

**Scientific Method**

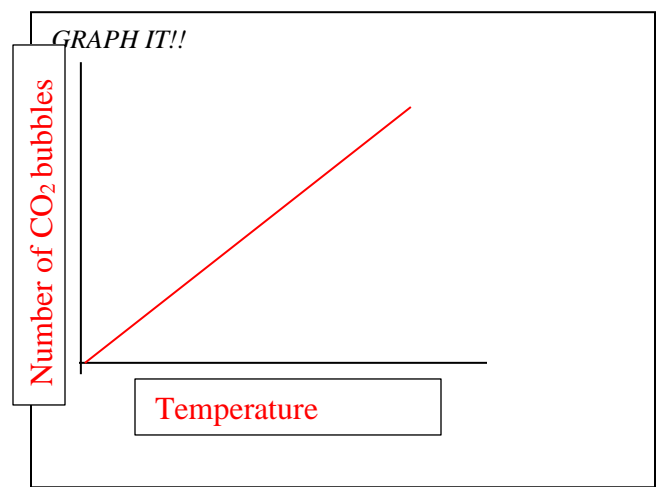
1. Match the following terms with the correct definition.

- |          |                         |  |
|----------|-------------------------|--|
| <u>B</u> | 1. Independent variable | a. Data that is numerical.   |
| <u>G</u> | 2. Dependent variable   | b. Variable that is manipulated and is given to the experimental group(s). |
| <u>F</u> | 3. Experimental group   | c. Information collected during an experiment.                             |
| <u>E</u> | 4. Control group        | d. Data that is in the form of word descriptions.                          |
| <u>H</u> | 5. Constants            | e. The group that gets the standard or normal conditions.                  |
| <u>C</u> | 6. Data                 | f. The group that gets the independent variable.                           |
| <u>D</u> | 7. Qualitative Data     | g. Variable that is measured and responds to the testing.                  |
| <u>A</u> | 8. Quantitative Data    | h. Factors in an experiment that must remain the same in all groups.       |
| <u>I</u> | 9. Hypothesis           | i. An if/then statement that predicts the outcome of an experiment.        |

2. A student studied the effects of increases in temperature on the respiration rate of yeast cells. He varied the temperature from 10 degrees Celsius to 40 degrees Celsius, and counted the number of carbon dioxide bubbles given off at the different temperatures. He kept one yeast culture at room temperature during the entire experiment. Results are given in the table below.

<u>Temperature (degrees Celsius)</u>	<u>Number of Carbon Dioxide Bubbles</u>
10	3
20	11
30	18
40	30

- What is the question the scientist is trying to answer?  
**How does temperature affect yeast respiration?**
- What is the independent variable?  
**temperature**
- What is the dependent variable?  
**carbon dioxide bubbles**
- What is the control in this experiment?  
**Yeast culture group kept at room temperature**
- Write one sentence explaining the results of the experiment.  
**As the temperature increases, the yeast respiration increases as shown by increasing CO<sub>2</sub> bubbles.**
- How do you know which axis to graph the variables on? (How can DRY MIX help you?) Label the graph with the correct variables on the correct axes.  
**DRY MIX = Dependent variable is graphed on the y-axis and the independent variable is graphed on the x-axis.**



**Classification**

1. List the taxa in order from broadest to most specific starting with the category of domain.

**Domain, Kingdom, Phylum, Class, Order, Family, Genus, Species**

2. Which two levels are used in binomial nomenclature, the naming of organisms?

**Genus** and **Species**

3. Write the scientific name of a human (HOMO SAPIENS) correctly. ***Homo sapiens***

4. Which two organisms in the table below are most closely related? **Humpback whale and spider monkey**

**Classification of Four Organisms**

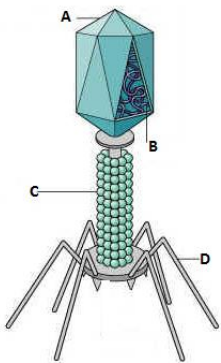
	<b>Corn</b>	<b>Whale Shark</b>	<b>Humpback Whale</b>	<b>Spider Monkey</b>
<b>Kingdom</b>	Plantae	Animalia	Animalia	Animalia
<b>Phylum</b>	Anthophyta	Chordata	Chordata	Chordata
<b>Class</b>	Monocotyledones	Chondrichthyes	Mammalia	Mammalia
<b>Order</b>	Commelinales	Squaliformes	Cetacea	Primates
<b>Family</b>	Poaceae	Rhincodontidae	Balaenopteridae	Atelidae
<b>Genus</b>	Zea	Rhincodon	Megaptera	Ateles
<b>Species</b>	<i>Zea mays</i>	<i>Rhincodon typus</i> ,	<i>Megaptera novaeangilae</i>	<i>Ateles paniscus</i>

**Viruses**

1. Viruses (are/**are not**) considered living because **they do not have all 8 characteristics of living things**.

2. Viruses are specific to their host cells. A virus that infects a bacterium is called a **bacteriophage**.

3. Label the structure of the typical bacteriophage below:



- A. **capsid composed of protein**
- B. **DNA or RNA but not both**
- C. **Body sheath**
- D. **Tail fibers**

4. What are all 8 characteristics of living things? List them below.

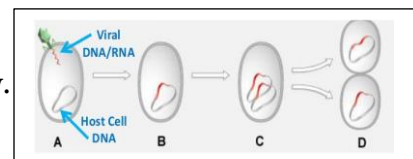
**Composed of cells, reproduce, obtain materials for energy, have DNA, RNA and macromolecules, grow and develop, change over time, respond to stimuli, homeostasis.**

