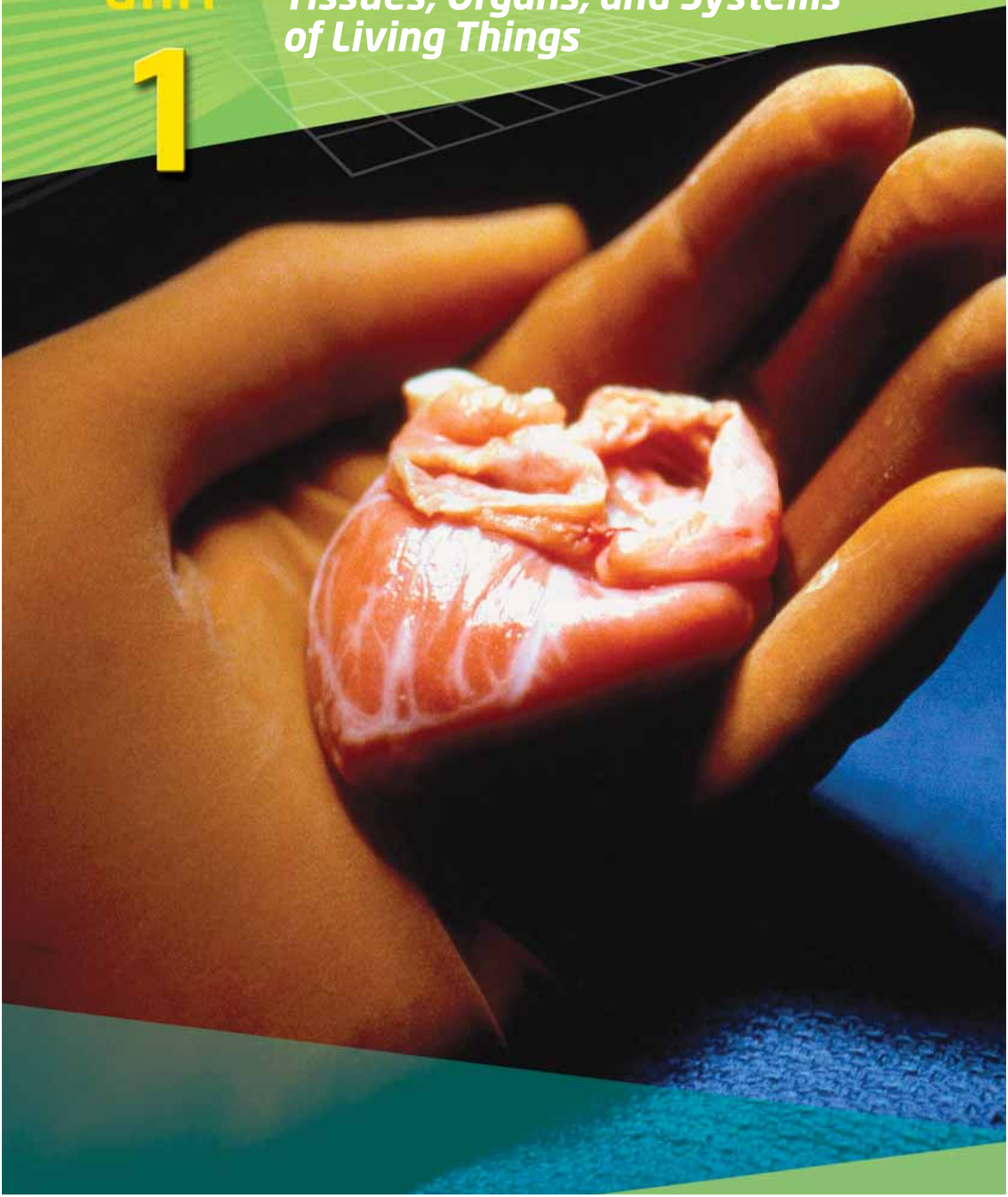
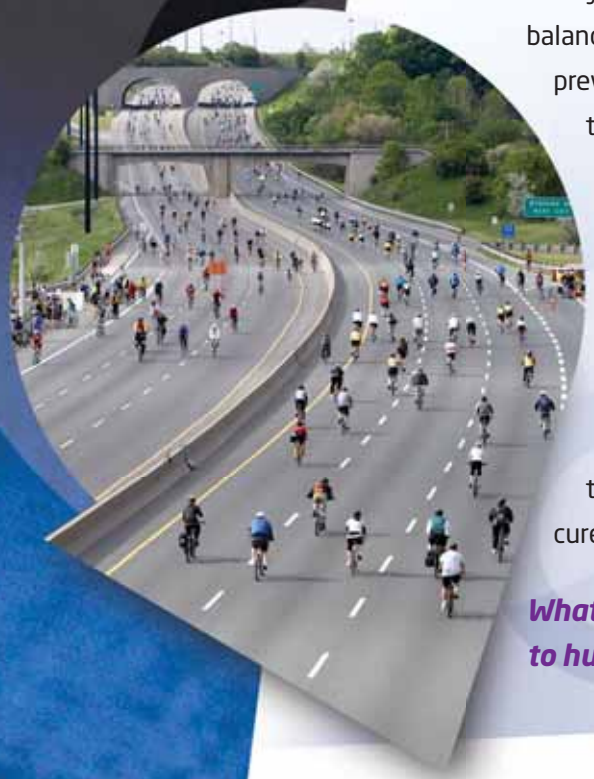
UNIT 1

Tissues, Organs, and Systems of Living Things



BIG IDEAS

- Developments in medicine and medical technology can have social and ethical implications.
- Plants and animals, including humans, are made of specialized cells, tissues, and organs that are organized into systems.



