

Discover!

Science

SAMPLE
PDF

6A



Table of Contents

Chapter 1: Life

Lesson 1: Scientific Process	6
Lesson 2: Characteristics of Life.....	12
Lesson 3: Using a Microscope.....	19
Lesson 4: Classifying Life	26
Lesson 5: Using a Classification System.....	32
Lesson 6: Chapter 1 Review	39

Chapter 2: Cell Structure

Lesson 7: Cell Theory.....	48
Lesson 8: Parts of a Cell	55
Lesson 9: A Cell Is Like.....	62
Lesson 10: Photosynthesis and Cellular Respiration.....	68
Lesson 11: Chapter 2 Review	74

Chapter 3: Information in the Cell

Lesson 12: DNA	82
Lesson 13: Transcription and Translation	88
Lesson 14: The Cell Cycle.....	95
Lesson 15: Mitosis.....	102
Lesson 16: Meiosis	108
Lesson 17: Chapter 3 Review	115

Chapter 4: Introduction to Genetics

Lesson 18: Introduction to Genetics	124
Lesson 19: Calculating Inheritance with Punnett Squares	130
Lesson 20: Non-Mendelian Inheritance	136



Discover! Social Studies 6A

Published in Catasauqua, Pennsylvania
by Discover Press, a division of
Edovate Learning Corp.

334 2nd Street

Catasauqua, PA 18032

edovate.com

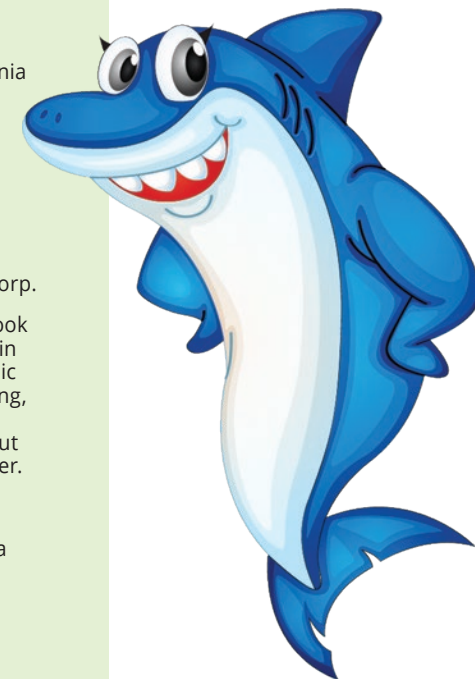
Copyright © 2021 Edovate Learning Corp.

All rights reserved. No part of this book
may be reproduced or transmitted in
any form or by any means, electronic
or mechanical, including photocopying,
recording, or by any information
storage and retrieval system, without
permission in writing by the publisher.

ISBN: 978-1-956330-32-8

Printed in United States of America

1st Edition



Lesson 8

Parts of a Cell

By the end of this lesson, you will be able to:

- name cellular organelles and their functions
- describe how the cell membrane controls which molecules can move into and out of the cell
- contrast the view that cell structures are engineered with the view that they evolved

Lesson Review

If you need to review the difference between eukaryotes and prokaryotes, please go to the lesson titled “Cell Theory.”

Academic Vocabulary

Read the following vocabulary words and definitions. Look through the lesson. Can you find each vocabulary word? Underline the vocabulary word in your lesson. Write the page number of where you found each word in the blanks.

- **cell membrane:** the organelle that holds the cell together and acts as a boundary for things to come in and go out of the cell (page ____)
- **cell wall:** the organelle unique to plant cells that gives the cell a rigid structure and helps to contain the water that comes into the cell (page ____)
- **central vacuole:** a very large organelle in plant cells that controls the flow of water in and out of the cell and stores the pigment seen in plant flowers (page ____)
- **centrosomes:** the organelles in animal cells that create structure and help the cell divide (page ____)