5. Highlight the ones that do not apply to viruses.

6. Which virus replication cycle results in immediate death of the host cell? **Lytic cycle**

7. Which virus replication cycle results in a host cell that has the virus integrated into its own DNA and doesn't destroy the host cell until after it has undergone cell division? **Lysogenic cycle**

8. Draw a prophage being integrated into the host DNA and label in the space below.

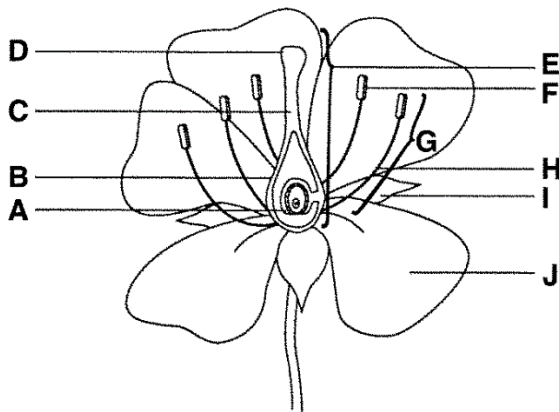


## Kingdoms

1. What are the two Kingdoms of Bacteria? **Eubacteria and Archaeobacteria**
2. What is the main difference between these two kingdoms? **Archaeobacteria does not have peptidoglycan in their cell walls and Eubacteria does have peptidoglycan in its cell wall.**

\*\*For the following kingdom characteristics, circle the correct answer within the parentheses.

3. Bacteria are (**prokaryotes**/eukaryotes) and are (**unicellular**/multicellular/both). What does their genetic information look like in their cells? **A single circular chromosome**
4. Kingdom Protista is composed of organisms that are (prokaryotes/**eukaryotes**), (unicellular/multicellular/**both**) and may be **animal**-like, **plant**-like or **fungus**-like.
5. Kingdom Fungi is composed of organisms that are (prokaryotes/**eukaryotes**), (unicellular/multicellular/**both**) and are (autotrophic/heterotrophic/**heterotrophic decomposers**). How do fungi reproduce? **Spores**
6. Kingdom Plantae is composed of organisms that are (prokaryotes/**eukaryotes**), (unicellular/**multicellular**/both) and are (**autotrophic**/heterotrophic/heterotrophic decomposers).
7. Label the diagram of the flower below and write the function of each of the parts.



<u>Flower Part</u>	<u>Function</u>
A. <b>Ovule</b>	<b>haploid gamete (egg)</b>
B. <b>Ovary</b>	<b>houses the ovule</b>
C. <b>Style</b>	<b>tube which the pollen falls</b>
D. <b>Stigma</b>	<b>sticky; attracts pollen (sperm)</b>
E. <b>Carpel/Pistil</b>	<b>entire female reproductive organ</b>
F. <b>Anther</b>	<b>produces pollen (sperm)</b>
G. <b>Stamen</b>	<b>entire male reproductive organ</b>
H. <b>Filament</b>	<b>stem that raises the anther high</b>
I. <b>Sepal</b>	<b>protects the flower before it buds</b>
J. <b>Petal</b>	<b>colorful to attract pollinators</b>

8. What is the difference between the three plant tropisms below?
  - a. Phototropism- **plants grow toward/bend toward light source**
  - b. Thigmotropism- **plants grow in response to touch.**
  - c. Gravitropism- **plant roots grow in direction of gravity; plant stems grow away from direction of gravity. Roots are positively gravitropic and stems are negatively gravitropic.**
9. Kingdom Animalia is composed of (prokaryotes/**eukaryotes**), (unicellular/**multicellular**/both) and are (autotrophic/**heterotrophic**/heterotrophic decomposers). Animals are broadly divided into two groups: **vertebrates** and **invertebrates**.

10. Invertebrate Characteristics: write what types of organisms are in these groups and a major characteristic.
- Phylum Porifera- sponges; sessile, full of pores, filter feeders
  - Phylum Cnidaria- jellyfish, sea anemones; stinging cells
  - Phylum Platyhelminthes- flatworms such as tapeworm; one body opening
  - Phylum Nematoda- roundworms such as Ascaris; most are parasitic, two body openings
  - Phylum Annelida- segmented worms such as earthworms
  - Phylum Mollusca- clams, octopus, snails; muscular foot
  - Phylum Arthropoda- insects, spiders; jointed appendages, exoskeleton
  - Phylum Echinodermata- starfish, sand dollars, sea urchins; spiny skin
11. Vertebrate Characteristics from Phylum Chordata: write what types of organisms are in these groups and a major characteristic.
- Class Agnatha- jawless fish; no hinged jaws
  - Class Chondrichthyes- cartilaginous fish such as sharks; cartilage skeleton
  - Class Osteichthyes- bony fish such as salmon, perch; bony skeleton
  - Class Amphibia- amphibians such as frogs, toads, salamanders; dual life on land and in water
  - Class Reptilia- reptiles such as snakes, lizards, turtles; dry, scaly skin, amniotic egg, claws on toes
  - Class Aves- birds; feathers, hollow bones
  - Class Mammalia- mammals; give milk to young

