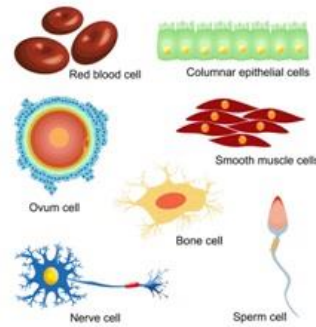
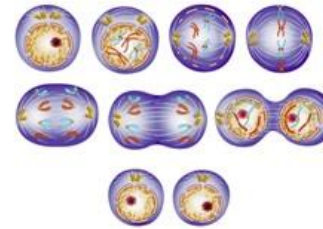


Here are some of the pages included in our Cell Packet:

Feel free to email me if you have any questions! ~Liesl Liesl@homeschoolden.com

A Study of Cells Packet



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Cell Theory Develops:

Cells are the basic unit of all living things. All living things are made up of cells. Most living things are made of many cells or are

Some organisms are made of only one cell. These are _____
The invention of the light microscope around 1590 allowed scientists to see and learn about cells.

Robert Hooke: Was the first person to coin the term "cell" as used in biology, based on his observation of cork cell tissue. He thought these looked like the small rooms (or cells) used by monks in a monastery.

This illustration from a book published in 1665 shows the microscopic structure of cork:



Anton van Leeuwenhoek observed and drew bacteria.

It was he who discovered bacteria, free-living protists, sperm cells, blood cells, microscopically.

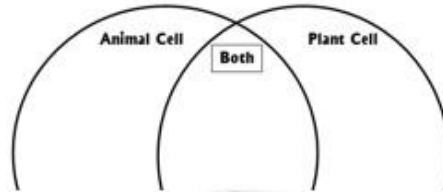
Cell Theory: In the 1800s three German scientists are known as cell theory. Explain cell theory.



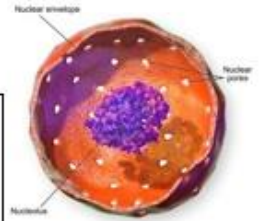
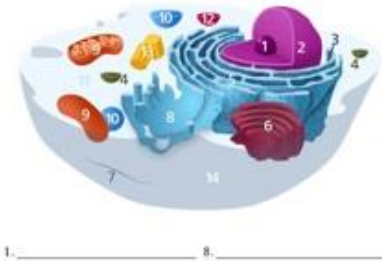
Pictured to the left is an electron microscope. It uses accelerated electrons as the so much smaller objects than that of light. The first electron microscope was the first practical electron microscope to be used.



Compare the Organelles in Plant and Animal Cells:



Organelles of an Animal Cell



Nucleus

Classification

5 Living Kingdoms

Scientists have divided things into five main groups:

unicellular organism without a nucleus	unicellular organism with a nucleus	multicellular organisms that have nuclei and cell walls but lack chloroplasts	multicellular organisms that have nuclei and cell walls and chloroplasts	multicellular organisms that have nuclei but lack cell walls and chloroplasts
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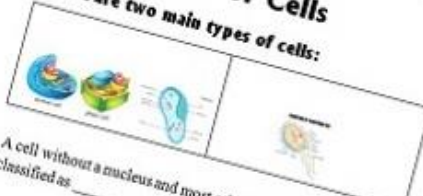
Draw a picture of...

a Monera (bacteria)	a Protista (like an amoeba or paramecium)

Scientists have divided animals into invertebrates and vertebrates. What are the five vertebrate groups?

Types of Cells

There are two main types of cells:



A cell without a nucleus and most other organelles is classified as _____ cells.

Structure of a Bacterium Cell

An example of this type of cell is _____



Diagram of a cell in the cytoplasmic layer

Other than bacteria, all living things in the environment are made up of _____ cells.

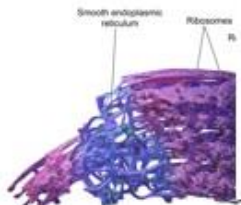
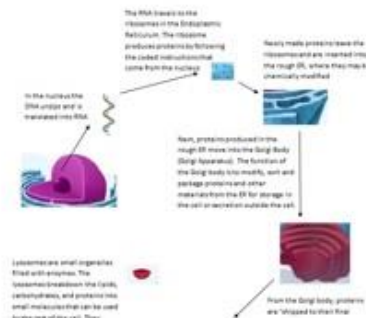
Anatomy of an Animal Cell



All eukaryotic cells contain _____ and other organelles.