A pediatric heart surgeon's hand cradles an infant's tiny defective heart that is no bigger than a walnut. The 48-day-old patient, Dylan Stork, had a life-threatening heart defect. A heart transplant saved his life.

This baby was born with a defective heart, but some kinds of heart disease develop or worsen as a result of lifestyle choices. Research has shown that eating a balanced diet and getting plenty of exercise can help prevent heart disease. Research has also helped develop technologies to identify and treat heart problems. Fundraising events such as the Ride for Heart, shown here, help raise money for research into causes and treatment of heart disease while promoting healthy living.

In this unit, you will learn about cells, tissues, and organs and how they work together in systems in plants and in animals. You will also learn about technologies designed to diagnose, study, treat, and cure diseases affecting body systems.

What are some social and ethical issues related to human organ transplants?

Get Ready for Unit 1

Concept Check

1. Decide whether each statement about the cell theory is true or false. If a statement is false, rewrite it to make it true.

a. The cell is the basic unit of life.

b. Some cells come from pre-existing cells.

c. All living things are made up of many cells.

2. Find the pond organism that is labelled A, and sketch it in your notebook. Identify and label the cell organelles listed below in your sketch. Then, below your sketch, state the function(s) of each of these organelles within the cell. (Note: Not all of these organelles will be present.)

a. nucleus

b. cell membrane

c. cell wall

d. vacuole

e. mitochondria

f. cytoplasm

3. In your notebook, write the number that matches each part of the microscope listed below.

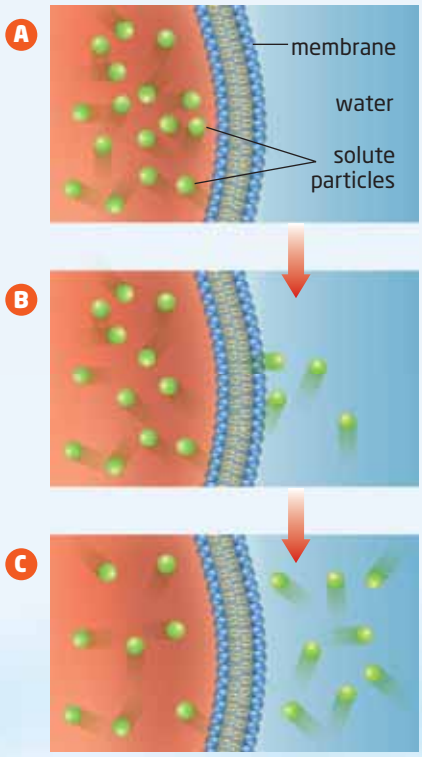
a. light source

b. stage

c. eyepiece

d. objective lens

4. Diagrams A, B, and C show the process of diffusion. Describe what is happening in these diagrams using the following terms: *concentration, high, low, membrane, permeable, selectively,* and *solute.*



Inquiry Check

5. Identify In your notebook, list as many characteristics of unicellular and multicellular organisms as you can. Compare your list with a partner's list.

6. Observe and Record Observations Copy the following table in your notebook. Identify the organisms in the photographs on the previous page by completing the table. Explain your answers using the characteristics you listed in question 5 above.

Characteristics of Unicellular and Multicellular Organisms

Organism	Plant, Animal, or Protist?	Unicellular or Multicellular?	Observations
A			
B			
C			

Numeracy and Literacy Check

7. Analyze Bacterial cells replicate by splitting into two cells. When conditions are favourable (for example, when there is space and a food source), bacteria can divide every 20 min. This is called exponential growth. Use this table to answer the questions below.

Exponential Growth of Bacteria

Time (min)	Number of Bacteria
0	1
20	2
40	4
60	8

a. If conditions are favourable, how many bacterial cells will exist after 2 hours?

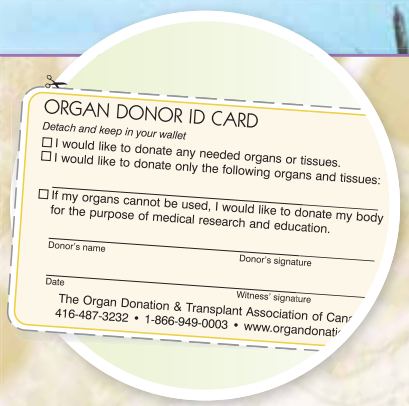
b. If conditions are favourable, how long will it take before the population of bacterial cells reaches 1000?

8. Write Use the words below to explain how multicellular organisms are structured.

cells organism organ systems
organs tissues

Looking Ahead to the Unit 1 Projects

At the end of this unit, you will have an opportunity to apply what you have learned in an inquiry or research project. Read the Unit 1 Projects on pages 126–127. Start a project folder now (either paper or electronic). Store ideas, notes, news clippings, website addresses, and lists of materials that might help you to complete your project.



Inquiry Project

Investigate the phases of mitosis.

An Issue to Analyze

Research and form an opinion about organ donation.