

CELLS

1. Study the table and tick off what applies to each cell (animal and plant).

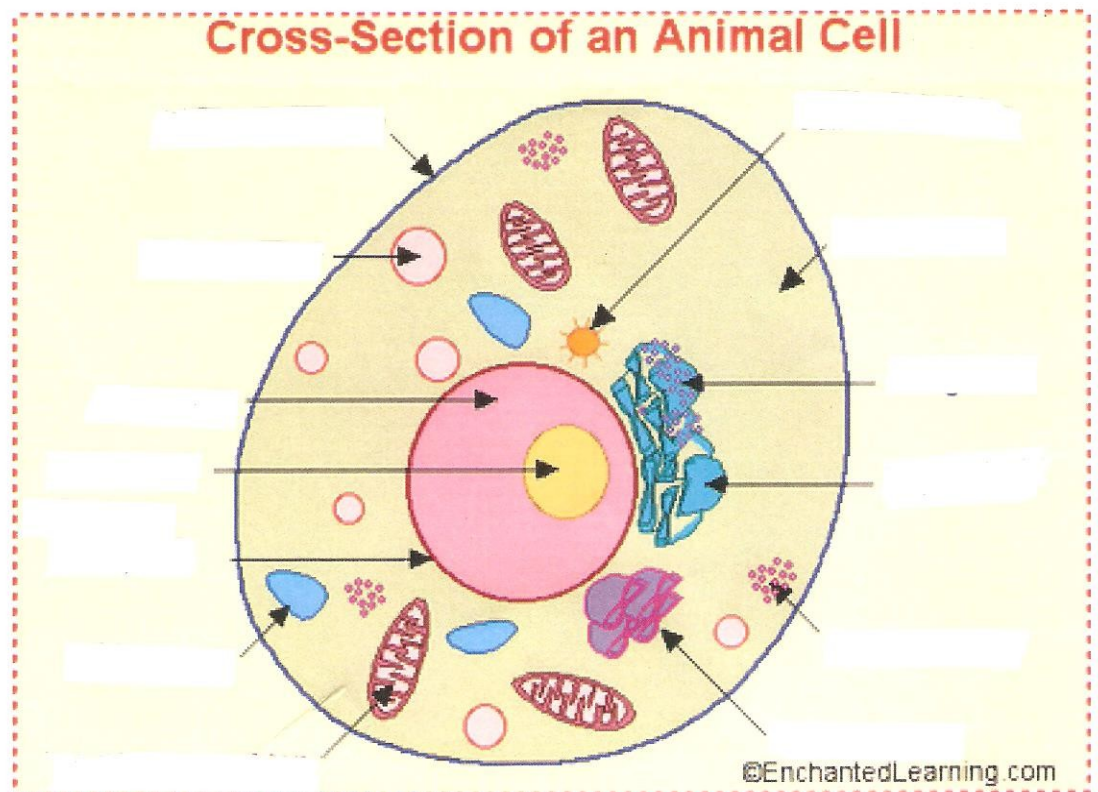
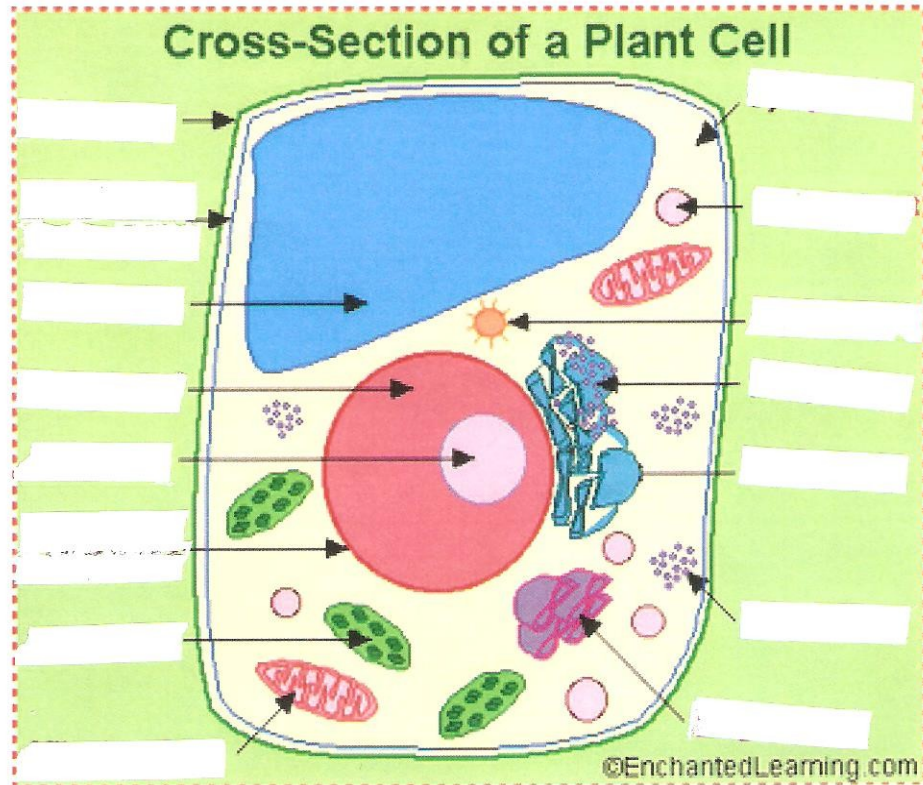
organelles		animal cell	plant cell
cell membrane	/ˈmɛmbreɪn/		
cell wall			
lysosome	/ˈlaɪsə,soʊm/		
nucleus	/ˈnuːkliəs, ˈnyu-/		
nucleolus	/nuːkliələs, nyu-/		
nuclear membrane	/ˈnuːkliər, ˈnyu-/		
centrosome	/ˈsɛntrə,soʊm/		
cytoplasm	/ˈsaɪtəplæzəm/		
rough ER (endoplasmic reticulum)	/rɪˈtɪkyləm/		
chloroplast	/ˈklɒrəplæst, ˈkloʊr-/		
smooth ER	/rɪˈtɪkyləm/		
ribosomes	/ˈraɪbə,soʊm/		
vacuole	/ˈvækju,ʊl/		
mitochondrion, pl. mitochondria	/ˌmaɪtəˈkɒndriən/, pl./-driən/		
amyloplast	/ˈæməloʊplæst/		
Golgi apparatus	/ˈgɔldʒi/ /ˌæpəˈrætəs, -ˈreɪtəs/		