### **Biochemistry**

- Explain the difference between a monomer and a polymer:  
 \_A polymer is a large molecule (macromolecule) made of many smaller units called monomers. \_\_\_\_\_
- What element do all organic compounds contain? carbon \_\_\_\_\_
- Key characteristics of carbohydrates
  - What is the function of carbohydrates in the body? Quick source of energy
  - What are some examples of carbohydrates? \_sugars, bread, pasta, cake, candy, glucose, lactose, etc.
  - What is the monomer? \_monosaccharide \_\_\_\_\_
  - What elements are found in carbohydrates? \_C, H, O in 1:2:1 ratio \_\_\_\_\_
  - What letters do many carbohydrates end in? \_-ose \_\_\_\_\_
- Key characteristics of lipids
  - What is the function of lipids in the body? \_\_\_Long term energy storage
  - What are some examples of lipids? \_fats, oils, butter, waxes, steroids \_\_\_\_\_
  - What is the monomer? \_triglyceride (one molecule of glycerol+ 3 fatty acids) \_\_\_\_\_
  - What elements are found in lipids? \_C, H, O in no particular ratio \_\_\_\_\_

5. Key characteristics of proteins

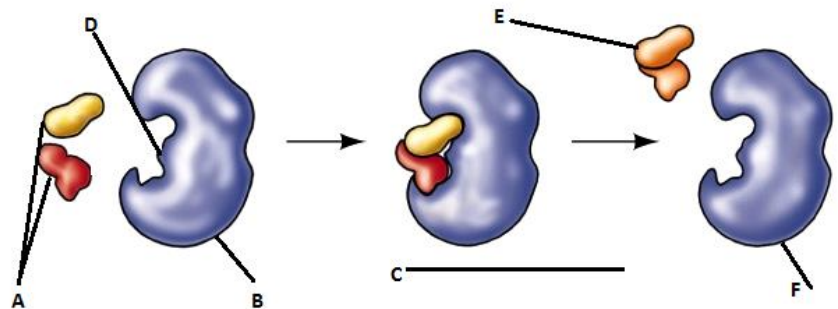
- a. What are the main functions of proteins in the body? **Structural components that make up skin, hair, nails, muscle, bone; plays a role in our immune system; enzymes regulate cell reactions.**
- b. What are some examples of proteins? **\_meats, beans, eggs, enzymes\_**
- c. What is the monomer? **\_amino acids\_**
- d. What elements are found in protein? **C, H, O, N, S\_\_\_\_\_**

6 Key characteristics of nucleic acids

- a. What is the function of nucleic acids? **\_stores and transmits genetic information\_**
- b. What are examples of nucleic acids? **\_DNA and RNA\_\_\_\_\_**
- c. What is the monomer? **\_nucleotide\_\_\_\_\_**
- d. What elements are found in nucleic acid? **\_C, H, O, N, P\_\_\_\_\_**

7. What macromolecule is an enzyme? **\_protein\_\_\_\_\_**

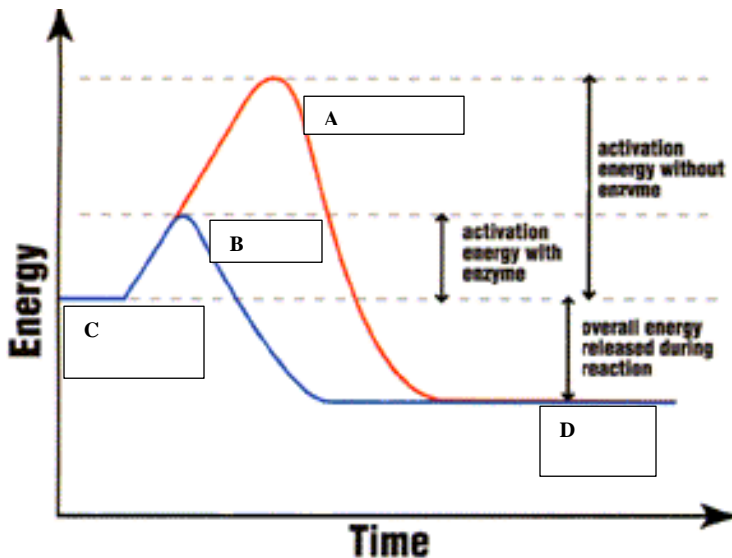
- a. What is the function of enzymes in the body? **\_They speed up chemical reactions.**
- b. How do enzymes affect activation energy? **They lower the activation energy.**



8. Label the following letters below.

- a. **substrates\_\_\_\_\_**
- b. **enzyme\_\_\_\_\_**
- c. **enzyme-substrate complex\_\_\_\_\_**
- d. **\_active site\_\_\_\_\_**
- e. **\_products\_\_\_\_\_**
- f. **\_enzyme\_\_\_\_\_**

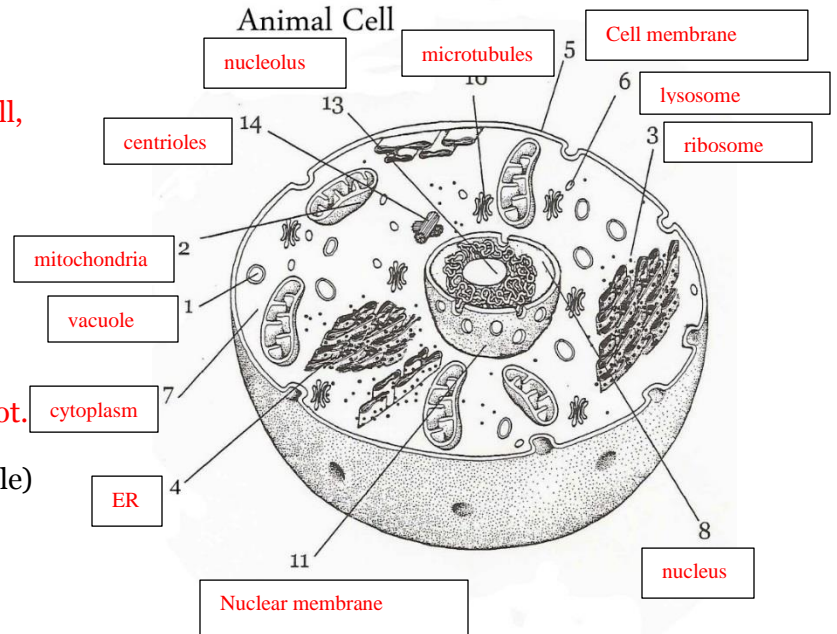
9. Use the graph below to answer the questions on the right.