- **chloroplast:** the organelle responsible for the processes of photosynthesis within a plant (page ____)
- **cytoplasm:** a thick fluid made up of water, salts, and proteins that is inside all cells (page ____)
- **endoplasmic reticulum (ER):** the part of the cell that makes, packages, and transports protein and fat throughout the cell (page ____)
- **eukaryote:** the organisms that have cells with membrane-bound organelles (page ____)
- **Golgi apparatus:** an organelle that receives proteins from the ER and packages them into vesicles for transport to the cell’s membrane or out of the cell into the body (page ____)
- **mitochondria:** an organelle that performs cellular respiration and provides energy for the cell (page ____)
- **nucleolus:** the part of the nucleus that creates ribosomes (page ____)
- **nucleus:** the main organelle of a cell that contains all of the genetic information of the organism (page ____)
- **organelle:** a small structure within a cell that performs a specific task (page ____)
- **ribosomes:** the organelles that translate genetic information into amino acids and help make proteins (page ____)
- **vesicle:** the membrane-bound structures that transport proteins throughout the cell and across the cell membrane (page ____)

Materials Needed

craft materials or snack foods, hot glue, markers, colored pencils

Your cells have to translate genetic messages in order to create the amino acids and proteins that your body needs to function. If any of the messages get changed during translation, mutations can occur that cause issues like muscular dystrophy, Down's syndrome, and cystic fibrosis.

Muscular dystrophy is caused by a defective gene in the cells that produce the proteins that protect muscle fibers. This means that their muscles will break down over time and cause issues with walking and using their arms. Some forms even affect the muscles used in breathing and by the heart.

Down's syndrome is a genetic disorder caused by a miscommunication during cell division that gives them a third copy of the twenty-first chromosome. This causes distinct facial features, as well as developmental and intellectual delays. Some people with Down's syndrome may also struggle with thyroid and heart issues.

Cystic fibrosis is an inherited disorder that is caused by a mutation in the gene responsible for the creation of mucus, sweat, and digestive juices. This mutation makes the various secretions thick and sticky, which causes blockages in the lungs, pancreas, and other organs.

Take some time to research other disorders that occur because of genetic mutations.

How can one miscommunication or mistranslation within a cell cause issues for people and other organisms?



IN THE REAL WORLD



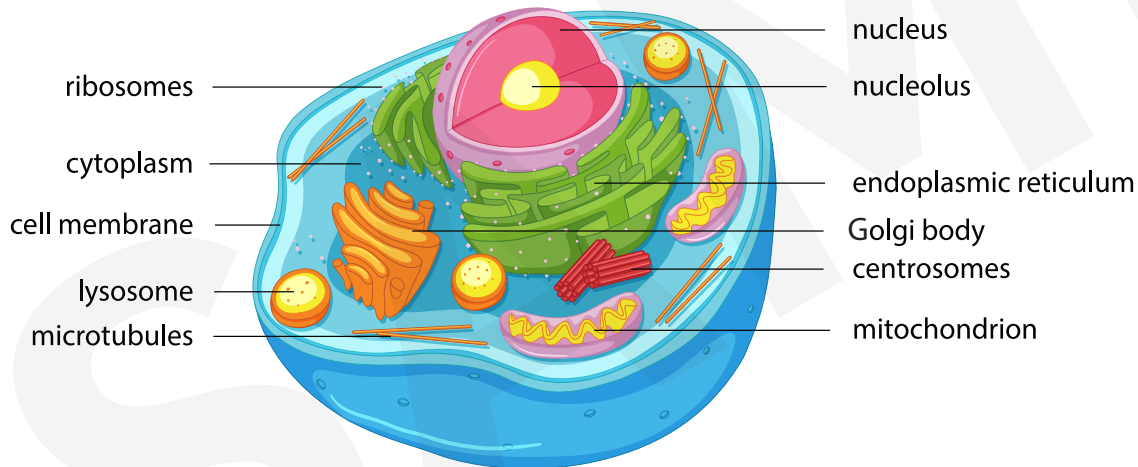
Mutations occur when the genetic sequence of an organism's DNA is changed and is often passed down from parent to child. Many times, these mutations go unnoticed or they can cause issues, but sometimes mutations actually benefit an organism. One great example of this is a mutation discovered in the people who live in Limone, Italy. The mutation causes them to create high levels of high-density lipoprotein, and this prevents fat buildup in their arteries. There is virtually no heart disease in that area because of this mutation!

Research other beneficial mutations in the world. When are mutations a positive occurrence?

Basic Cell Organelles

In the last chapter, you learned that all living things are made up of cells. They are the smallest, living building blocks of life. They can grow, react to stimuli, reproduce, and perform complex functions to maintain homeostasis. How do they do this? Cells have genetic information (usually DNA) and small structures within a cell that perform a specific task. These structures are called **organelles**, and they are just tiny organs inside each cell. **Eukaryotes** are organisms that have cells with membrane-bound organelles that float in the **cytoplasm**, a thick fluid made up of water, salts, and proteins. This means that the cell's organelles are separated from one another as they each perform a special job. Plants and animals are eukaryotes and their cells have many of the same organelles.