2. Now use comparing/contrasting markers from the last lesson to talk about the two types of cells.

3. Label the parts of each cell (see the pictures).

Plant cell: cell wall, cell membrane, vacuole, golgi body, ribosomes, smooth ER, chloroplast, nuclear membrane, mitochondrion, cytoplasm, amyloplast, rough ER, centrosome, nucleus, nucleolus

Animal cell: cell membrane, nuclear membrane, mitochondrion, lysosome, vacuole, golgi body, centrosome, nucleus, cytoplasm, nucleolus, ribosomes, smooth ER, rough ER



4. **Work in pairs. Student A will describe a plant cell to student B. Then student B will describe an animal cell to student A.** Start with an introductory statement of what the picture shows and then carry on referring to the colour, shape and position of the organelles.

Useful phrases:

What we can see in the picture is...

The picture shows...

In the picture we can see...

What we can see here is the picture of...

+all the phrases to describe location from our lesson on laboratory equipment

5. **Looking for specific information. Skim the glossary of terms below and answer the questions.**

- a. Where does the digestion of cell nutrients take place?
- b. What converts the energy stored in glucose into ATP?
- c. What surrounds the nucleus?
- d. Where is ribosomal RNA produced?
- e. Characterize the substance of cytoplasm.
- f. What is the function of a cell wall?
- g. What does chloroplast contain?
- h. Where does protein synthesis take place?

The following is a glossary of animal cell terms:

cell membrane - the thin layer of protein and fat that surrounds the cell. The cell membrane is semipermeable, allowing some substances to pass into the cell and blocking others.

centrosome - (also called the "microtubule organizing center") a small body located near the nucleus - it has a dense center and radiating tubules. The centrosomes is where microtubules are made. During cell division (mitosis), the centrosome divides and the two parts move to opposite sides of the dividing cell. The centriole is the dense center of the centrosome.

cytoplasm - the jellylike material outside the cell nucleus in which the organelles are located.

