Learner Paper-based Material

An Adventure into Cells and Their Parts



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To the student

Welcome to this material!

Now you can have fun learning about science. This material is designed to help you to understand one of the most important scientific concepts, cells and their parts, in an interesting and meaningful way. You can use this material alone or as part of a school lesson to learn about cells and their parts.

After you study with this material, you will be able to explain cells to your family, identify their parts and functions, and discriminate between plant cells and animal cells.



Organization of this instruction

1. Introduction (paper-based)

2. Lesson (paper-based)

What are cells?

Comic strips Things to Remember! Small practices

What are cell parts and their functions?

Comic strips Things to Remember!! Small practices

Are plant and animal cells the same or different?

3

Comic strips Things to Remember!!! Small practices

3. Main practice (computer-based)

4. Test (paper-based)

Components of this instruction

This material is composed of four parts: introduction, lesson, main practice, and test.

Introduction

This is a brief introductory section to the lesson.

Lesson

The lesson deals with three topics: 1) What are cells?; 2) What are cell parts and their functions?; and 3) Are plant and animal cells the same or different? In each section, you will learn about the topic while reading comic strips. Comic strips will help you understand the material more easily by using narration, attractive images, and interesting examples. Following each comic strips, a "Things to Remember" section will give you a chance to summarize the important points that read in the comic strips. Finally, there will be a couple of small practices in each section.

Main practice

After you finish the comics and the small practices, you will do the main practice with a computer. In the computer practice, you will be provided with immediate feedback as soon as you answer a question. For this section, you should have an access to our Web site at http://mentor.ucs.indiana.edu/~r521002/Final/cells.html.

Test

After the main practice with the computer, you will go back to the paper material and answer a ten question test. After you complete the test by yourself, you should check your answers using the answer sheet or submit your answer sheet to your teacher the next school day, depending on how your teacher has assigned this material.

Key features of this instruction

Important points in blue

In each comic strip, important points about each topic are highlighted in blue and each panel containing the points is outlined in blue as well, like in this example. Therefore, when you come across something highlighted in blue, please pay attention.



Things to Remember!

The important points highlighted in the comic strips in blue are also presented in the "Things to Remember!" section after each main comic, as in this example. This is designed to assist you in understanding the material.



Key features of this instruction

Computer practice

The main practice is completed using a computer. It contains many vivid visual images of cells. As soon as you answer a question, you will be provided with immediate feedback.

General State of the Control of the

Images of cells

Examples of cells are presented, using two types of images, *line drawings* and *photographs*. They will help you understand cells that are invisible to you by creating their mental pictures in your mind. You will feel excited at the real photographs of cells!



Introduction

Introduction

Do you know what this is?

Yes. It is a microscope.

This microscope brings a new world close to you.

It helps you to see things that you cannot see with the naked eye.

Cells are some of those very small things that a microscope can help you to see.

You will have exciting experiences observing cells using a microscope.



By the way, What are cells? What do cells look like? What are cells made up of? What work does each cell part do? Are dog cells different from rose cells?

Even if you are not clear about the answers yet, you will be able to answer all these questions after you have completed this lesson. In this lesson, you will make a fantastic journey into cells and their parts.



From now on, you will see this guy very frequently. He is very kind and smart, and will lead you into the world of cells step by step.

With the help of this guide, you will be able to understand the major characteristics of cells, identify cell parts and their functions, and discriminate similarities and differences between plant cells and animal cells.

Are you ready now?



Comic strips Things to Remember! Small practices









Things to Remember!

- 1. Cells are basic units of all living things including human beings.
- 2. Cells are not exactly same in their shape and structure, but remarkably similar.
- 3. New cells are produced from existing cells.



Line drawing of a cell



Real image of a cell



Small Practices

1. Fill in the blank.

_____, which are very tiny, make up all living things.

 Answer yes or no. Is this spider made up of cells?





Answer Key

- 1. Cells
- 2. Yes, it does. All living things contain cells. Since a spider is a living thing, it contains cells.



Comic strips Things to Remember!! Small practices













Are you understanding the parts well? You may more easily understand them when you are trying to match the cell parts with what you already know, like the shopping mall you have been to.



Hi! I am chloroplasts. I am only in plant cells, like the cell wall. I contain chlorophyll, which captures energy from sunlight and uses it to produce food for the cell.



I am like a pizza shop in the mall that makes food.



So my nickname is "Food Producers".

Ok. Let's start again. In

meet chloroplasts. Hi.

the cytoplasm, we can also

















Things to Remember!!

