Mr. Hammond

6th Grade Science

Calamity Day Assessments

***Day 6***

**The Main Parts of Cell**

Read and complete questions.

***Day 7***

**Cells**

Complete review assessment

***Day 8***

**Genetics: The Science of Heredity**

Complete review assessment

# The Main Parts of a Cell

## What Are the Main Parts of a Cell?

Most cells have several factors in common. In this lesson, you will learn to be able to identify the three main parts found in most cells and describe their functions. The three main parts of most cells and their descriptions are shown below. Most cells include a nucleus, the cytoplasm, and the cell membrane.

## Nucleus

Long strands of chromosomes that contain **deoxyribonucleic acid (DNA)** are located in the **nucleus**. DNA is the hereditary material or the genetic blueprint for the organism. This is important for the reproduction of new cells. The nucleus is usually found near the cell's center and can be round or egg-shaped. It is usually darker in color than the rest of the cell. It is the control center of the cell. It controls all of the life processes that go on inside the cell. It is often referred to as the "brains" of the outfit.

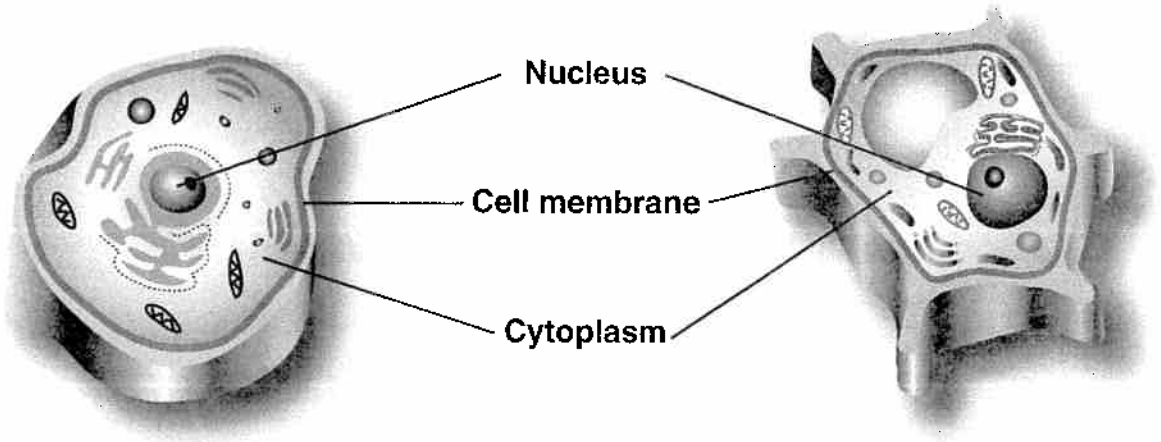
## Cytoplasm

Most of the cell is made up of **cytoplasm**. It contains all the living material in a cell except for the nucleus. This gel-like area of the cell contains the chemicals needed by the cell. It resembles the white part of a raw egg. This is where most of the activities take place, as it contains all of the other cell parts, or **organelles**.

## Cell Membrane

The **cell membrane** is a thin layer that encloses the cell and controls the movement of materials into and out of the cell; it offers protection and shapes the cell. It surrounds and holds the cell together. It is often referred to as the "gatekeeper" for the cell. The cell membrane seems to know which materials to let into the cell and which materials to let out of the cell.

**ANIMAL CELL** **PLANT CELL**

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# What Are Other Cell Parts?

## Organelles

You can compare the cell to a school. There are many components of the school that help it run. Each component has a special job to do, and they must all work together to run the school. The components of the cell are called **organelles** (or guh NELS). Organelles are small structures that float in the gel-like cytoplasm. Each organelle must perform its unique job to keep the cell working properly. The cell is a unique miniaturization of life's functions. It moves, reacts, protects itself, grows, and reproduces more cells like itself. It has a control center, power plants, internal communication, and construction and manufacturing elements. Now that you know the three main parts of a cell, let's take a closer look at the amazing components called organelles that are responsible for keeping the cell alive.

## Business in a Small World

Keeping the cell in operation is the work of many different organelles. Of course, you've already learned that the nucleus is the part of the cell that keeps everything in control. Cells need power (energy) to keep things humming along. Where does the energy come from that keeps a runner going at full-blast? It comes from a tiny, sausage-shaped pod with the Greek name **mitochondrion** (MYT uh KAHN dree un). Its job is to produce the power or energy needed by burning food obtained or produced in the cell. The mitochondrion is the seat of power—the powerhouse of the cell.