- a. Which line to the left (A or B) represents the use of an enzyme in the chemical reaction? **\_B\_\_\_\_\_**
- b. Which line to the left (A or B) represents the chemical reaction without an enzyme? **\_A\_\_\_\_\_**
- c. Which letter represents the reactants? **\_C\_\_\_\_\_**
- d. Which letter represents the products? **\_D\_\_\_\_\_**
- e. Does this graph represent an endergonic reaction or an exergonic reaction? **\_EXERGONIC\_\_\_\_\_**

## The Cell Structure & Function

1. Label the cell to the right.
2. Is this an **animal cell** or a plant cell? (Circle)
3. How do you know? **It does not have a cell wall, It has centrioles and lysosomes.**
4. List three differences between an animal cell and a plant cell. **\_Plant cells have chloroplasts, \_cell walls, and large central \_vacuole and animal cells do not.**
5. Is this cell a prokaryote or a **eukaryote**? (Circle)
6. How do you know? **It has a nucleus.**
7. State the three parts of the cell theory
  - a. **All organisms are made up of cells.**
  - b. **Cells are the basic unit of structure and function.**
  - c. **All cells come from pre-existing cells.**



8. Fill out the chart by writing **only one or two** words to describe the function of the organelle.

Major Organelle	Function
a. Mitochondria	Site of cellular respiration; provides energy
b. Nucleus	Control center; houses DNA
c. Cell Wall	Outer boundary providing structure and support
d. Ribosome	Site of protein synthesis; makes proteins
e. Endoplasmic Reticulum	Transportation system; can be rough or smooth
f. Golgi apparatus	Folds and packages proteins for export
g. Cell membrane	Regulates what goes into and out of cell
h. Vacuole	Storage of food, water, wastes
i. Lysosome	Digests wastes and old cell parts
j. Centriole	Produces spindle for cell division
k. Chloroplast	Site of photosynthesis; makes food (glucose); contains chlorophyll

## Cell Transport

1. Match the following terms.

B 1. Passive Transport

E 2. Active Transport

G 3. Diffusion

C 4. Osmosis

D 5. Facilitated Diffusion

A 6. Endocytosis

F 7. Exocytosis

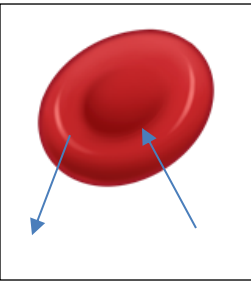
- a. Form of active transport that involves the cell membrane engulfing particles (this includes phagocytosis and pinocytosis).
- b. Type of transport that does not involve energy; [high] to [low].
- c. Form of passive transport that involves diffusion of water across membrane.
- d. Form of passive transport that involves use of transport proteins.
- e. Type of transport that does require energy; [low] to [high].
- f. Form of active transport that involves the cell membrane pushing out particles.
- g. Form of **PASSIVE** transport that involves movement of small particles.

2. What is the phospholipid bilayer? **Another name for cell membrane because it is composed of two layers of phospholipids.**

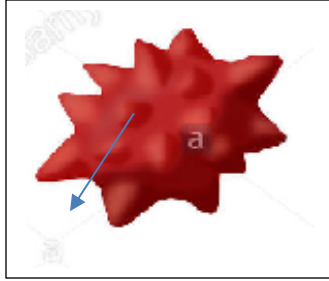
3. The cell membrane is described as selectively permeable or semi-permeable. What does this mean? **It is picky about what goes into and out of the cell.**

4. Draw what the cell to the right would look like if placed in the following solutions. Show the direction of water flow with arrows.

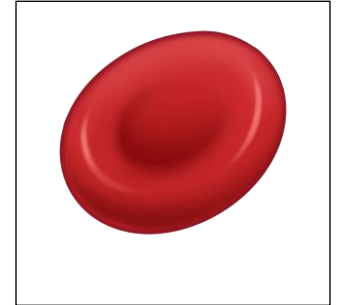
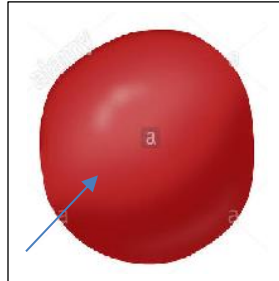
Isotonic



