

CHAPTER 3 - Cell Processes and Energy

An _____ is any substance that cannot be broken down into _____ substances. The smallest unit of an _____ is called an _____.

An element is made up of _____ kind of atom.

TABLE OF ELEMENTS:

Periodic Table of the Elements © www.elementsdatabase.com

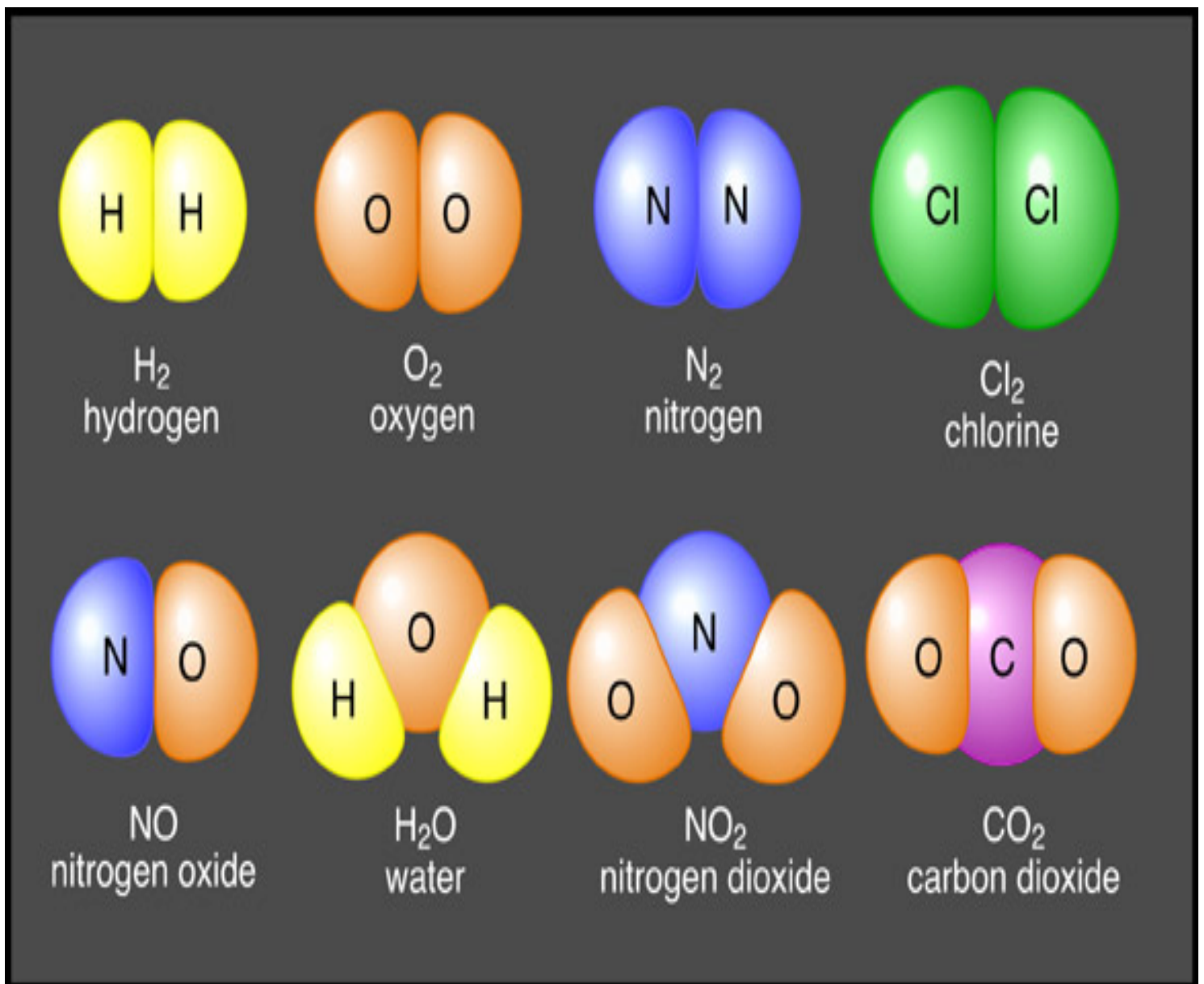
H ¹																	He ²
Li ³	Be ⁴											B ⁵	C ⁶	N ⁷	O ⁸	F ⁹	Ne ¹⁰
Na ¹¹	Mg ¹²											Al ¹³	Si ¹⁴	P ¹⁵	S ¹⁶	Cl ¹⁷	Ar ¹⁸
K ¹⁹	Ca ²⁰	Sc ²¹	Ti ²²	V ²³	Cr ²⁴	Mn ²⁵	Fe ²⁶	Co ²⁷	Ni ²⁸	Cu ²⁹	Zn ³⁰	Ga ³¹	Ge ³²	As ³³	Se ³⁴	Br ³⁵	Kr ³⁶
Rb ³⁷	Sr ³⁸	Y ³⁹	Zr ⁴⁰	Nb ⁴¹	Mo ⁴²	Tc ⁴³	Ru ⁴⁴	Rh ⁴⁵	Pd ⁴⁶	Ag ⁴⁷	Cd ⁴⁸	In ⁴⁹	Sn ⁵⁰	Sb ⁵¹	Te ⁵²	I ⁵³	Xe ⁵⁴
Cs ⁵⁵	Ba ⁵⁶	57-71	Hf ⁷²	Ta ⁷³	W ⁷⁴	Re ⁷⁵	Os ⁷⁶	Ir ⁷⁷	Pt ⁷⁸	Au ⁷⁹	Hg ⁸⁰	Tl ⁸¹	Pb ⁸²	Bi ⁸³	Po ⁸⁴	At ⁸⁵	Rn ⁸⁶
Fr ⁸⁷	Ra ⁸⁸	89-103	Rf ¹⁰⁴	Db ¹⁰⁵	Sg ¹⁰⁶	Bh ¹⁰⁷	Hs ¹⁰⁸	Mt ¹⁰⁹	Ds ¹¹⁰	Rg ¹¹¹	Cn ¹¹²	Uut ¹¹³	Fl ¹¹⁴	Uup ¹¹⁵	Lv ¹¹⁶	Uus ¹¹⁷	Uuo ¹¹⁸
lanthanoids		57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	
actinoids		89	90	91	92	93	94	95	96	97	98	99	100	101	102	103	

When _____ or more elements combine chemically, they form a _____.

Most elements in living things occur in the form of a _____.

