to make a four-pocket folder. They could use the folder to collect index cards of information, key terms, and diagrams.