Hypertonic

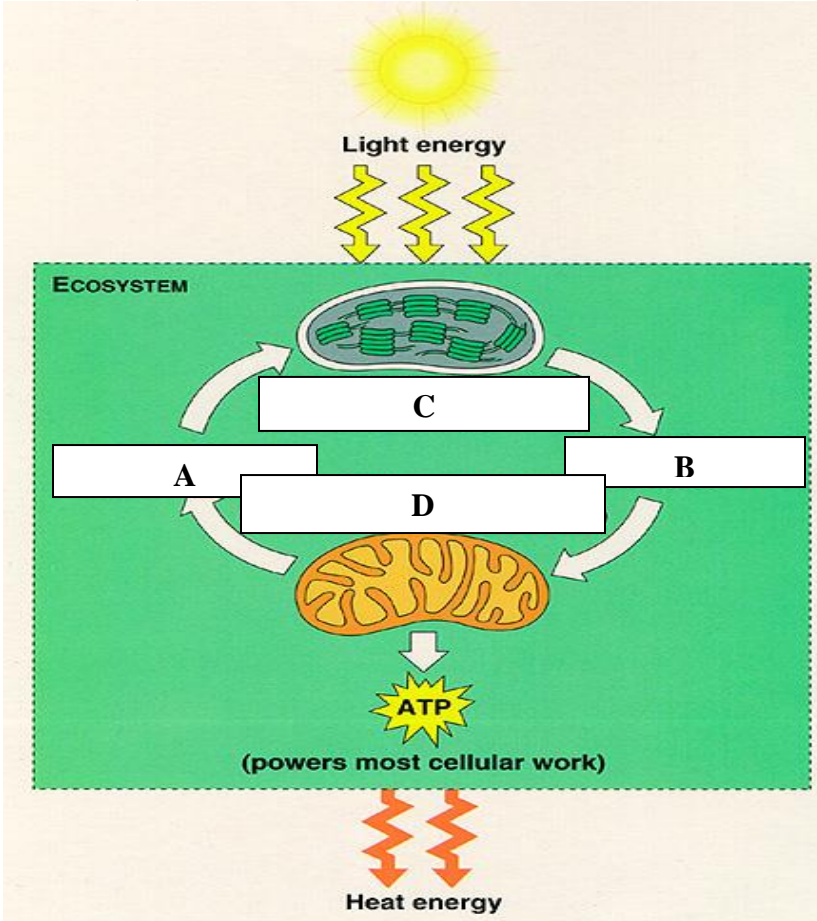
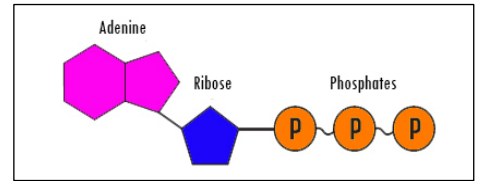


Hypotonic



**Cell Energy**

1. What is ATP and what is its function? **Adenosine Triphosphate; provides energy to the cell.**
2. How does ATP provide energy to the cell (what happens)? **By breaking off the third phosphate group.**
3. Make a rough sketch of ATP to the right and include each of the parts.



4. Fill in the missing pieces of the picture:

A. What are the reactants of photosynthesis and the products of cellular respiration?  
**Carbon dioxide, water, energy**

B. What are the products of photosynthesis and the reactants of cellular respiration?  
**Glucose, oxygen**

C. In what organelle does photosynthesis occur? **chloroplast**

D. In what organelle does cellular respiration occur? **mitochondria**

5. What is the relationship between photosynthesis and cellular respiration?

**The reactants of one are the products of the other; they are opposite processes.**

6. Fill out the chart on the two types of respiration:

	<b>Aerobic</b>	<b>Anaerobic</b>
<b>Oxygen required?</b>	<b>Yes</b>	<b>No</b>
<b>Steps?</b>	<b>1. Glycolysis 2. Krebs Cycle 3. Electron Transport Chain</b>	<b>1. Glycolysis</b>
<b>Net ATP/Products?</b>	<b>36 ATP</b>	<b>2 ATP</b>



7. Complete the following table.

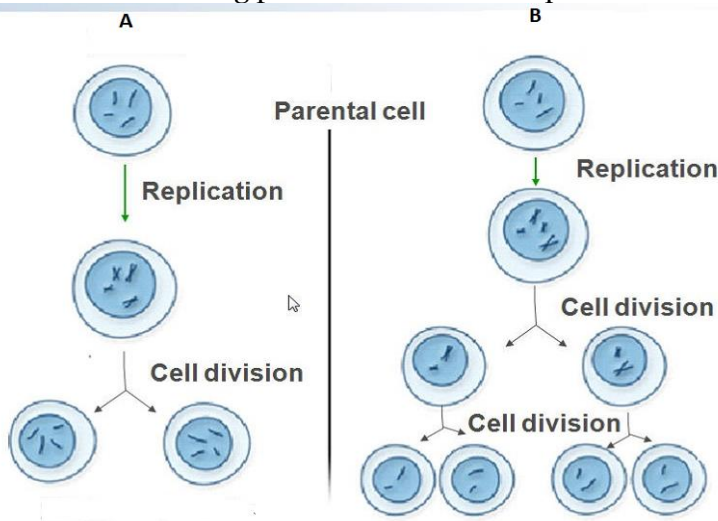
	<b>Photosynthesis</b>	<b>Cellular Respiration</b>
<b>What type of organisms do this?</b>	Plants and plant-like organisms	All eukaryotes do aerobic
<b>Cell organelle process occurs in</b>	Chloroplast	Mitochondria
<b>Overall Equation</b>	$6\text{CO}_2 + 6\text{H}_2\text{O} + \text{sunlight} \rightarrow \text{C}_6\text{H}_{12}\text{O}_6 + 6\text{O}_2$	$\text{C}_6\text{H}_{12}\text{O}_6 + 6\text{O}_2 \rightarrow 6\text{CO}_2 + 6\text{H}_2\text{O} + 36 \text{ATP}$