The smallest unit of any compound is called a _____.

EXAMPLES of COMPOUNDS:



COMPOUNDS:

Water is a _____. It is made up of two _____ atoms and one _____ atom. Water makes up almost _____% of your body. Most chemical reactions within cells cannot take place without _____.

Atoms, Molecules, Compounds

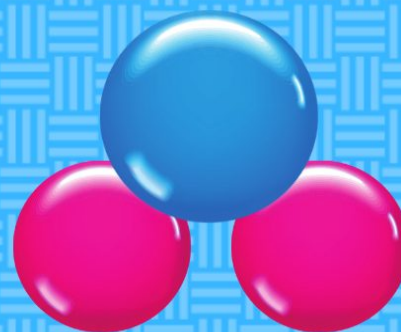
A compound consists of two or more elements chemically bonded in a fixed ratio.



Atoms



Molecules



Compounds



Many compounds in living things contain the element _____.

Most compounds that contain _____ are called _____ compounds. Compounds that DO NOT contain _____ are called _____ compounds. Some examples of inorganic compounds that you are already familiar with are _____ and _____.

CARBOHYDRATES:

_____, _____ and _____ are important groups of ORGANIC COMPOUNDS in living things. A CARBOHYDRATE is an organic _____ made of the elements of _____, _____ and _____.

Some examples of Carbohydrates are _____ and _____.

SUGARS molecules can combine to form larger _____ called _____, or _____ carbohydrates.

Some foods that contain high starch are _____, _____, _____ or _____.

When you eat some of these foods, your body produces _____, a sugar that your cells use to produce _____.

Carbohydrates can be found in the _____ of the cell.

LIPIDS

_____, _____ and _____ are examples of LIPIDS. Lipids are energy-rich _____ compounds made of _____, _____ and _____. Lipids contain EVEN MORE _____ than carbohydrates. Lipids can be found in the _____ of the cell.

PROTEINS

PROTEINS are large _____ molecules made of _____, _____, _____, _____, and sometimes _____. Foods that are high in PROTEIN can include _____, _____, _____ and _____.

PROTEINS are made up of smaller molecules called _____. There are only _____ kinds of _____, but they can combine to form many different _____.

Proteins can be found in the _____ of the cell. A protein, called an _____, is a type of PROTEIN that _____ a chemical reaction within living organisms. Without _____,

many chemical reactions that are necessary for life would either take too long to happen, or not happen at all.

TOP NATURAL SOURCES OF DIGESTIVE ENZYMES

FOODS



PAPAYA



PINEAPPLE



KIWI



AVOCADO.



COCONUT



ALOE VERA



FIGS



GARLIC



GINGER



HONEY



SAUERKRAUT



KIMCHI



FERMENTED FOODS



FLAX SEEDS



BARLEY GRASS



BEE POLLEN



MELON



BANANAS



WHEATGRASS JUICE



SPIRULINA



PAU A` ARCO



KEFIR & YOGURT

FOOD SUPPLEMENTS



PROBIOTICS



FIBRES

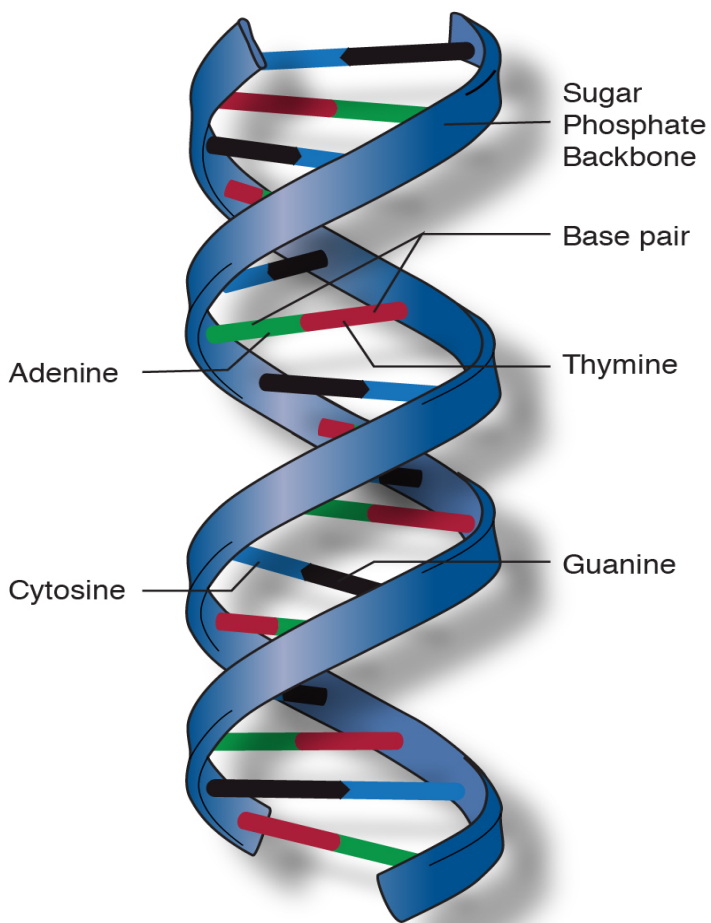


DIGESTIVE ENZYMES

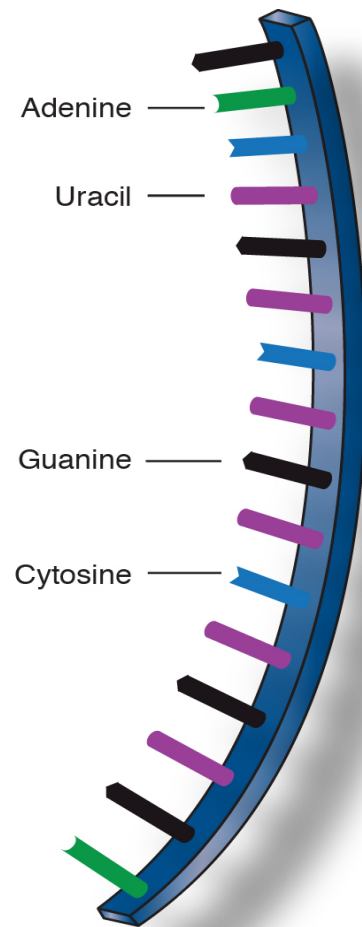


NUCLEIC ACIDS

NUCLEIC ACIDS are very long _____ molecules made up of _____, _____, _____ and _____. NUCLEIC ACIDS contain the _____ needed for cells to carry out the _____ functions of life.