How do the organelles work together in a cell?



Endoplasmic Reticulum



Cell Theory Develops:

Cells are the basic unit of all living things. All living things are made up of cells. Most living things are made of many cells or are _____.

Some organisms are made of only one cell. These are _____.

The invention of the light microscope around 1590 allowed scientists to see and learn about cells.

Robert Hooke: Was the first person to coin the term "cell" as used in biology, based on his observation of cork cell tissue. He thought these looked like the small rooms (or cells) used by monks in a monastery.

This illustration from a book published in 1665 shows the microscopic structure of cork:



Antonie van Leeuwenhoek: observed and described microscopic protozoa and bacteria.

It was he who discovered bacteria, free-living and parasitic microscopic protists, sperm cells, blood cells, microscopic animals and rotifers, and much more.

Cell Theory: In the 1850s three German scientists added to our understanding of cell theory. These are known as cell theory. Explain cell theory below:



Proposed to the left is an _____ electron microscope. It can reveal much smaller objects than that of light microscopes.

The first electron microscope was developed in 1931. It took several years before the first practical electron microscope to be developed.

Cell Theory Develops:

What are cells?

What was the light microscope invented?

Robert Hooke:



Antonie van Leeuwenhoek:

What is Cell Theory?

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Classification

5 Living Kingdoms

Scientists have divided things into five main groups:

unicellular organism without a nucleus	one-celled organism or animal, plant, fungus	single, multicellular organisms that have nuclei and cell walls, but lack chloroplasts	multicellular organisms that have nuclei, but their nuclei lack cell walls and chloroplasts	multicellular organisms that have a nucleus that has a cell wall. This group also includes plants and fungi.
--	--	--	---	--

Draw a picture of...

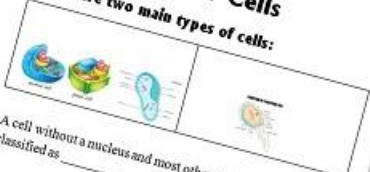
a Monera (bacteria)	a Protista (like an amoeba or paramecium)

Scientists have divided animals into invertebrates and vertebrates. What are the five vertebrate groups?

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Types of Cells

There are two main types of cells:




A cell without a nucleus and most other organelles is classified as _____ cells.

Structure of a Bacteria Cell:




An example of this type of cell is _____



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Other than bacteria, all living things in the environment are made up of _____ cells.

Anatomy of an Animal Cell



All eukaryotic cells contain _____ and other organelles.

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Animal Cells vs. Plant Cells

Organelles of an Animal Cell



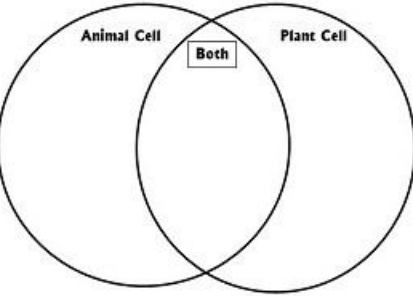
- _____
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animal cell plant cell

Compare the Organelles in Plant and Animal Cells:



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Organelles of the Cell Review Sheets





Animal Cell Review Sheet

Identify these parts of the cell:
Nucleus, Centrioles, Ribosomes, Lysosomes, Golgi apparatus, Vacuoles, Mitochondria, Cell Membrane, Rough endoplasmic reticulum (RER), Smooth ER, Cytoplasm, Microtubules

Structure of a Typical Animal Cell




Cell Organelles

	
Mitochondria Releases energy from glucose (sugar). It produces the power or energy needed by the cell.	Endoplasmic Reticulum This enables the cell to transport material where it is needed. Proteins are found in vesicles for transport to the Golgi apparatus (and other sites).
	
Golgi Apparatus Sorts and sends proteins to different parts of the cell. As needed, bits of this break off.	Centrioles Helps the cell use microtubule as tracks to form asters. Forms 9 and 10.

