

Unit 1

Unit 1 Tissues, Organs, and Systems

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Unit 1 Tissues, Organs, and Systems

BIG IDEAS

- All animals are made of specialized cells, tissues, and organs that are organized into systems.
- Although technology and chemicals can be used to improve human health, they can also constitute a health hazard.

Overall Expectations

- **B1** analyse some current technologies or substances that have an impact on human tissues, organs, or systems, and evaluate their effects on human health
- **B2** investigate cell division, cell specialization, and the organization of systems in animals, including humans, using various laboratory techniques
- **B3** demonstrate an understanding of the hierarchical organization of cells, from tissue, to organs, to systems in animals, including humans

Materials

Please see pages TR-32 to TR-37 for a list of the materials required for this unit and other units.

Overview

In this unit, students will learn how understanding cells can help us understand how organisms function. Components of cells work together to perform all life functions. Examples of life functions include digesting what we eat, being able to breathe, and having a bone heal if it has been broken. Cellular processes enable all organisms to meet their basic needs. Two of an organism's basic needs are growth and regeneration. Survival of the organism is dependent upon cell division in order to pass on the required hereditary materials.

Students will investigate why animal cells divide and what happens when they do. By examining how animal cells work together in the human body, students will begin to appreciate that even though all cells begin alike (stem cells), they can differentiate into specialized cells that perform different functions and can group together as tissues to form the necessary organs for body functions. When the organ systems work together in the human body, important tasks such as respiration, circulation, and digestion maintain the homeostatic (even) balance required by all living organisms.

Exposure to technology, substances, and environmental factors can affect human health. Students will examine some of the possible consequences of such exposure.

Using the Unit Opener (Student textbook pages 2-5)

- Many students will have seen a Spider-Man movie or read Spider-Man comics. Invite a volunteer to summarize the main idea of how Spider-Man got his powers. Have students read the summary on page 3 for a scientific point of view.
- Discuss differences (and similarities) between fact and fiction with students. The changes that Spider-Man undergoes are definitely fictional, but dramatic cellular changes do happen in real life and do affect the entire organism. Everything that goes on in our cells has an effect on our entire bodies. The questions at the bottom of page 3 provide a possible guide to further class discussion.
 - Do rapid cellular changes really happen or is that just in the movies?
 - How are your own cells organized into the tissues, organs, and systems that give you your own unique abilities?
 - What can impair the cells' health and, therefore, yours?
- **ELL** Preview any relevant vocabulary with English language learners. This might include the terms *cell*, *tissue*, *organ*, and *system*. You could use a diagram to show the relationship among these terms. In addition, be aware that instructions and wordings may need to be simplified for English language learners by providing a synonym. For example, *impair* = *hurt*.
- Have students look at Unit 1 At a Glance on pages 4 and 5, and explain what it tells them about what they will learn. They will see that each topic will answer a question that relates to tissues, organs, and body systems, and that each topic includes several key concepts.
- Students can use **BLM 1-1 Unit 1 Anticipation Guide** to record their thoughts about tissues, organs, and body systems. Then, at the end of the unit, they can revisit the blackline master and see how their understandings and opinions have changed as a result of their study.
 - **ELL** Build in an oral component for English language learners. Before writing, partner them with a peer who has strong English skills and have them talk through the Anticipation Guide. The peer could record as the pair talks.
- Students can use **BLM 1-2 Key Terms in Unit 1** to review the meanings of Key Terms.

Preparing for the Unit Projects

- Read Looking Ahead to the Unit 1 Projects, on page 5, to the class. Then allow students to read the projects themselves, on pages 98 and 99, including the assessment checklists. Encourage students to consider the tasks that would be involved in each project and choose the one that they would most like to do.
 - **ELL** English language learners may find the language skills required in the Inquiry Investigation more accessible.
- Provide instructions on how you would like students to set up their project planning folder(s). Rather than using a file folder, where loose pages can fall out, consider using a portfolio-style folder that can be closed securely. (These can be purchased at a dollar store.)
- Have students write an “action plan” or “to-do list” of the tasks they will need to accomplish to be successful with their project(s). You may want to provide them with **BLM A-47 Unit 1 Inquiry Investigation Rubric** and **BLM A-48 Unit 1 An Issue to Analyze Rubric** at this planning stage so they understand what is expected of them.
- Once a week, allow students 10 minutes or so to review their unit project materials and move forward in their preparations.
- The information about organ systems and how they work together in Topic 1.3 and Topic 1.4 will be especially helpful to students who have chosen to complete Inquiry Investigation: How Diseases Affect Organs. They should write their questions early in the unit so that they are ready to look for answers to them when they reach these topics.
- Students who choose to complete An Issue to Analyze: Encouraging Healthy Lifestyles will find relevant information in all topics of the Unit. Have them write their research questions early, and draw their attention to information and ideas that may be relevant to their project as you begin the unit.

Get Ready (Student textbook pages 6–7)

Concepts

- Students should describe the cell as the basic unit of life, and describe living things as being made up of one or more cells (question 1).
- Students should draw simple cells, including some cell components, and show some differences among different types of cells (question 2).
- Students should know the main parts of a microscope, their functions, and basic procedures for safe microscope use (questions 3 to 6).