Deoxyribonucleic acid
(DNA)



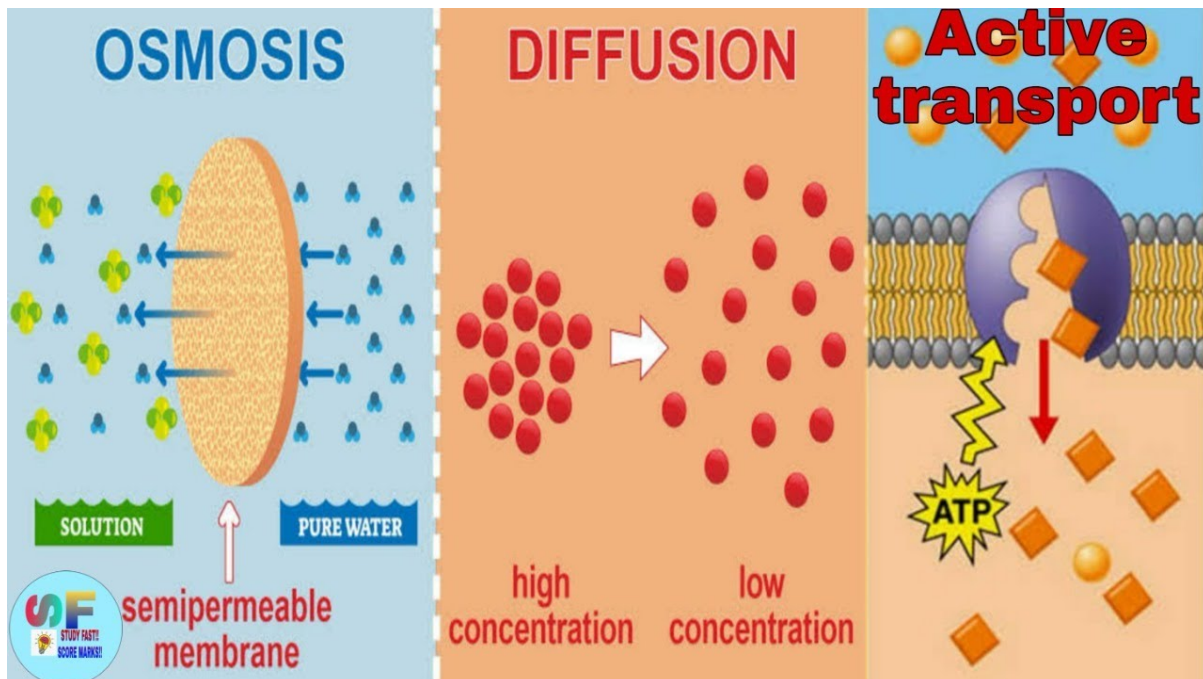
Ribonucleic acid
(RNA)

There are two types of NUCLEIC ACIDS:

1. Deoxyribonucleic Acid (_____) -- This is the _____ material that carries _____ and is passed on to its _____. The information in _____ directs the cells _____. Most _____ is found in the _____ of the cell.

2. Ribonucleic acid (_____) -- This is important in the _____ of PROTEINS. _____ is found in the _____ and the _____ in cells.

*** End of Section 3.1 ***



Section 3.2 -- The Cell In Its Environment

Cells have _____ that protect them. ALL cells are surrounded by a _____. The cell membrane allows some substances to _____ the membrane, and other substances _____ through the membrane. This is called _____.

Substances that move in and out of the _____ do so by one of three methods:

1. _____
2. _____
3. _____

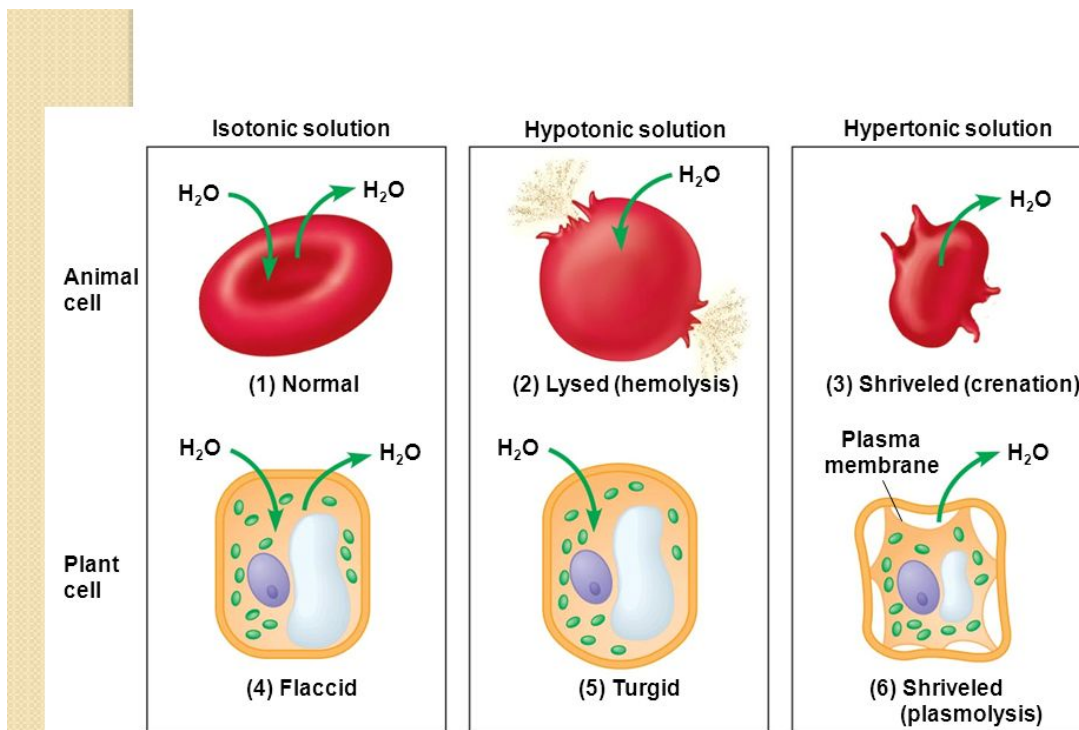
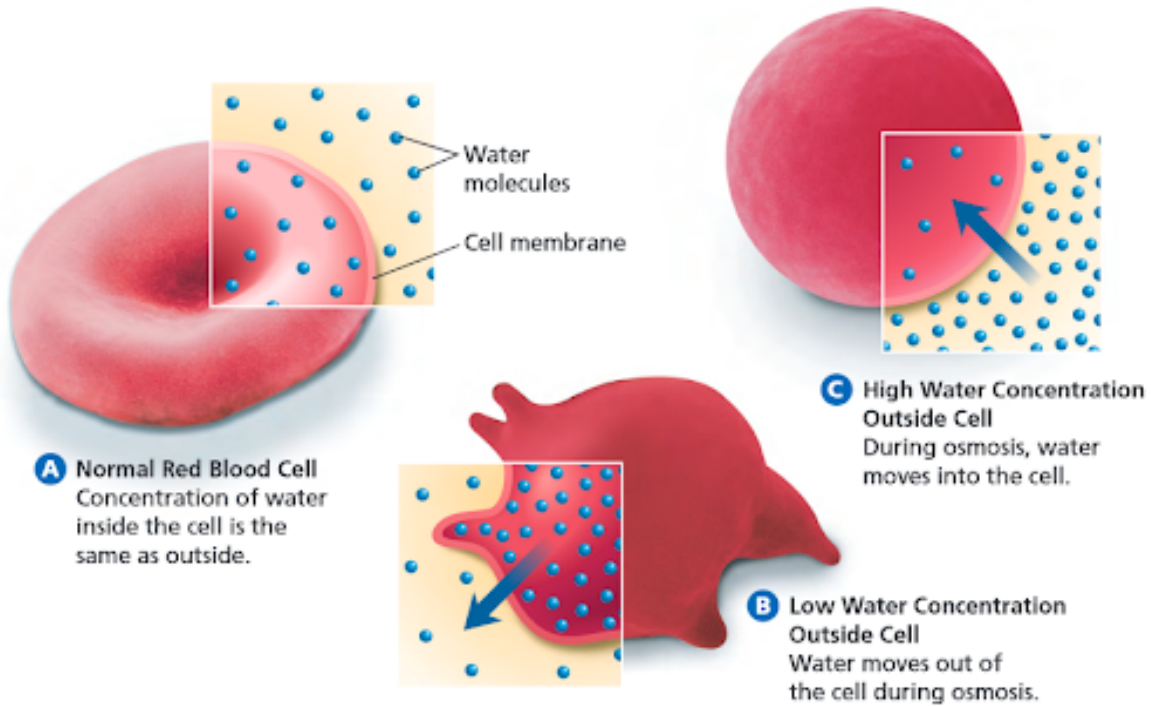
DIFFUSION