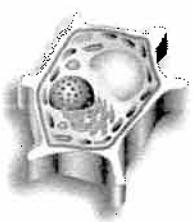
The cell needs to be able to deliver the goods produced just like a manufacturing plant needs to deliver goods to its customers. The **endoplasmic reticulum** (EN doh PLAS mik ri TIK yoo lum), or ER, is a tube-like network that enables the cell to transport (deliver) material where it is needed. ER is the transfer-and-delivery setup. The prime building material for the cell is **protein**. All living things need protein for growth. Inside every cell are small round structures that make the protein, called **ribosomes**. Sometimes they operate in isolation, but usually they are found along the edge or linked to the ER. The protein is then wrapped or packaged for shipment in a complex called the **Golgi** (GOL jee) **body**. Golgi bodies, stacks of protein-filled sacs, store and package the protein the cell exports. As needed, bits of the Golgi complex breaks off, and the protein, neatly packaged, goes to market.

The **vacuoles** (VAK yoo wohls), another cell organelle, are liquid-filled spaces inside the cell that serve as storage bins. They store water, food, and waste for the cell. Inside plant cells, you will find that the vacuole is very large. Animal cells have numerous small vacuoles.

Other organelles in the cytoplasm of plant cells are green, disc-shaped structures that contain chlorophyll called **chloroplasts**. It is the chloroplast that allows the plant to make its own food.

**A typical animal cell**

**A typical plant cell**



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# Comparing Plant and Animal Cells

All cells are classified into one of four categories. **Free-living plant cells** form single-celled, plant-like organisms. **Free-living animal cells** form single-celled, animal-like organisms. **Associated plant cells** live in communities in association with each other to form the multicellular organism that makes its own food—trees, bushes, and flowering plants make up this group. **Associated animal cells** also live in communities in association with each other to form the multicellular organism that moves about in order to obtain food—dogs, butterflies, elephants, and people make up this group.

Plant cells are different from animal cells. They have a rectangular shape and are more rigid because they have a non-living structure called a **cell wall** that surrounds the cell membrane. They also contain tiny disc-shaped structures called **chloroplasts**. Chloroplasts allow the cell to make its own food by a process called **photosynthesis**. After reading this lesson, you should be able to identify the ways in which plant and animal cells are alike and different.

As you have already learned, all living things are made up of cells. Some living things, such as plants and animals, are made up of many cells. These cells have many similarities as well as many differences.

## A) Similarities: Cell Comparisons

- Both have a cell membrane that surrounds the cell.
- Both are filled with a gel-like substance called cytoplasm that contains all of the materials needed by the cell.
- Both have a nucleus where DNA is stored.
- Both have ribosomes that make proteins needed by the cell.
- Both have mitochondria, or a power source, that breaks down food and releases energy.
- Both have vacuoles that contain food, water, and waste products. Animal cells usually have more and smaller vacuoles than plant cells do.
- Both have endoplasmic reticulum, or ER, a system of tubes that transport proteins.
- Both have Golgi bodies, which package and distribute proteins outside the cell.

## B) Differences: Cell Contrasts

- A plant cell has a cell wall that surrounds the cell membrane and provides shape and support; an animal cell does not.
- Plant cells have chloroplasts for photosynthesis; animal cells do not.
- Plant cells are more rectangular or brick-shaped; animal cells are more rounded.
- Plants use chloroplasts to store energy in sugar; animal cells use mitochondria to release energy stored in food.
- Plants have only one large vacuole; animal cells have several small ones.
- Plant cells lack lysosomes; animal cells have these.

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Name: _____ Date: _____

# The Parts of a Cell: *Reinforcement Activity*

**To the student observer:** Explain what organelles are.

_____

_____

**Analyze:** Which cells would contain more mitochondria: skin cells or muscle cells? Why?

_____

_____

_____

**Directions:** Answer the following questions.

1. Why does a cell need energy? _____

   _____

2. List the three main parts of the cell and describe the function of each.

   a. _____

   b. _____

   c. _____

3. Which structure in a cell makes protein? _____

4. Which structure is responsible for the transportation and delivery of materials?

   _____

5. What is stored in cell vacuoles? _____

6. What are three ways in which plant cells differ from animal cells?

   a. _____

   b. _____

   c. _____

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Name: _____ Class: _____ Date: _____ ID: A

# Cells

**Multiple Choice**
*Identify the letter of the choice that best completes the statement or answers the question.*

____ 1. What is the total magnification of a microscope with two lenses when one lens has a magnification of 10, and the other lens has a magnification of 30?
a. 150
b. 300
c. 200
d. 450

____ 2. Which of the following statements is part of the cell theory?
a. Only plants are composed of cells.
b. All cells are produced from other cells.
c. Cells can be produced from nonliving matter.
d. Only animals are composed of cells.