Anatomy of an Animal Cell



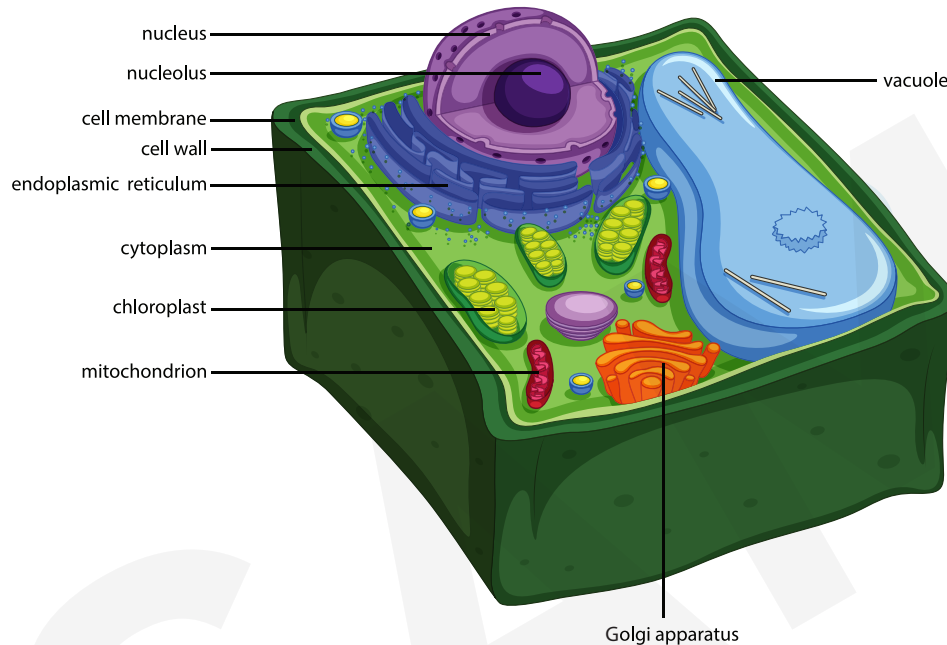
Animal cells and plant cells both have the following organelles:

- A **nucleus** contains all of the genetic information of the organism and determines the function of the cell. Inside the nucleus is the **nucleolus**. This is the organelle that determines which proteins a cell creates.
- **Ribosomes** are organelles that are found in every cell, including prokaryotes. Their job is to decode the DNA in the cell and determine the amino acid sequence the cell needs to create proteins. They can be found floating freely or attached to other organelles.
- The **endoplasmic reticulum (ER)** is made up of two parts. The rough ER, which has ribosomes attached to it, and the smooth ER, which does not have any ribosomes. The ER's job is to create proteins and transport them throughout the cell.
- The **Golgi apparatus** receives proteins from the ER and packages them into **vesicles**, which are membrane-bound structures that transport them to the cell's membrane or out of the cell into the body.
- The **mitochondria** are where cellular respiration takes place. They produce all of the energy that the cell needs.
- The **cell membrane** holds the cell together and acts as a boundary for things to come in and go out of the cell. The cell membrane is also responsible for maintaining homeostasis in all cells.
- **Microtubules** are small structures that help in creating a cell's shape, cell division, and protein transportation.

Specialty Organelles

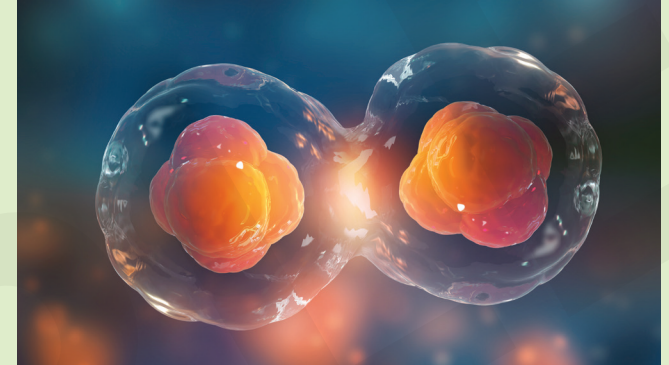
While many parts of animal and plant cells are the same, there are a few differences. For example, animal cells contain **lysosomes** that break down and recycle old organelles and **centrosomes** that create structure and help the cell divide. Plant cells also have some highly specialized organelles that are obviously different from animal cells.