DIFFUSION is the process by which _____ move from an area of _____ concentration to an area of _____ concentration. Molecules are always _____. They _____ into other molecules, over and over again. In time, they spread out _____ throughout the area. This is the process of _____.

OSMOSIS

OSMOSIS is the _____ of _____ molecules through the _____ membrane.

Three types of Solutions



FERMENTATION:

Some cells are able to obtain _____ from food _____ using _____. This is the process called _____.

There are two types of FERMENTATION:

1. ALCOHOLIC FERMENTATION :

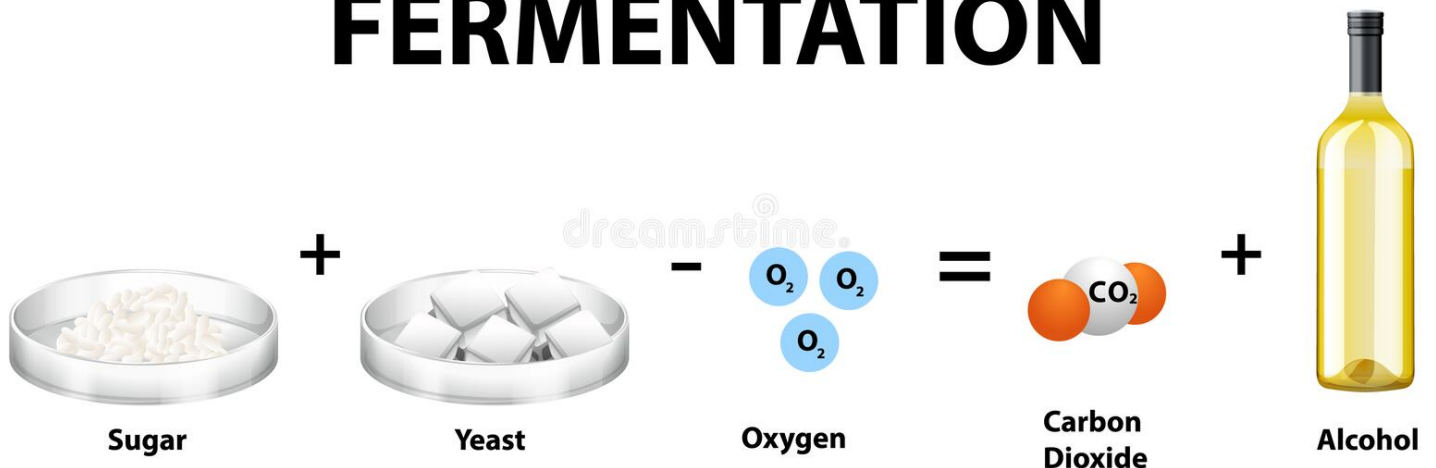
_____ breaks down _____. This causes air pockets in _____ and the creation of _____.

1. LACTIC ACID FERMENTATION:

Occurs when your _____ are lacking in _____

This can cause painful _____

FERMENTATION



Because cells cannot function without _____, most cell activity depends on _____. (LOOK at Figure 9 (pg 83) of your book.)

ACTIVE TRANSPORT

ACTIVE TRANSPORT requires the use of the cell's _____. Transporting _____ will move the material across the _____. When a cell moves molecules _____ the direction they naturally move, it requires _____ of the cell. This is called _____.