Animal Cell Review Sheet


Name: _____



- The jelly-like fluid that fills the cell.
- The control center of the cell containing genetic material (DNA).
- Where proteins are made. Sometimes these are found in isolation, sometimes they are found on the edge or linked to the ER.
- The outer covering of the cell. It controls what goes in and out.
- Contains enzymes that help break down any food the cell absorbs.
- Makes and stores fat, it synthesizes lipids, steroids, and others. It metabolizes carbohydrates and more.
- This enables the cell to transport material where it is needed. Proteins are found in vesicles for transport to the Golgi apparatus (and other sites).
- Releases energy from glucose (sugar). It produces the power or energy needed by the cell.
- Sorts and sends proteins to different parts of the cell. As needed, bits of this break off.
- These are like small packages that carry things (such as hormones) out of the cell.
- Helps the cell divide. Organizes a microtubule network during mitosis to form spindles and asters. Forms the basis of cilia and flagella.
- Involved in maintaining the structure of the cell. They are involved in _____.

Animal Cell Review Sheet

Name: _____



Match the organelle with the description that fits best.

- Nucleus
- Centrioles
- Ribosomes
- Lysosomes
- Golgi apparatus
- Vesicles
- Microtubules
- Cell Membrane
- Rough endoplasmic reticulum (RER)
- Smooth ER
- Cytoplasm
- Mitochondria

a. These are like small packages that carry things (such as hormones) out of the cell.

b. This enables the cell to transport material where it is needed. Proteins are found in vesicles for transport to the Golgi apparatus (and other sites).

c. Where proteins are made. Sometimes these are found in isolation, sometimes they are found on the edge or linked to the ER.

d. The jelly-like fluid that fills the cell.

e. These are involved in maintaining the structure of the cell. These are also involved in moving things around in the cell. They are involved in chromosome separation (mitosis and meiosis).

f. Makes and stores fat; it synthesizes lipids, steroids, and others. It metabolizes carbohydrates and more.

g. The control center of the cell containing genetic material (DNA).

h. The outer covering of the cell. It controls what goes in and out.

i. Releases energy from glucose (sugar). It produces the power or energy needed by the cell.


j. Helps the cell divide. Organizes a microtubule network during mitosis to form spindles and asters. Forms the basis of cilia and flagella.

k. Contains enzymes that help break down any food the cell absorbs.


l. Sorts and sends proteins to different parts of the cell. As needed, bits of this break off.

Cell Organelles

Below can you identify the Nucleus, Rough ER, vesicles, Golgi apparatus



What are the organelles below? What do they do?



How Proteins are Made in a Cell

Protein production:

Scientists estimate that each human cell contains 10 billion protein molecules

Why do we need proteins? Proteins do much of the work in the body. Proteins are responsible for a wide range of tasks

- hemoglobin - carries oxygen in your blood
- enzymes like amylase, pepsin, and trypsin - help you digest your food
- alpha-keratin - forms your hair and nails
- antibodies - defend your body from invading microorganisms such as bacteria and viruses
- insulin - gives elasticity to your skin
- myosin - speed chemical reactions inside your body

Proteins are made from small molecules called amino acids. There are 20 standard amino acids, each with its own shape, size and properties.

How are proteins made?

Step 1) the genetic code in your DNA is read - this is called transcription. The DNA strands are pulled apart and transcribed into a closely related molecule called RNA

Step 2) messenger RNA (mRNA) carries the genetic message to the cytoplasm

Step 3) ribosomes read the mRNA units in sequence and string together the corresponding amino acids in the proper order

Step 4) transfer RNAs (tRNAs) carry the appropriate amino acids to the ribosome. Each tRNA has a small section called an anticodon that matches up with a specific amino acid

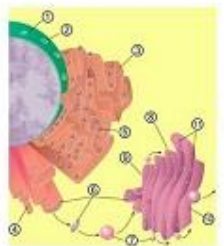
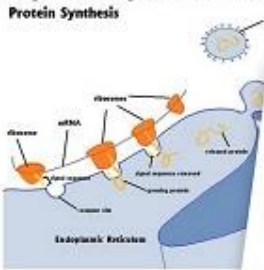
Step 5a) Proteins made by the rough ER

Step 5b) Proteins made by the Golgi via vesicles

Protein Shape

Proteins come in virtually every shape imaginable. Scientists have linked misfolded proteins to Alzheimer's, Lou Gehrig's disease

How do the organelles work together in a cell to create protein?