Golgi body - (also called the Golgi apparatus or Golgi complex) a flattened, layered, sac-like organelle that looks like a stack of pancakes and is located near the nucleus. It produces the membranes that surround the lysosomes. The Golgi body packages proteins and carbohydrates into membrane-bound vesicles for "export" from the cell.

lysosome - (also called cell vesicles) round organelles surrounded by a membrane and containing digestive enzymes. This is where the digestion of cell nutrients takes place.

mitochondrion - spherical to rod-shaped organelles with a double membrane. The inner membrane is infolded many times, forming a series of projections (called cristae). The mitochondrion converts the energy stored in glucose into ATP (adenosine triphosphate) for the cell.

nuclear membrane - the membrane that surrounds the nucleus.

nucleolus - an organelle within the nucleus - it is where ribosomal RNA is produced. Some cells have more than one nucleolus.

nucleus - spherical body containing many organelles, including the nucleolus. The nucleus controls many of the functions of the cell (by controlling protein synthesis) and contains DNA (in chromosomes). The nucleus is surrounded by the nuclear membrane.

ribosome - small organelles composed of RNA-rich cytoplasmic granules that are sites of protein synthesis.

rough endoplasmic reticulum - (rough ER) a vast system of interconnected, membranous, infolded and convoluted sacks that are located in the cell's cytoplasm (the ER is continuous with the outer nuclear membrane). Rough ER is covered with ribosomes that give it a rough appearance. Rough ER transports materials through the cell and produces proteins in sacks called cisternae (which are sent to the Golgi body, or inserted into the cell membrane).

smooth endoplasmic reticulum - (smooth ER) a vast system of interconnected, membranous, infolded and convoluted tubes that are located in the cell's cytoplasm (the ER is continuous with the outer nuclear membrane). The space within the ER is called the ER lumen. Smooth ER transports materials through the cell. It contains enzymes and produces and digests lipids (fats) and membrane proteins; smooth ER buds off from rough ER, moving the newly-made proteins and lipids to the Golgi body, lysosomes, and membranes.

vacuole - fluid-filled, membrane-surrounded cavities inside a cell. The vacuole fills with food being digested and waste material that is on its way out of the cell.

<http://www.enchantedlearning.com/subjects/animals/cell/>

The following is a glossary of plant cell anatomy terms.

amyloplast - an organelle in some plant cells that stores starch. Amyloplasts are found in starchy plants like tubers and fruits.

ATP - ATP is short for adenosine triphosphate; it is a high-energy molecule used for energy storage by organisms. In plant cells, ATP is produced in the cristae of mitochondria and chloroplasts.

cell membrane - the thin layer of protein and fat that surrounds the cell, but is inside the cell wall. The cell membrane is semipermeable, allowing some substances to pass into the cell and blocking others.

cell wall - a thick, rigid membrane that surrounds a plant cell. This layer of cellulose fibre gives the cell most of its support and structure. The cell wall also bonds with other cell walls to form the structure of the plant.

centrosome - (also called the "microtubule organizing centre") a small body located near the nucleus - it has a dense center and radiating tubules. The centrosomes is where microtubules are made. During cell division (mitosis), the centrosome divides and the two parts move to opposite sides of the dividing cell. Unlike the centrosomes in animal cells, plant cell centrosomes do not have centrioles.

chlorophyll - chlorophyll is a molecule that can use light energy from sunlight to turn water and carbon dioxide gas into sugar and oxygen (this process is called photosynthesis). Chlorophyll is magnesium based and is usually green.

chloroplast - an elongated or disc-shaped organelle containing chlorophyll. Photosynthesis (in which energy from sunlight is converted into chemical energy - food) takes place in the chloroplasts.

cristae - (singular crista) the multiply-folded inner membrane of a cell's mitochondrion that are finger-like projections. The walls of the cristae are the site of the cell's energy production (it is where ATP is generated).

cytoplasm - the jellylike material outside the cell nucleus in which the organelles are located.

Golgi body - (also called the Golgi apparatus or Golgi complex) a flattened, layered, sac-like organelle that looks like a stack of pancakes and is located near the nucleus. The Golgi body packages proteins and carbohydrates into membrane-bound vesicles for "export" from the cell.

granum - (plural grana) A stack of thylakoid disks within the chloroplast is called a granum.

mitochondrion - spherical to rod-shaped organelles with a double membrane. The inner membrane is infolded many times, forming a series of projections (called cristae). The mitochondrion converts the energy stored in glucose into ATP (adenosine triphosphate) for the cell.

nuclear membrane - the membrane that surrounds the nucleus.

nucleolus - an organelle within the nucleus - it is where ribosomal RNA is produced.