Anatomy of a Plant Cell



The plant cell contains three organelles that have special functions unique to plants:

- A **cell wall** gives the cell a rigid structure and helps to contain the water inside the cell.
- The **central vacuole** is a very large organelle that controls the flow of water in and out of the cell and stores the pigment seen in plant flowers.
- **Chloroplasts** are responsible for the processes of photosynthesis within a plant. This is the process that uses sunlight, carbon dioxide, and water to make food for the plant.



Each cell is like a little city with a main governing building, a post office, garbage trucks, and highways. But how did they get that way? There are two main views in the scientific world. One is that they evolved into their complex form over many, many years. The other is that they were designed by a creator.

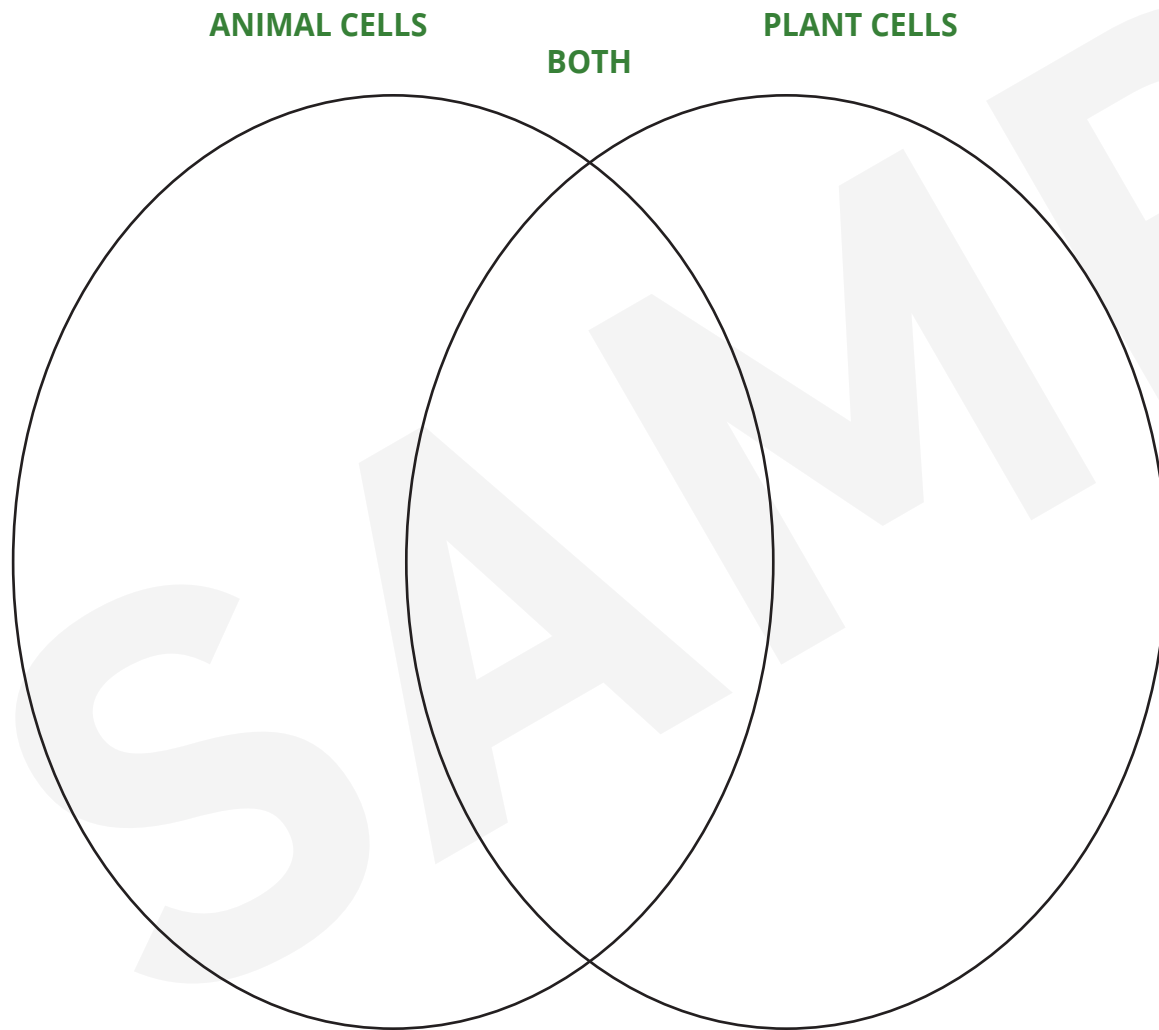
Those who believe that cells evolved theorize that organic molecules (most likely amino acids) spontaneously formed about 3.8 million years ago. Then they started to come together to form proteins, and those proteins came together to form the first cells. These cells continued to come together and evolve to form various organisms.