____ 3. Which of the following statements is NOT part of the cell theory?
a. Cells are the basic unit of structure and function in living things.
b. All cells are produced from other cells.
c. Only animals are composed of cells.
d. All living things are composed of cells.

____ 4. What does the term *magnification* refer to?
a. how sharp and clear an image is
b. the ability to make things look larger than they are
c. how many lenses a microscope uses
d. how much light is needed to see an image

____ 5. What is the function of a cell membrane?
a. to support the cell
b. to perform different functions in each cell
c. to control what enters and leaves the cell
d. to form a hard outer covering for the cell

____ 6. Which organelle is the control center of a cell?
a. mitochondrion
b. ribosome
c. nucleus
d. chloroplast

____ 7. What is the function of a cell wall?
a. to protect and support the cell, and give the cell shape
b. to perform different functions in each cell
c. to prevent water from passing through it
d. to prevent oxygen from entering the cell

____ 8. Unlike the cell wall, the cell membrane
a. is found in all cells.
b. is made of chromatin.
c. protects the nucleus with a rigid layer of cellulose.
d. produces energy for the cell.

____ 9. Which organelles store food, water, and waste needed by the cell?
a. mitochondria
b. chloroplasts
c. ribosomes
d. vacuoles

____ 10. Which organelles release chemicals that break down large food particles into smaller ones to help with digestion?
a. endoplasmic reticulum
b. Golgi bodies
c. lysosomes
d. vacuoles

____ 11. The invention of the this instrument which uses lenses to make small objects look large allowed us to see cells.
a. plants.
b. microscope.
c. animals.
d. cells.

**Modified True/False**
*Indicate whether the sentence or statement is true or false. If false, change the identified word or phrase to make the sentence or statement true.*
*3 are False, 1 is True*
*Word Bank: electrons, chloroplasts, endoplasmic reticulum*

____ 12. Organelles that use energy from sunlight to produce food are called mitochondria.
_____

____ 13. Mitochondria are the "powerhouses" of the cell because they produce most of the energy that the cell needs.
_____

____ 14. The Golgi body is a series of passageways that carry and transport materials from one part of the cell to another. _____

____ 15. Electron microscopes use a beam of light to produce a magnified image. _____

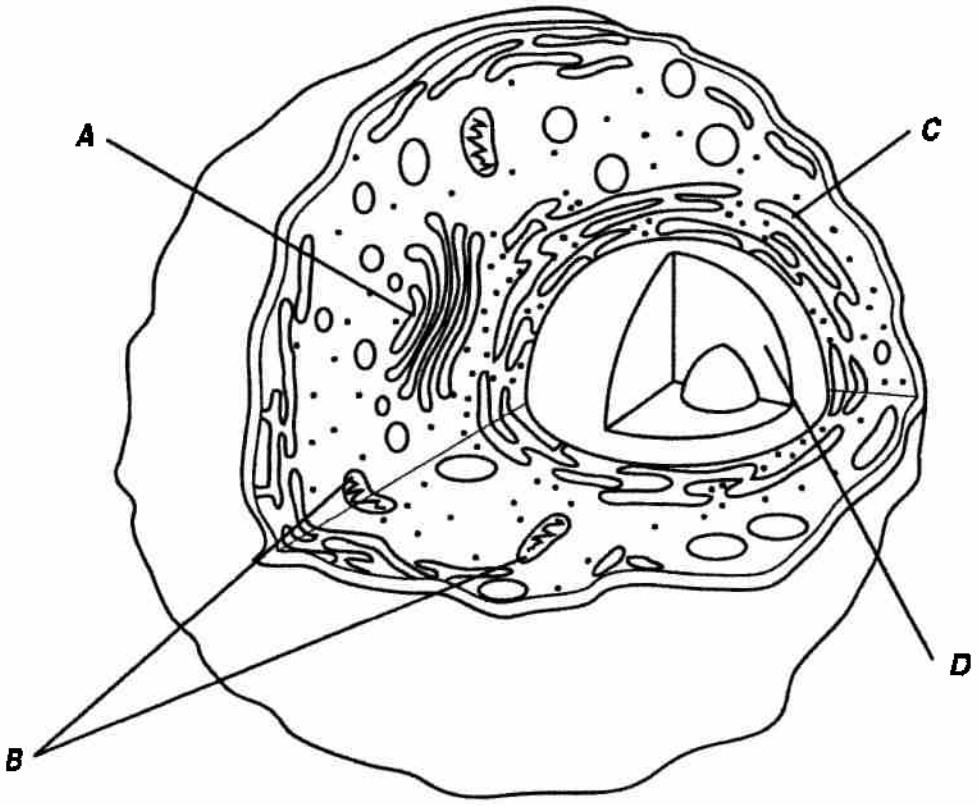
**Completion**
*Complete each sentence or statement.*
*Word Bank: function, convex, ribosomes, resolution, compound, chromatin*