### Cell Reproduction

1. Use the following chart to check which statement applies to mitosis, meiosis or both.

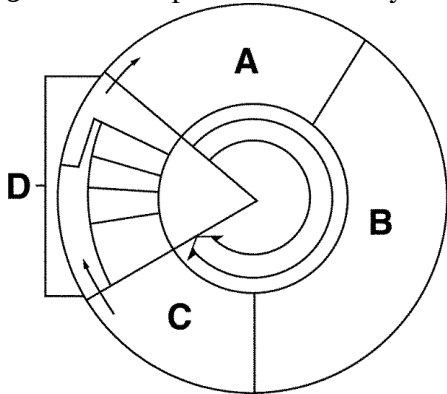
<b>Statement</b>	<b>Mitosis</b>	<b>Meiosis</b>
Nucleus and nuclear membrane break down	X	X
Sister chromatids move to opposite ends of the cell	X	X
Centrioles form spindle fibers	X	X
Homologous chromosomes pair to form tetrads		X
Crossing over occurs		X
Makes somatic cells, such as lung cells	X	
Makes gametes, such as egg and sperm		X
Makes daughter cells	X	X
Associated with asexual reproduction	X	
Associated with sexual reproduction		X
Daughter cells are genetically identical	X	
Daughter cells are genetically different		X
Begins with the diploid number of chromosomes	X	X
Ends with the diploid number of chromosomes	X	
Ends with the haploid number of chromosomes		X
Creates 2 daughter cells	X	
Creates 4 daughter cells		X
Chromosomes move to the equator of the cell	X	X
Has one division cycle	X	
Has two division cycles		X

2. Use the following picture to answer the questions that follow.



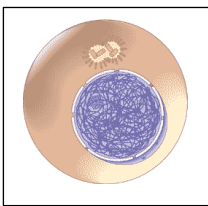
- Which diagram represents mitosis?  
A
- Which diagram represents meiosis?  
B
- What is the diploid number of both diagrams? 4
- What is the haploid number? 2
- Which diagram ends with the diploid number of chromosomes? A
- Which diagram ends with the haploid number of chromosomes? B
- What type of daughter cells will form from the division process in A? **somatic cells**
- What type of daughter cells will form from the division process in B? **sperm or egg (gametes)**

3. Label the parts of the cell cycle below.

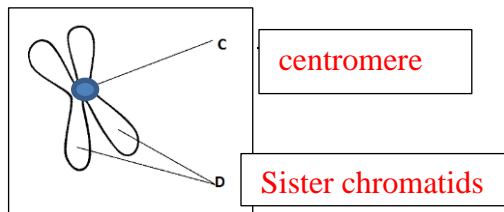


- G1**
  - S**
  - G2**
- A, B, and C make up: **interphase**
- M Phase (cell division)**
- Parts of D: **prophase, metaphase, anaphase, telophase, cytokinesis**

4. Label the different types of DNA as they exist in interphase and mitosis and meiosis as well as their parts: chromatin, doubled chromosome, centromere, sister chromatids, single chromosome, tetrad/homologous chromosomes.



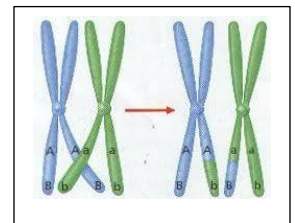
A chromatin



B doubled chromosome



E single chromosome



F tetrad composed of two homologous chromosomes

- What is crossing over? **Exchange of genetic information between homologous chromosomes in the tetrad**
- Does it occur during mitosis or meiosis? **Meiosis only**
- During what phase does it occur? **Prophase I**

## Genetics

1. Match the following terms with the correct definition.

- |  |  |
|--|--|
| <u>B</u> 1. Gene                           | a. A trait that is hidden or masked by a more powerful trait.              |
| <u>D</u> 2. Genotype                       | b. A segment of DNA that codes for a specific trait.                       |
| <u>F</u> 3. Phenotype                      | c. Principle stating that some traits overpower other traits.              |
| <u>H</u> 4. Allele                         | d. Two letter combination of alleles for a given trait. Ex: Bb             |
| <u>K</u> 5. Homozygous                     | e. Principle stating that when alleles separate they do it independently.  |
| <u>M</u> 6. Heterozygous                   | f. Physical appearance of a trait as determined by the genotype. Ex: Green |
| <u>N</u> 7. Genetics                       | g. Principle stating that alleles separate during gamete formation.        |
| <u>I</u> 8. Punnett Square                 | h. An alternate form of a gene represented by a single letter.             |
| <u>L</u> 9. Dominant                       | i. A tool used to predict the probability of the offspring's traits.       |
| <u>O</u> 10. Incomplete Dominance          | j. The offspring express both traits of the parents equally.               |
| <u>J</u> 11. Codominance                   | k. Describes a genotype where both of the alleles are the same.            |
| <u>G</u> 12. Law of Segregation            | l. A trait that overpowers or masks another trait.                         |
| <u>E</u> 13. Law of Independent Assortment | m. Describes a genotype where one allele is dominant and one is recessive. |
| <u>C</u> 14. Law of Dominance              | n. The study of heredity.  |
| <u>A</u> 15. Recessive                     | o. The offspring express the traits of both parents as a blend or mixture. |

2. Complete Dominance Problem

In humans, having dimples is dominant over not having dimples.

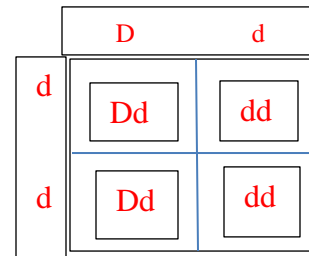
Cross a man who is heterozygous for the dimples trait with a

Woman who does not have dimples. Use the letter D.

Parents: Dd x dd

Genotypic ratio: 0 DD: 2 Dd: 2 dd

Phenotypic ratio: 2 Dimples: 2 no Dimples



3. Incomplete Dominance Problem

In rabbits, a brown fur coat is the result of a blend between

red fur and white fur. Assign genotypes to the following

phenotypes. Then cross two brown fur rabbits. Use the letter R.