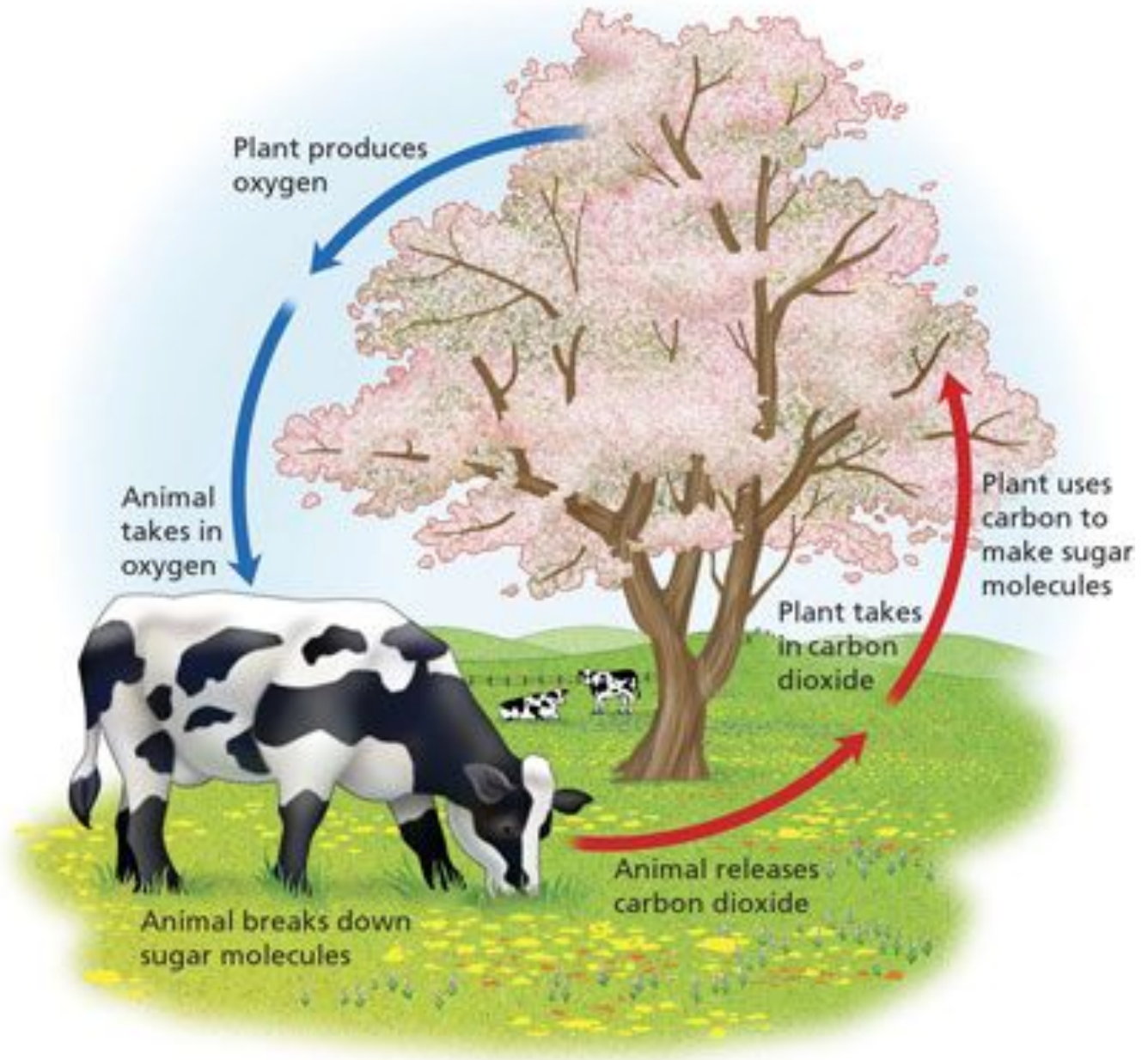
Cells have several ways of moving materials by ACTIVE TRANSPORT.

One method, is the transport proteins in the membrane _____ molecules outside the cell, and _____ them in, using the _____ energy.

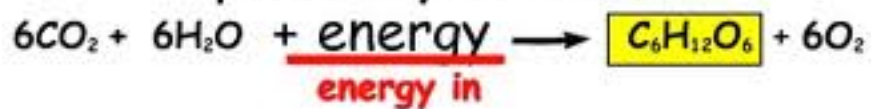
A second method, is transport by _____. The cell membrane _____ the molecule and forms a _____ within the cell. The cell uses _____ energy.

PASSIVE TRANSPORT requires _____ of the cell's _____. Materials pass through the _____ without any _____ from the cell.

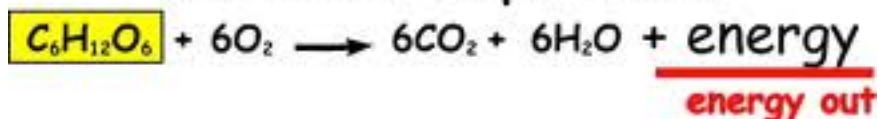
PHOTOSYNTHESIS AND CELLULAR RESPIRATION:



photosynthesis



aerobic respiration



Section 3.3 PHOTOSYNTHESIS

The process by which cells capture energy through _____ and uses it to make food is called _____. It means _____ (photo) and _____ (synthesis).

Nearly all living things obtain energy either _____ or _____ from the energy of _____ captured during _____.

THE Two STAGES OF PHOTOSYNTHESIS:

STAGE 1:

The first stage in photosynthesis involves capturing the _____ in _____. In plants, this occurs mostly in the _____. The main photosynthetic pigment in chloroplasts is _____. _____ captures the light _____ and uses its power for the second stage of _____.

STAGE 2:

The second stage of photosynthesis the cell uses the _____ energy to produce _____. The cell needs _____ and _____ in this process. In plants, the _____ absorb water from the _____. The

water then moves upward through the plant's _____ to the _____. The gas, _____ enters the plants through small openings, called _____ which are located on the _____ of leaves. Once in the _____, both the _____ and the _____ move into the _____ of the cell.

Inside the chloroplasts, the _____ and the _____ begin to change. They use the _____ captured in the first stage of photosynthesis to help in this _____.

This will produce TWO products:

1. One product, _____, that contains _____.

The chemical formula is :_____. Cells use the _____ created by _____, which is a _____ to carry out its cell functions.

2. The other product is _____ which exits the leave through

the _____ . ALMOST ALL of the Earth's

_____ is produced by living things through

this process of _____ .

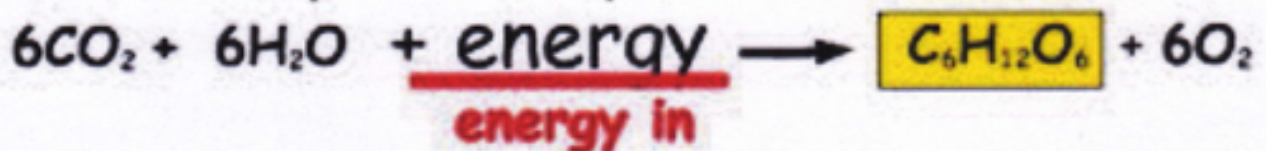
The events of photosynthesis can be summed up as:

What happens to the SUGAR produced in photosynthesis?