16. A light microscope that has two or more lenses is called a(n) _____ microscope.
17. Cells are the basic units of structure and _____ in living things.
18. The sharpness and clearness of an image produced by a microscope is called _____.
19. A lens that is thicker in the center than at the edges is called a(n) _____ lens.
20. The nucleus of a cell has thin strands of _____ that contain the DNA.
21. Small molecules called _____ make up proteins.

**Short Answer**

*Use the diagram to answer each question. The diagram is of an animal cell.*
*Word Bank: Mitochondria, Nucleus, Endoplasmic Reticulum*
*Letter A is the Golgi Body.*

***Cell Structures***




22. Structure A is a Golgi body. Describe its function.
The Golgi body is a structure
that_____.

23. Identify the structures labeled B and describe their function. The structures are
_____, and their job is to make
_____ for the cell.

24. Identify structure C and describe its function. Structure C is the _____, and
_____is the job it performs for
the cell.

25. Identify the large round structure labeled D and describe its function. Structure D is the
_____, and it has the job of
_____ for the cell.

**Essay**

26. You are looking at the inside of a cell. Explain how you can tell whether the cell is animal or plant.

_____

_____

_____

_____

# Genetics: The Science of Heredity

## Multiple Choice

*Write the letter of the correct answer on the line at the left.*

____ 1. An allele whose trait always shows up in an organism when the allele is present is a
   a. mutation.
   b. dominant allele.
   c. recessive allele.

____ 2. When a plant has two dominant alleles for tall stems, its alleles are written as
   a. *TT*.
   b. *tt*.
   c. *Tt*.

____ 3. The likelihood that a certain event will happen is called
   a. genetics.
   b. heredity.
   c. probability.

____ 4. An organism's phenotype is its
   a. physical appearance.
   b. genetic makeup.
   c. allele combination.

____ 5. For codominant traits, heterozygous organisms have a phenotype that shows
   a. only the recessive allele.
   b. only the dominant allele.
   c. both alleles.

____ 6. If the body cells of an organism have 12 chromosomes, how many chromosomes do the sex cells have?
   a. 12
   b. 24
   c. 6

____ 7. Punnett squares are useful because they show the
   a. actual results of a genetic cross.
   b. possible results of a genetic cross.
   c. effects of mutations.

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____ 8. The main function of genes is to control
- **a.** the production of proteins.
- **b.** where a cell divides.
- **c.** when sex cells are made.

____ 9. The cytoplasm is the part of the cell in which
- **a.** DNA is located.
- **b.** proteins are made.
- **c.** RNA is made.

____ 10. In the first stage of protein synthesis,
- **a.** transfer RNA carries an amino acid to the ribosome.
- **b.** messenger RNA is made using DNA as the pattern.
- **c.** the ribosome releases the protein chain.

## Completion

*Read each word in the box. In each sentence below, fill in the correct word. Not all of the words will be used.*

| | | |
|---|---|---|
| alleles | genes | heterozygous |
| meiosis | mutation | homozygous |

**11.** The different forms of a gene are called _____.

**12.** An organism that has two different alleles for a trait is _____.

**13.** According to the chromosome theory of inheritance, _____ are carried from parents to offspring on chromosomes.

**14.** The process by which the number of chromosomes is reduced by half to form sex cells is _____.

**15.** A change in a gene or chromosome is a(an) _____.

## True or False

*If a statement is true, write* true. *If it is false, write* false.

_____ **16.** The passing of traits from parents to offspring is called codominance.

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_____ **17.** Probability is a number that describes how likely it is that an event will happen.