Red fur genotype: RR

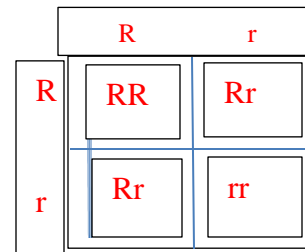
Brown fur genotype: Rr

White fur genotype: rr

Parents: Rr x Rr

Genotypic ratio: 1 RR: 2 Rr: 1 rr

Phenotypic ratio: 1 red: 2 brown: 1 white



4. Codominance Problem

In chickens, a checkered feather pattern (BW) is a combination of both

black (BB) and white feathers (WW). Both black feathers and white

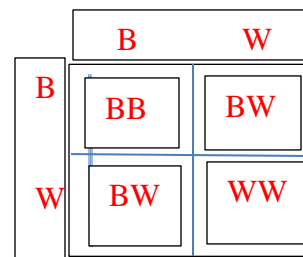
feathers are dominant and equally expressed in the offspring. Cross two

checkered chickens.

Parents: BW x BW

Genotypic ratio: 1 BB: 2 BW: 1 WW

Phenotypic ratio: 1 black: 2 checkered: 1 white



### 5. Multiple Alleles Problem

In humans, there are four types of blood; type A, type B, type AB, and type O. The alleles A and B are codominant to each other and the O allele is recessive to both A and B alleles.

- What possible genotypes will produce B type of blood? BB or BO
- What is the only genotype that will produce O type of blood? OO
- What is the only genotype that will produce AB type of blood? AB
- What blood type is the universal donor? O universal receiver? AB

In the 1950's, a young woman sued film star/director Charlie Chaplin for parental support of her illegitimate child. Charlie Chaplin's blood type was already on record as type AB. The mother of the child had type A and her son had type O blood.

a. Complete a Punnett square for the possible cross of Charlie and the mother.

	<b>A</b>	<b>?</b>
<b>A</b>	<b>AA</b>	<b>A?</b>
<b>B</b>	<b>AB</b>	<b>B?</b>

b. The judge ruled in favor of the mother and ordered Charlie Chaplin to pay child support costs of the child. Was the judge correct in his decision based on blood typing evidence? Explain why or why not. \*refer to any Punnett squares to support your answer. **He cannot be the father because he cannot contribute an o allele.**

### 6. Sex-Linked Problem

Can a male be a carrier of a sex-linked trait? **No** Why or why not? **Carriers are heterozygous and males only have one X linked allele so they either express the trait or do not express the trait**

In humans, hemophilia is a sex-linked trait. Females can be normal, have the disease, or be carriers for the trait. Males will either have the disease or not, but they won't ever be carriers.

	<b>X<sup>h</sup></b>	<b>Y</b>
<b>X<sup>H</sup></b>	<b>X<sup>H</sup>X<sup>h</sup></b>	<b>X<sup>H</sup>Y</b>
<b>X<sup>h</sup></b>	<b>X<sup>h</sup>X<sup>h</sup></b>	<b>X<sup>h</sup>Y</b>

X<sup>H</sup>X<sup>H</sup>: normal female

X<sup>H</sup>X<sup>h</sup>: female who is a carrier

X<sup>h</sup>X<sup>h</sup>: female with hemophilia

X<sup>H</sup>Y: normal male

X<sup>h</sup>Y: male with hemophilia

Show the cross of a man who has hemophilia with a woman who is a carrier.

What is the probability that their children will have the disease? 50%

7. Di-hybrid Problem

In sheep, assume that spotted skin (S) is dominant over non-spotted skin (s) and that wooly hair (W) is dominant over non-wooly hair (w). Cross a heterozygous spotted, non-wooly sheep with a heterozygous wooly-haired, non-spotted sheep. Give phenotypic ratios of offspring.

Parent 1 Genotype: **Ssww**

Parent 2 Genotype: **ssWw**

Foil Options: (First, Outer, Inner, Last)

Parent 1   **S**    **s**    **w**    **w**  

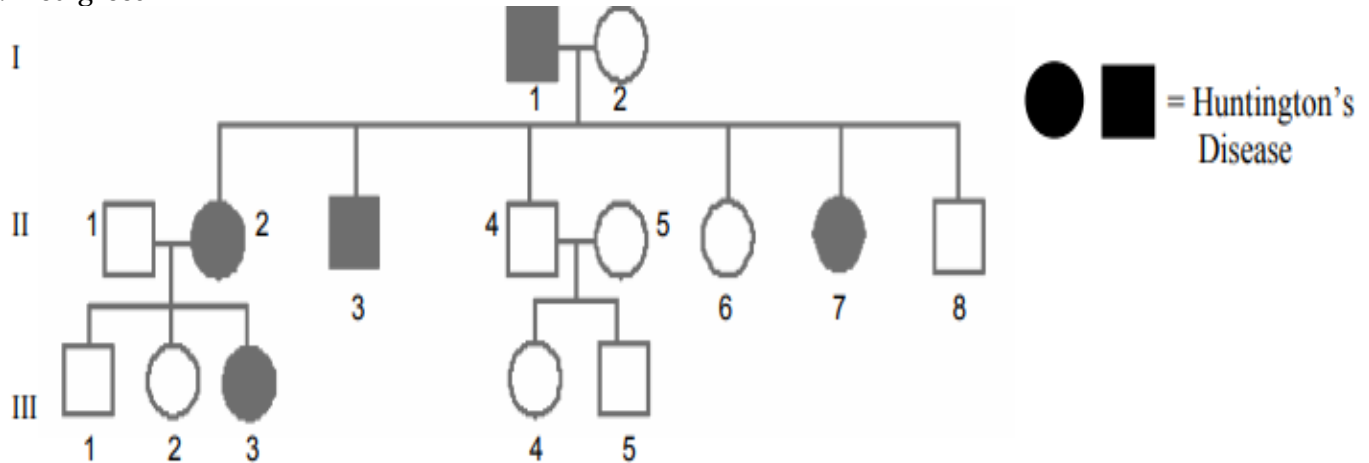
Parent 2   **s**    **S**    **w**    **w**  