Proteins: When Something Goes Wrong

Sickle Cell Disease: An error in just one amino acid can cause disease. Sickle cell disease is caused by a single error in the gene for hemoglobin (the oxygen carrying protein in red blood cells).

Atoms spot in the protein, the amino acid is incorrect. These molecules stick together and distort the normally round, smooth red blood cells into jagged sickle shapes. Symptoms of Sickle Cell Disease include pain in the organs or joints (when distorted blood cells jam together). This blockage stops oxygen from getting to organs and tissues.

Cystic Fibrosis: Sometimes the proteins don't fold properly. Cystic Fibrosis is caused when a protein is incorrectly folded (usually caused by the deletion of a single amino acid). Usually the protein allows chloride ions to pass through the outer membrane of cells, but when it doesn't work, the ions can't flow through (panel 2). A thick, sticky mucus builds up in the lungs and digestive organs.

Alzheimer's Disease is also thought to be caused from misfolded proteins. This involves memory loss and the loss of other thinking skills. Brain cells are destroyed and people lose their ability to do even simple tasks.

Parkinson's Disease - a degenerative disorder of the central nervous system. Early symptoms of the disease are movement related (shaking).

Huntington's Disease - this is a genetic degenerative disorder that affects muscle coordination and leads to mental disease and behavioral problems.

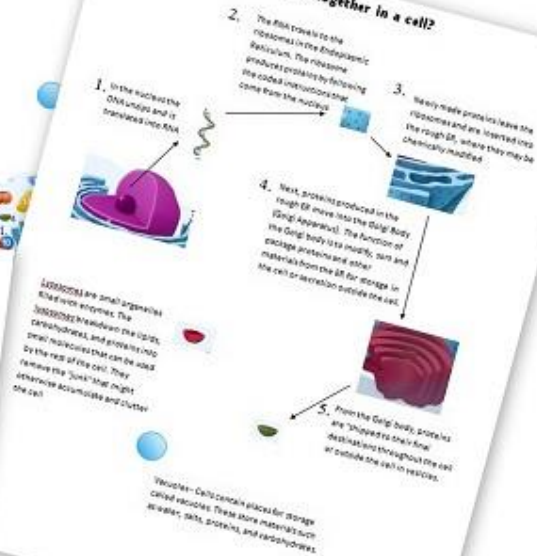
Creutzfeldt-Jakob Disease - This is also known as Mad Cow Disease. It is caused by an agent called a prion. Prions are misfolded proteins that replicate by converting their properly folded counterparts, so that brain tissue to develop holes and take on a more sponge-like texture. The disease leads to rapid neurodegeneration, causing the brain to shrink.

Taucler's Disease This disease is caused by a deficiency of an enzyme which means that the lysosomes can't break down materials. The large molecules accumulate in the cell eventually killing it.

How do the organelles work together in a cell to create protein?



How do the organelles work together in a cell?



LIPOIDS are small organelles that store energy. The LIPOIDS are made in the cytoplasm, and proteins that are needed that can be used by the rest of the cell. They remove the 'junk' that might otherwise accumulate and clutter the cell.


Vesicles - Cells contain places for storage called vesicles. These store materials such as water, salts, proteins, and carbohydrates.

Name _____


PLANT CELL

Label the Parts of the Plant:
Stem, leaves, roots, root hairs, shoot (and/or flower)

Label the plant cell:
 chloroplast
 nucleus
 mitochondrion
 Golgi apparatus
 vacuole
 endoplasmic reticulum
 vesicle

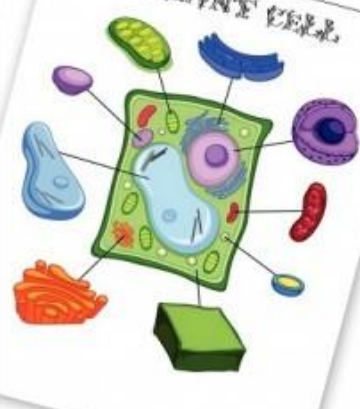


What is photosynthesis?