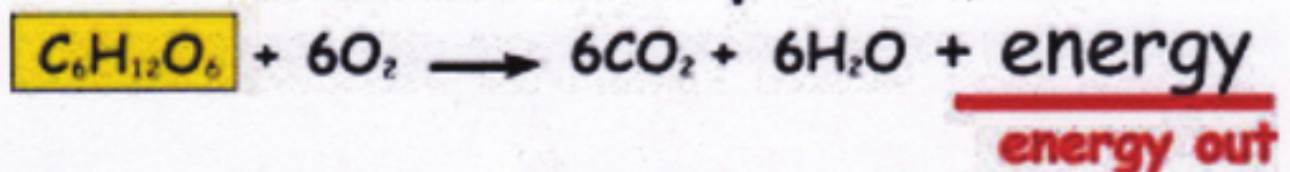
1. _____

2. _____

photosynthesis



aerobic respiration



Photosynthesis



When you get hungry, you might decide to raid the cookie jar or ask your mom to make you a sandwich. You do this because humans and animals get energy from the foods they eat.

Plants use light energy from the sun to produce the food they need to survive. This process is called photosynthesis.

INGREDIENTS

Light energy
Rays from the sun



Carbon dioxide
From the air



Water
Gathered by plant's roots in the soil



Chlorophyll
Present in cells of green plants



1 SUNLIGHT

Light shining down from the sun is absorbed by the plant's cells. These tiny cells are what make up the plant and its leaves.



Sunlight



Typical plant cell

Cell wall

Cell nucleus

Central vacuole
Large fluid-filled space

Chloroplasts
Contain the chemical chlorophyll

2 CHLOROPHYLL

Inside some of these cells is a special ingredient called chlorophyll. This is the compound that traps the sun's light to start the process of photosynthesis.

3 WATER

Water and carbon dioxide are two of the main

Water



Oxygen

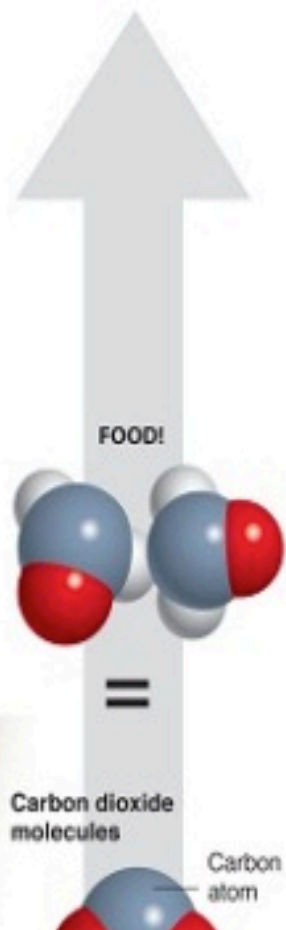


Carbon Dioxide



4 END RESULT

The sugar created by photosynthesis is sent to the rest of the plant for food.



FOOD!

Carbon dioxide molecules

Carbon atom

3.4 CELLULAR RESPIRATION

Food supplies your body with _____, an energy-rich _____ is the process by which cells obtain energy from _____.

During CELLULAR RESPIRATION, cells break down simple _____, such as sugar, and release the _____ they contain.

THE TWO STAGES OF CELLULAR RESPIRATION:

STAGE 1: The first stage occurs in the _____ of the cell.

There, _____ molecules are broken down to _____ molecules. A _____ amount of energy is needed, and _____ is not involved in the process.

STAGE 2: The second stage takes place in the _____ of the cell. There, the small molecules that were broken down in the first stage, create a chemical reaction that uses _____ and requires _____ in the process.

Two products of CELLULAR RESPIRATION are _____ and _____. Also, _____ is used in the process. In most animals, _____ and _____ are released from the body. Thus, when you breathe in, you take in _____, a raw

material for _____. When you breathe out, you release the products of respiration, _____ and _____.

The overall CELLULAR RESPIRATION PROCESS is:

PHOTOSYNTHESIS vs. CELLULAR RESPIRATION

Photosynthesis and Cellular Respiration are _____ processes.

WHY? Because in Photosynthesis, _____ and _____ are used to produce _____ and _____.

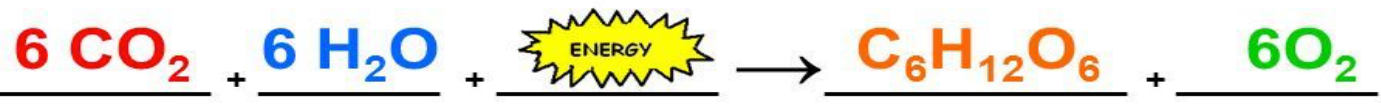
During Cellular Respiration, _____ and _____ are used to produce _____ and _____.

Together, the two processes, form the life cycle used in the Earth's _____.