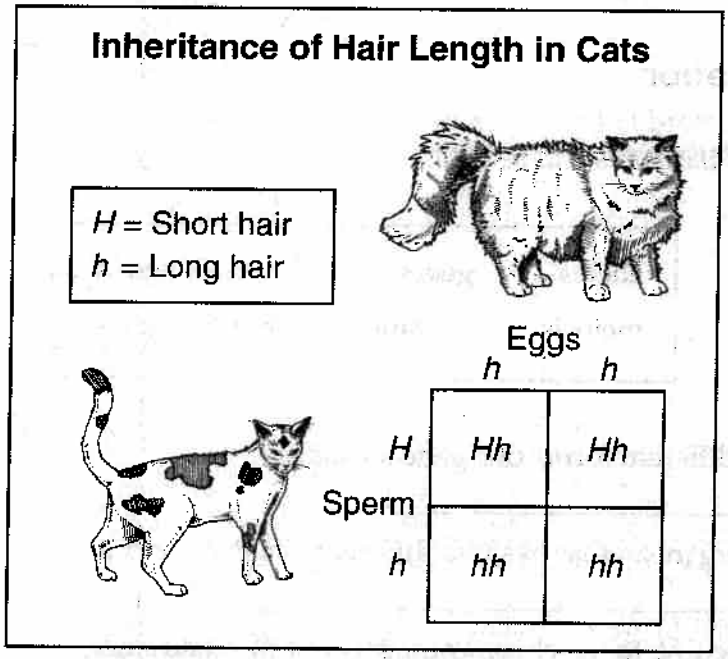
_____ **18.** Each time a coin is tossed, there is a 75 percent chance that the coin will land heads up.

_____ **19.** Chromosomes are made up of proteins joined together like beads on a string.

_____ **20.** Unlike DNA, RNA has the nitrogen base uracil.

## Using Science Skills

*The diagram below shows a cross between two cats. Use the diagram to answer questions 21, 22, and 23.*




____ **21. Interpreting Diagrams** What alleles for hair length could egg cells possibly have?

**a.** only H

**b.** only h

**c.** both H and h

____ **22. Interpreting Diagrams** What is the phenotype of offspring that are hh?

**a.** long hair

**b.** short hair

**c.** wavy hair

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____ **23. Applying Concepts** What is the probability that the offspring will have long hair?

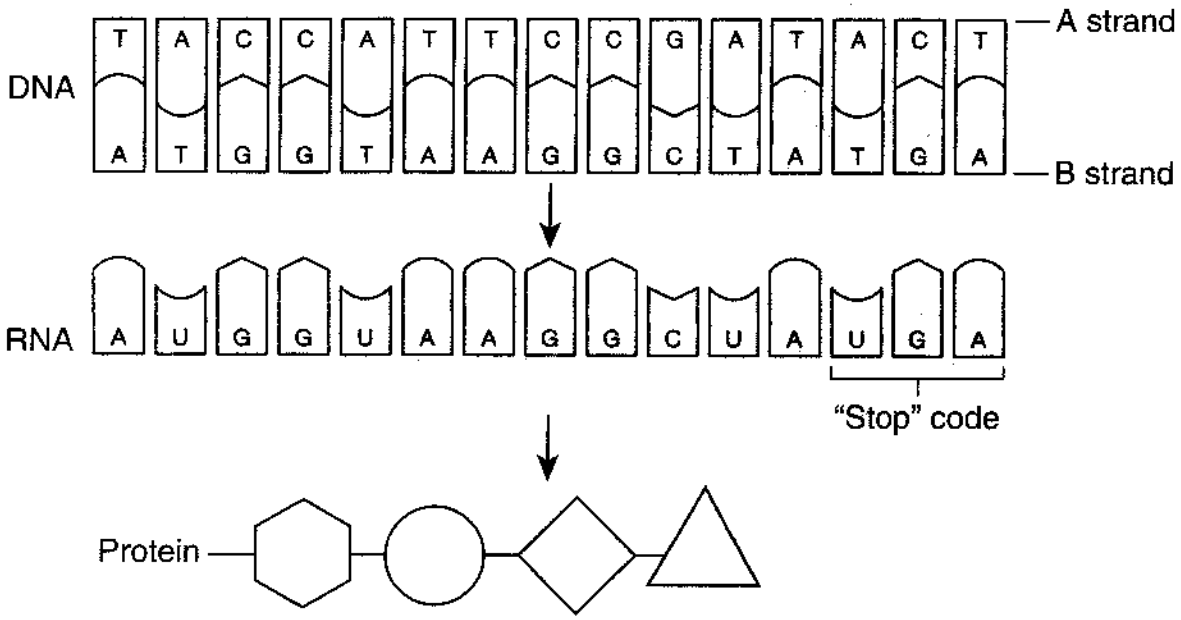
**a.** 1 in 4

**b.** 2 in 4

**c.** 3 in 4

## Using Science Skills

*Use the diagram below to answer questions 24 and 25.*




____ **24. Applying Concepts** What process is shown in this diagram?

**a.** meiosis

**b.** DNA replication

**c.** protein synthesis

____ **25. Inferring** Which strand of the DNA molecule was used to make the messenger RNA?

**a.** A strand

**b.** B strand

**c.** neither A strand nor B strand

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