Name _____

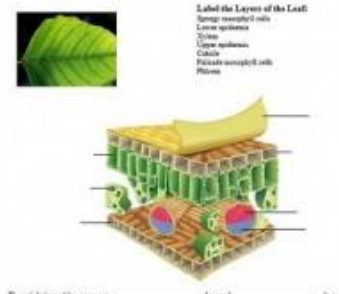
PLANT CELL



Name _____

PARTS OF A LEAF

Label the Layers of the Leaf:
 Upper epidermis
 Lower epidermis
 Cuticle
 Palisade mesophyll cells
 Phloem



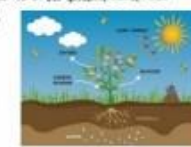
The xylem (water) moves from _____ to _____ through the _____.
 The phloem (sugar) moves from _____ to _____.
 In the spring, stomata (pores) in the leaf allow for _____.
 Stomata close to prevent _____ from the _____.
 Phloem _____ carries food to the rest of the plant.
 Guard cells regulate the opening of the stomata based on water _____.

Name _____

PHOTOSYNTHESIS

What are the parts of the plant?

Draw a picture of a plant cell.



What is cellulose?

What is the vacuole?

What are chloroplasts?

What is photosynthesis? Where does it take place?

Name _____

Organelles of a Plant Cell

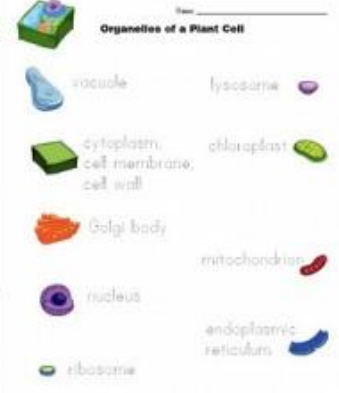
- chloroplast
- mitochondrion
- vacuole
- endoplasmic reticulum
- Golgi body
- ribosome
- nucleus
- lysosome
- cytoplasm, cell wall



Name _____


Organelles of a Plant Cell

vacuole lysosome
 cytoplasm, cell membrane, cell wall chloroplast
 Golgi body mitochondrion
 nucleus endoplasmic reticulum
 ribosome



Name _____

STATE CARBON DIOXIDE



Oxygen is known as _____ and has _____ bonds.
 Carbon is known as _____ and has _____ bonds.
 Hydrogen is known as _____ and has _____ bonds.
 Water is also known as _____.

Create a water molecule:
 ○ ○ ○

Carbon dioxide is also known as _____.

Create a carbon dioxide molecule:
 ○ ○ ○

Name _____

PHOTOSYNTHESIS

What is the name of the "food" that plants make? **glucose**

How many carbon atoms are there? 6
 How many hydrogen atoms are there? 12
 How many oxygen atoms are there? 6

Make a model of this molecule using a molecular model set (if you have one)

Since we are not studying chemistry at the moment, we quickly reviewed some chemistry basics and used over the chemical bonding again with this explanation of happy atoms over at: http://www.chemtada.com/files/atom_bonds.html

Water molecule: ○ ○ ○
 Carbon dioxide molecule: ○ ○ ○

What are the products of photosynthesis? **Glucose and oxygen**

How does water go from the roots to the top of a tree? **It rises through the xylem.**
 How are sugars moved from the leaves to all of the cells in the plant and to the roots? **Sugars move through phloem.**

Oxygen is known as O₂ and has 2 bonds.
 Carbon is known as C and has 4 bonds.
 Hydrogen is known as H and has 1 bond.

Name _____

PHOTOSYNTHESIS

What ingredients do chloroplasts need to make food?
 Using a molecular model set, make the two molecules you wrote above. If you don't have a set, draw a picture of these two molecules.

What is the name of the "food" that plants make?
 How many carbon atoms are there?
 How many hydrogen atoms are there?
 How many oxygen atoms are there?

Make a model of this molecule using a molecular model set (if you have one)

What are the products of photosynthesis?
 How does water go from the roots to the top of a tree?
 How are sugars moved from the leaves to all of the cells in the plant and to the roots?



Plant Cells, Parts of a Leaf, Photosynthesis Worksheets