Chemical Energy and Food

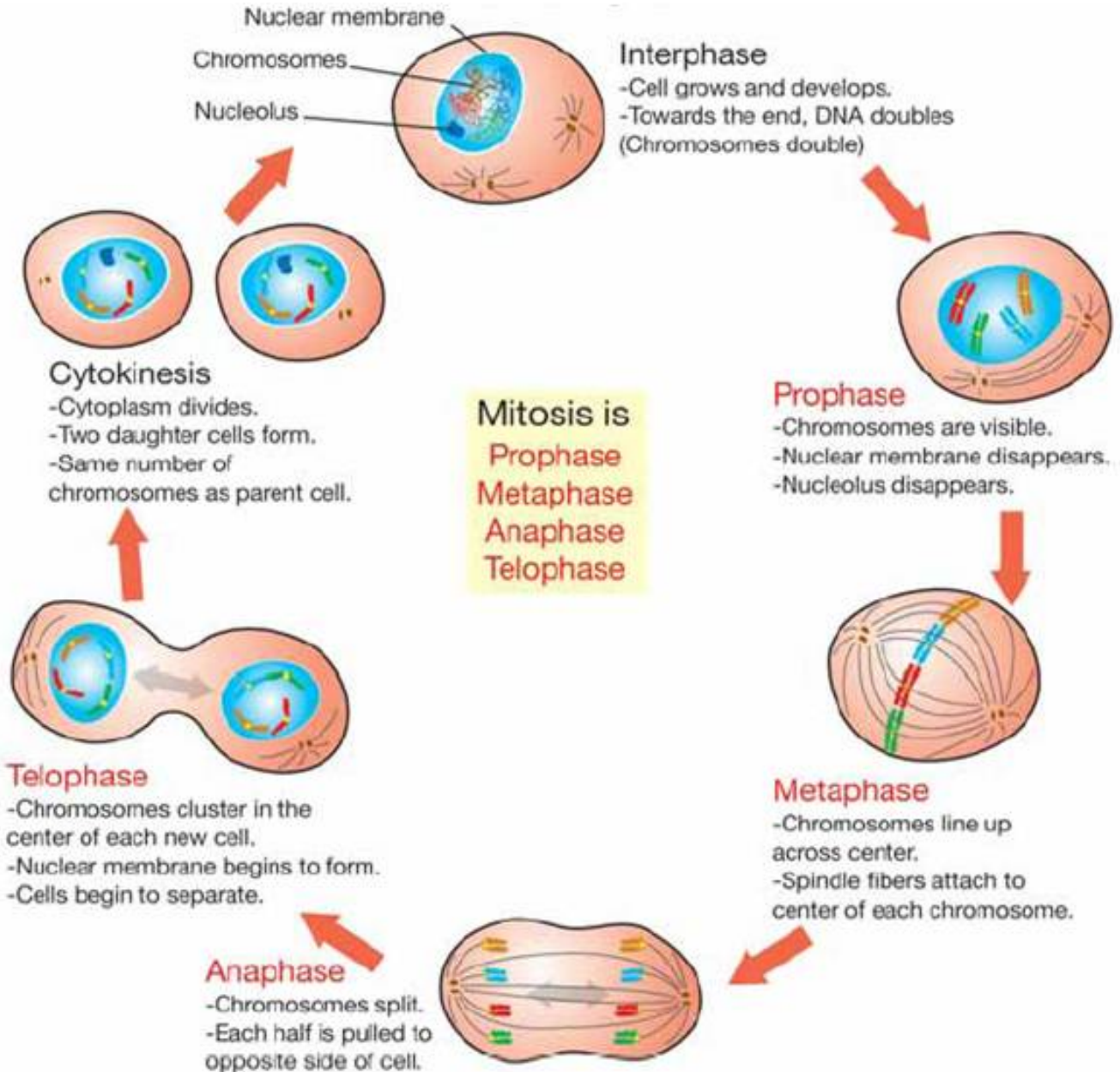
PHOTOSYNTHESIS

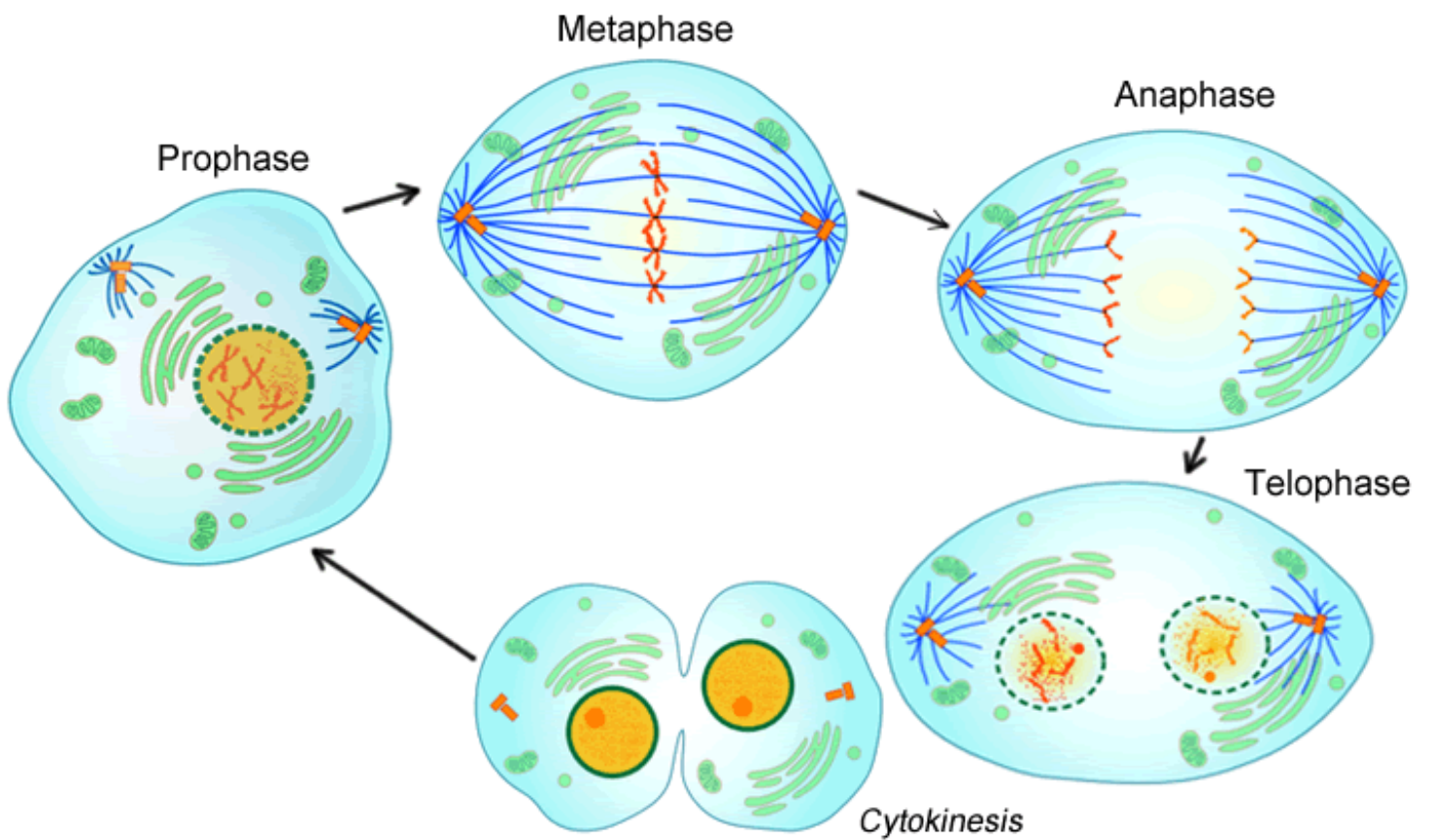
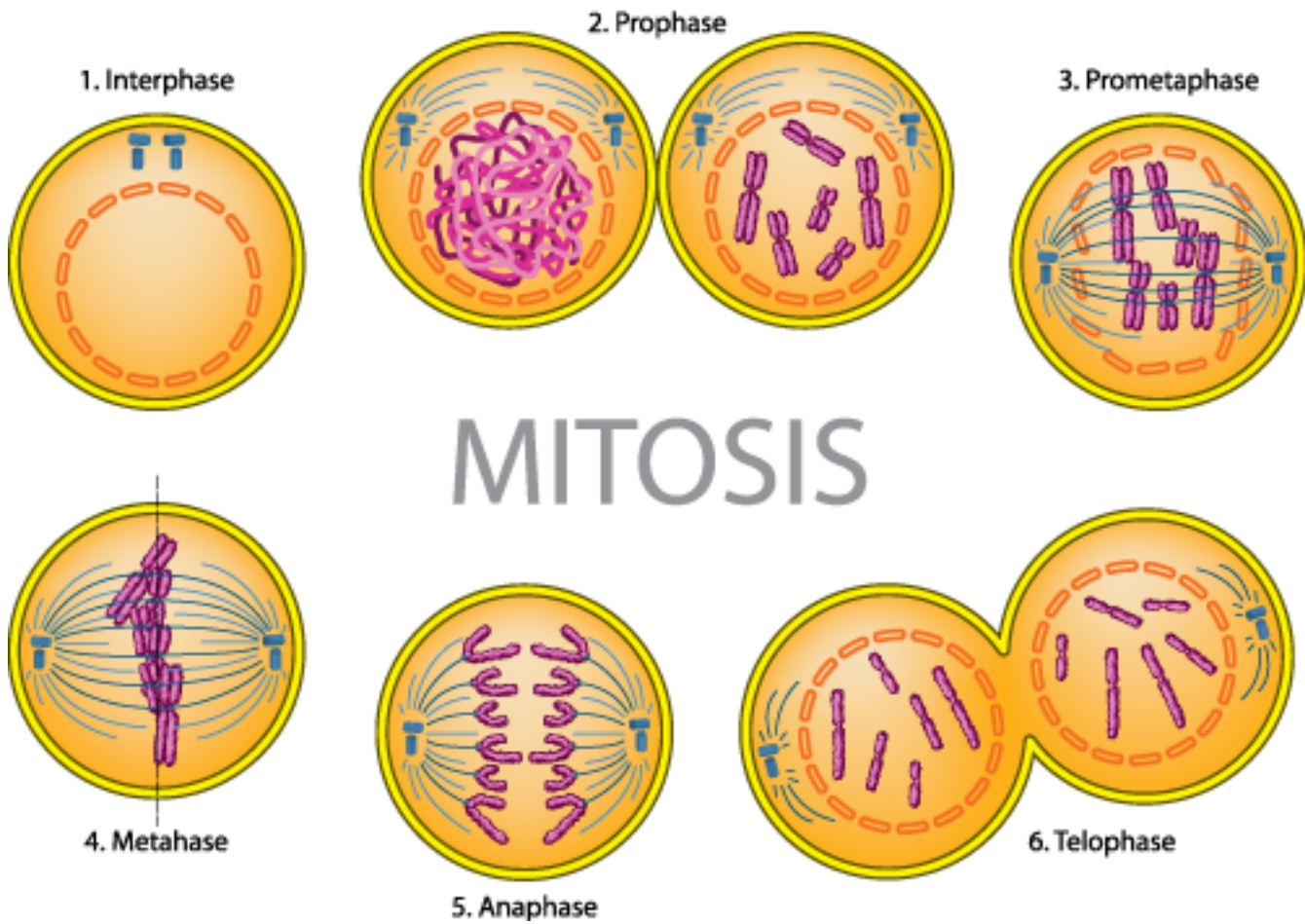