Those who believe that cells were designed by a creator explain that cells are just too intricate and well designed to have just happened. They believe that the structures and functions of cells could not have developed without the guidance of an intelligent creator.

PRACTICE

Fill in the Venn diagram to show which organelles are unique to animal and plant cells and which organelles they share.

Word Bank: nucleus nucleolus ribosome endoplasmic reticulum
cell wall cell membrane central vacuole chloroplasts
Golgi apparatus lysosomes centrosomes mitochondria microtubules



REVIEW

In this lesson, you learned:

- Eukaryotes are organisms that have cells with membrane-bound organelles, like a nucleus and endoplasmic reticulum.
- Animal and plant cells share many of the same organelles.
- The nucleus contains all of the organism's DNA and creates the ribosomes that translate the genetic information into amino acids. The ER and Golgi apparatus package the amino acids into proteins and transport them in vesicles within the cell and through the cell membrane.
- The cell membrane maintains homeostasis within the cell.
- Some scientists believe that cells evolved over a long period of time, while others believe that they were designed by an intelligent creator.

Think About It

How do the organelles within a cell work together? How does the cell membrane aid in maintaining homeostasis?

Creating Cells

Use craft materials or snack foods to create a model of either an animal cell or a plant cell. Make sure to include all of the organelles you learned about in this lesson and do some research to learn more about what they look like. Your model should be three-dimensional and as accurate as possible.

Explore how the different organelles fit and work together within the cell. Make sure to label each of the different parts of the cell, and then present it to a friend or family member. Can you explain what each of the organelles do?



How do the organelles in a cell work together to help the cell function?

Fill in the correct word to complete the statement.

1. The _____ is the organelle that is split into two types—rough and smooth—and its job is to create proteins.
2. _____ are small organelles that translate genetic information into amino acids.
3. The job of creating food from sunlight, carbon dioxide, and water belongs to the _____.
4. The _____ is responsible for creating ribosomes.
5. The _____ packages up proteins into vesicles for transportation throughout the cell and through the cell membrane.
6. The _____ is the organelle that is responsible for cellular respiration and creating the cell's energy.
7. The _____ is the organelle that contains all of the genetic information for the organism.
8. The _____ is responsible for maintaining homeostasis within the cell.

Circle the correct answer.

9. Which kind of cells contain membrane-bound organelles?
 A. prokaryote C. bacteria
 B. eukaryote D. none of the above

ONLINE CONNECTION

Search online for a “virtual cell lab” and work through one of the labs that you find. Explore the various structures of different cells and how they work together. These activities will allow you to explore the more detailed and complex structures of a cell.

10. Which organelle unique to a plant cell is responsible for the flow of water in and out of the cell, as well as storing pigment?
 A. cell wall C. central vacuole
 B. chloroplasts D. lysosome
11. The rough endoplasmic reticulum has that name because of the texture it has when it is observed through a microscope. What is attached to this organelle that gives it a rough look?
 A. ribosomes C. centrosomes
 B. vesicles D. mitochondria

Answer the following question with complete sentences.

12. What is the difference between the scientific viewpoints of cell design and cell evolution?

.....

.....

.....

Discover! K-12 Curriculum Advantage

When students become so curious about the world around them that they are determined to set out on a journey of exploration, their “discoveries” are inspirational.

Welcome to a new world of curriculum designed to open your child's eyes as well as their minds, to learn, grow, and thrive in a homeschool setting. Welcome to Discover!

To learn more, contact us at:
discover@edovate.com or visit
DiscoverK12Books.com