	Cell Parts	Main Functions	Nick Name
1	Cell wall	Surround and protect the cellMake the cell stiff and strong	Supporter and protector
2	Cell membrane	Hold and protect the cellControl the movement of materials into and out of the cell	Gate of the cell
3	Cytoplasm	 A watery, gel-like material in which cell parts move 	Area of movement
4	Mitochondria	 Produce and supply most of the energy for the cell 	Powerhouse of the cell
5	Chloroplasts	 Contain chlorophyll Capture the energy of sunlight and use it to produce food for the cell 	Food producers for the cell
6	Vacuoles	 Store food, water, and chemicals 	Storage tanks
7	Nucleus	Act as the 'brain' of the cellRegulate and control all cell activities	Control center
8	Nuclear membrane	 Surround and protect the nucleus Control the movement of materials into and out of the nucleus Exist in the nucleus 	Gate of the nucleus
9	Chromosomes	Direct cell activitiesExist in the nucleus	Director of the cell





Line drawings and real images of cells

Small Practices

- 1. Choose the wrong statement from the following.
 - 1) Mitochondria produces most of the energy for the cell.
 - 2) Chloroplasts are "food producers."
 - 3) Cell wall controls the movements of materials into and out of the cell.
 - 4) Nucleus regulates and controls all cell activities, acting as the "brain" of the cell.
- 2. Can you draw lines to match cell parts and nick names?

Cell part

- 1) Cytoplasm
- 2) Nuclear membrane
- 3) Vacuoles

- Nick name
- a. Gate of the nucleus
- b. Area of movement where cell parts move
- c. Storage tanks
- Please read the cell part descriptions below and answer the questions with yes or no (questions 3 – 5).
- This cell part is surrounded by a nuclear membrane. Is it a nucleus?



- This cell part is the powerhouse of the cell. Is it a mitochondria?

5. Are these chromosomes?_____



Answer Key

- 1. 3. It is cell membrane that controls the movements of materials into and out of the cell. Cell wall surrounds and protects the cell.
- 2. Cell part

1)

<u>Nick name</u>

- Cytoplasm _____a. Gate of the nucleus
- 2) Nuclear membrane _____b. Area of movement where cell parts move
- 3) Vacuoles—c. Storage tanks
- 3. Yes, it is a nucleus. Nucleus is surrounded by the nuclear membrane and controls cell activities. It is like a mall office.
- 4. Yes, it is a mitochondria. A mitochondria is where energy is released from food.
- 5. No, chromosomes are found in the nucleus. Chromosomes direct tell activities. It can be compared to a mall office director.

Comic strips Things to Remember!!! Small practices













Things to Remember!!!

- 1. Both plant cells and animal cells have 7 cell parts: cell membrane, cytoplasm, mitochondria, vacuoles, nucleus, nuclear membrane, and chromosomes.
- 2. In addition to the 7 parts, plant cells have 2 more parts: cell wall and chloroplasts.







Plant cell

Animal cell





Small Practices

- 1. Fill in the blank. Plant cells have 2 more parts than animal cells, which are _____ and
- Answer yes or no.
 Is this an animal cell?





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Answer Key

- 1. Cell wall, chloroplasts
- 2. No, it is not. It contains a cell wall and chloroplasts, so it is a plant cell.

Main practice

You will do the main practice with a computer. In the computer practice, you will be provided with immediate feedback as soon as you answer a question. For this section, you should have an access to our Web site at http://mentor.ucs.indiana.edu/~r521002/Final/cells.html.

After finishing the main practice, you will complete the test at the end of this material.

Turn on the computer for main practice now!





This is a man's hand. Does it contain cells?



2. Question

This structure controls the movement of materials into and out of the cell. Is it a mitochondria?





These structures are found in the nucleus and direct all cell activities. Are these structures chromosomes?



4. Question

These structures contain chlorophyll, which captures sunlight to make food. They can be found only in plant cells. Are they chloroplasts?





The tree on the left has grown bigger and taller than the tree on the right. Is it because existing cells have produced many new cells?



6. Question

This cell part surrounds and protects the nucleus. It also controls the movement of materials into and out of the nucleus. Is this a mitochondria?





This cell has only 7 parts: cell membrane, cytoplasm, mitochondria, vacuoles, nucleus, nuclear membrane, and chromosomes. Is this an animal cell or a plant cell?



8. Question

This cell part is the watery, gel-like area where other cell parts move around. Is this the nucleus?





This cell part stores food, water, and chemicals. Is this a vacuole?



10. Question

Does this toaster have cells?





Thank you for completing this material !!!

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