CELLULAR RESPIRATION



THE CELL CYCLE IN PICTURES:





3.5 - CELL DIVISION

The sequence of _____ and _____ that cells undergo is called _____. There are three stages of cell division:

1. _____
2. _____
3. _____

STAGE 1: INTERPHASE

This is the _____ of all the phases. This occurs _____ cell division. The functions of INTERPHASE are:

- _____
- _____
- _____
- _____

STAGE 2: MITOSIS

This is the stage when the cell's _____ divides into two _____. During Mitosis, _____ exact copy of the parent cell DNA is given to the _____ daughter cells. There are FOUR phases of MITOSIS:

1. _____
2. _____
3. _____
4. _____

During _____ the _____ lose their rod-like appearance.

A new _____ forms around each region of _____.

TELOPHASE has two functions:

1. _____
2. _____

STAGE 3: CYTOKINESIS

During _____, the cell _____ surrounds the _____ of the cell, causing the cell to split into _____ regions. Each daughter cell has _____ sets of _____ and about _____ of the cell's organelles. Each of these daughter cells now enter the phase of _____, and the cell cycle begins the entire process again.

CYTOKINESIS has three functions:

1. _____
2. _____
3. _____

In plant cells, the above process is slightly different, plants have a rigid cell _____ which cannot surround the _____ in the same way a _____ cell _____ can. Instead, a cell _____ forms across the middle of the cell, and this rigid structure forms into the cell _____ of the plant.

STRUCTURE AND REPLICATION OF DNA:



A _____ molecule is shaped like a _____
_____. The two sides of the DNA ladder are made up of _____ molecules alternating with _____ molecules.

Each rung on the ladder has _____ molecules that are made up of _____ and other elements. DNA has four kinds of NITROGEN bases:

1. _____
2. _____
3. _____
4. _____

The bases on one side of the ladder pair with only _____ base from the other side of the ladder. _____ only pairs with _____, and _____ only pairs with _____.

_____ PAIRS WITH _____
_____ PAIRS WITH _____

The patterns formed by these NITROGEN bases is what makes up the DNA structure in ALL living organisms. Everyone's DNA structure is _____. No two organisms have the _____ same DNA _____ and _____ - but all DNA structures have these _____ Nitrogen bases.

The replication process occurs when the two sides of the DNA ladder _____ and _____. This is much like the process of a zipper unwinding. Because of the way _____ bases pair up with one another, the order of the bases in each new _____ molecule _____ matches the order in the original _____ molecule. The daughter cells then have the _____ DNA _____ and _____.

**** END OF CHAPTER THREE ****