nucleus - spherical body containing many organelles, including the nucleolus. The nucleus controls many of the functions of the cell (by controlling protein synthesis) and contains DNA (in chromosomes). The nucleus is surrounded by the nuclear membrane

photosynthesis - a process in which plants convert sunlight, water, and carbon dioxide into food energy (sugars and starches), oxygen and water. Chlorophyll or closely-related pigments (substances that colour the plant) are essential to the photosynthetic process.

ribosome - small organelles composed of RNA-rich cytoplasmic granules that are sites of protein synthesis.

rough endoplasmic reticulum - (rough ER) a vast system of interconnected, membranous, infolded and convoluted sacks that are located in the cell's cytoplasm (the ER is continuous with the outer nuclear membrane). Rough ER is covered with ribosomes that give it a rough appearance. Rough ER transport materials through the

cell and produces proteins in sacks called cisternae (which are sent to the Golgi body, or inserted into the cell membrane).

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stroma - part of the chloroplasts in plant cells, located within the inner membrane of chloroplasts, between the grana.

thylakoid disk - thylakoid disks are disk-shaped membrane structures in chloroplasts that contain chlorophyll. Chloroplasts are made up of stacks of thylakoid disks; a stack of thylakoid disks is called a granum. Photosynthesis (the production of ATP molecules from sunlight) takes place on thylakoid disks.

vacuole - a large, membrane-bound space within a plant cell that is filled with fluid. Most plant cells have a single vacuole that takes up much of the cell. It helps maintain the shape of the cell.

<http://www.enchantedlearning.com/subjects/plants/cell/>

6. Write a comparison of an animal and a plant cell. Include both, similarities and differences.

7. **GRAMMAR REVISION: verbs and prepositions.** Some verbs are generally used with certain prepositions. Read the text comparing an animal and a plant cell, and fill in the gaps with missing prepositions.

Cells vary widely 1. _____ form and function, even within the same organism. The human body, for example, is made 2. _____ about two hundred different types of specialized cells, ranging 3. _____ foot-long nerve cells _____ tiny, disk-shaped blood cells.

Plant and animal cells have nearly all of the most important cell structures in common. For example, both plant and animal cells have a nucleus, which contains the cell's genetic material, or DNA. Plant and animal cells also have some of the same organelles floating 4. _____ the cytoplasm, the fluid-filled region between the cell membrane and the nucleus. Mitochondria, the cell's "powerhouses," create energy through the process of aerobic respiration; ribosomes are responsible for synthesizing proteins; the endoplasmic reticulum stores and transports proteins and other compounds within and outside the cell; Golgi bodies transform proteins 5. _____ more complex molecules; and lysosomes contain as many as 40 different enzymes used to break down large molecules. Indeed, even under a microscope it is difficult to tell apart many plant organelles from the same organelles found 6. _____ animals.

Despite all their similarities, plant cells and animal cells differ 7. _____ two important ways. First, plant cells have structures called chloroplasts, and animal cells don't. Chloroplasts are the structures that give leaves their green color and, more importantly, allow plants to acquire their energy 8. _____ the sun rather than food, the primary source of energy for animals. Like mitochondria, chloroplasts convert energy 9. _____ one form 10. _____ another. However, this process, called photosynthesis, is in many ways the opposite of the mitochondria's aerobic respiration process. In aerobic respiration, food molecules are combined 11. _____ oxygen to produce energy and carbon dioxide. In photosynthesis, chloroplasts use energy from the sun to convert carbon dioxide and water 12. _____ food molecules, like sugars and other carbohydrates.

All cells have a cell membrane, a structural layer that gives the cell shape, while allowing molecules of various types to pass 13. _____ and 14. _____ of the cell. Unlike animal cells, however, plant cells have a cell wall that surrounds the entire cell, including the membrane. The cell wall provides plant cells 15. _____ a protective covering and gives the plant the rigidity it needs in order to stand up even under pressure from wind, rain, and snow. This wall is made 16. _____ cellulose and is intricately cross-linked 17. _____ fibers of other carbohydrate molecules. This structural pattern also allows each cell to withstand the increased internal pressure from osmosis, when the plant absorbs water.

Adapted from: <http://www.teachersdomain.org/resource/tdc02.sci.life.cell.animplant/> Accessed: Nov.14, 2010

8. Carry on with exercises on prepositional phrases from the grammar handout