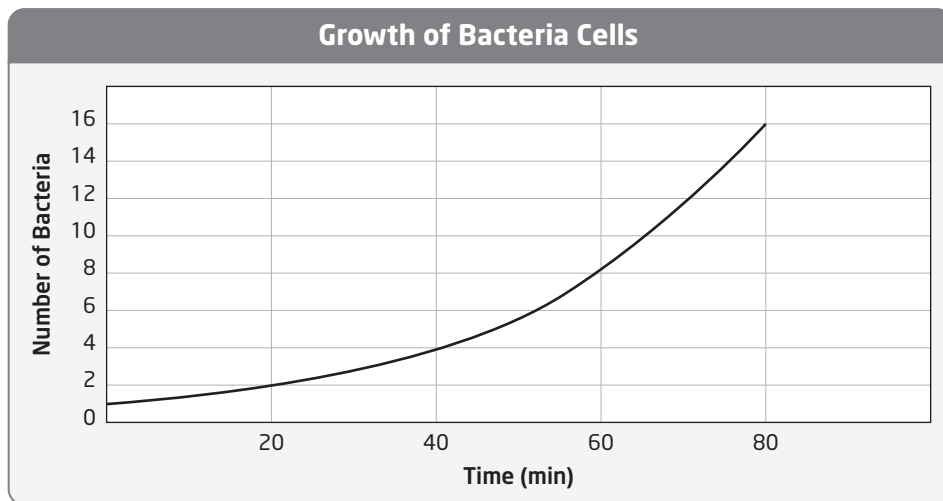
Skills

- Students should be able to brainstorm ideas and record them in a t-chart (question 7).
- Students should be able to evaluate a response and decide if it is correct or not (question 8).
- Students should be able to construct a line graph from a data table (question 9).
- Students should be able to construct a concise, logical explanation (question 10).

Students can review some of these skills using **BLM 1-3 Skills for Unit 1**.

Get Ready Answers

1. a) True
b) True
c) False. Some living things are made up of many cells but some are made up of only one cell.
2. a)-d) Drawings will vary, but should show some cell components, such as a nucleus and cell membrane. Drawings should also show some differences in shape among types of cells, with plant cells being more square shaped than animal cells, and muscle cells being longer than skin cells.
3. a) iv
b) iii
c) i
d) ii
4. b)
5. d)
6. b)
7. T-charts should include characteristics of single-celled organisms on one side and characteristics of many-celled organisms on the other side.
8. Partner is correct. Explanations will vary but should show some understanding that diffusion describes substances moving through other substances and resulting in more equal concentrations.
- 9.



10. For example: In a many-celled organism, cells are arranged into tissues, such as muscle tissue, or bone tissue. These tissues form organs, such as a heart, or a brain. Organs work together in organ systems.

Assessment OF Learning for Unit 1

Activity	Evidence of Learning	Supporting Learners
Unit 1 Inquiry Investigation, page 98	Models of a diseased and a healthy organ are detailed and accurate. Students describe how several organs are affected by the disease, and how to treat and prevent the disease.	<ul style="list-style-type: none"> Review Activities 1.13 and 1.15, in which students built models of specialized cells and tissues. Have students consider what materials worked well to represent the qualities of the cell or tissue. Students can use BLM G-43 Flowchart and BLM G-39 Cause-and-Effect Map to show these relationships.
Unit 1 An Issue to Analyze Project, page 99	Students list government resources that educate about healthy lifestyles and describe several costs and benefits of adopting a healthy lifestyle.	<ul style="list-style-type: none"> Students can use BLM G-46 PMI Chart to organize their analysis. Have a variety of Canadian resources promoting healthy lifestyles available in the library or classroom for students to refer to.

Assessment FOR Learning for Unit 1

Tool	Evidence of Learning	Supporting Learners
Get Ready, questions 1 and 2, page 6	Students describe in words and/or in pictures the basic structure of a cell.	<ul style="list-style-type: none"> Give students a simple diagram of a cell, including cell membrane, nucleus, mitochondria, vacuoles, and cytoplasm. Have them add labels to the diagram, and compare their diagram with a classmate. You could also supply the labels, and have students decide which label applies to which part of the cell.
Get Ready, questions 3 to 6, page 6	Students identify correct methods for focussing and carrying a microscope.	<ul style="list-style-type: none"> Read Science Skills Toolkit 4, Using a Microscope, on pages 348 and 349, with students. Students can review the parts of a microscope using BLM G-10 Parts of a Microscope. Consider having some students demonstrate how to use a microscope properly by handling a real microscope rather than by responding to written questions.
Get Ready, question 9, page 7	Students draw and label a line graph from a data table.	<ul style="list-style-type: none"> Read Numeracy Skills Toolkit 2, Organizing and Communicating Scientific Results with Graphs, on pages 360 to 365, with students. Students can review drawing line graphs using BLM G-34 Constructing Line Graphs.
Get Ready, question 10, page 7	Students organize their thoughts concisely and logically.	<ul style="list-style-type: none"> If students have difficulty writing, consider allowing them to respond orally or to have a classmate write out their oral responses.