	<b>Sw</b>	<b>Sw</b>	<b>sw</b>	<b>sw</b>
<b>sW</b>	<b>SsWw</b>	<b>SsWw</b>	<b>ssWw</b>	<b>ssWw</b>
<b>sw</b>	<b>Ssww</b>	<b>Ssww</b>	<b>ssww</b>	<b>ssww</b>
<b>sW</b>	<b>SsWw</b>	<b>SsWw</b>	<b>ssWw</b>	<b>ssWw</b>
<b>sw</b>	<b>Ssww</b>	<b>Ssww</b>	<b>ssww</b>	<b>ssww</b>

Offspring Genotypic Ratio:   **4 Spotted Wooly Sheep**  :   **4 Spotted Non-Wooly Sheep**  :  
  **4 Non-Spotted Wooly Sheep**  :   **4 Non-Spotted, Non-Wooly Sheep**

In a true dihybrid cross the phenotypic ratio will always be 9 : 3 : 3 : 1

### 8. Pedigrees



Pedigree Basics: Females are represented by a circle, males are represented by a square. Shaded in individuals are affected by the disorder.

Do all pedigrees 1/2 shade heterozygous individuals? No, some will leave heterozygous individuals unshaded

Use the pedigree above to answer the following questions:

Which members of the family above are affected by Huntington's Disease? I-1, II-2, II-3, II-7, III-3

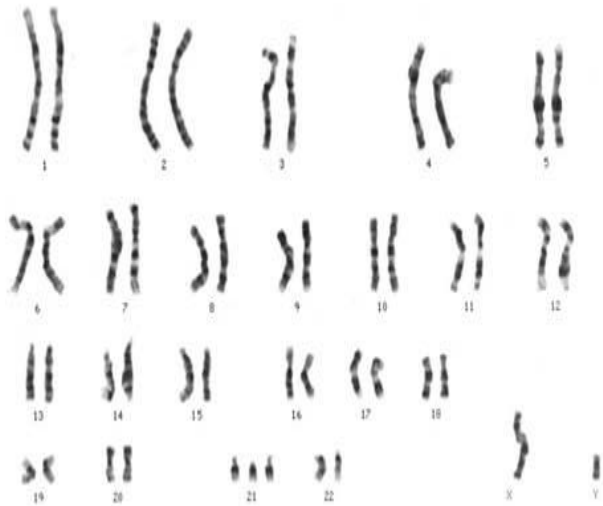
There are no carriers for Huntington's Disease- you either have it or you don't. With this in mind, is Huntington's disease caused by a dominant or recessive trait? Dominant

How many children did individuals I-1 and I-2 have? 6

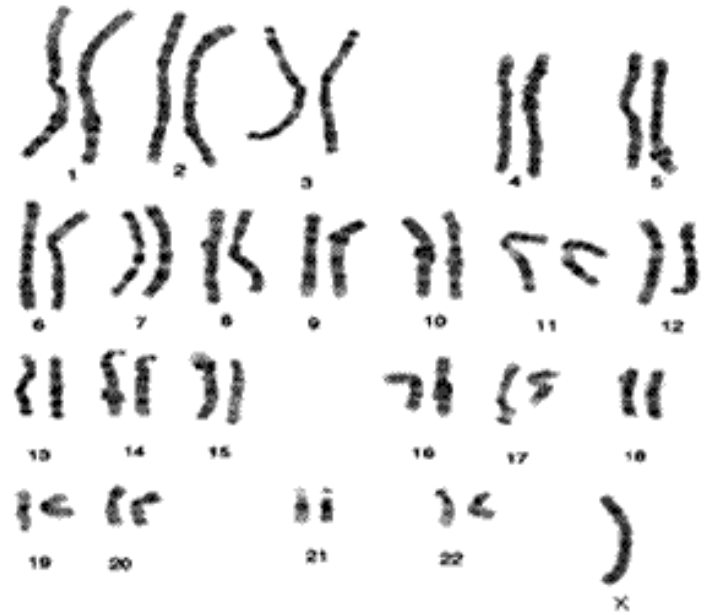
How many girls did II-1 and II-2 have? 2

How are individuals III-2 and II-4 related? II-4 is her uncle

## 9. Karyotypes



Patient A



Patient B

### Questions

1. What is karyotyping used for? **Identify the sex of the individual and located chromosomal disorders**
2. How many pairs of autosomal chromosomes do humans have? **22**
3. What sex is patient A? **Male (X and Y)**
4. Does Patient A have one of the disorders we discussed in class? If so, list the disorder and how you knew. **Yes, Trisomy 21 (Down Syndrome) – Three number 21 chromosomes**
5. Does Patient B have one of the disorders we discussed in class? If so, list the disorder and how you knew. **Yes, Turner's Syndrome because she only has one number 23 chromosome**
6. What are two pieces of information you can get from a Karyotype? **Sex of the individual and location of chromosomal disorders**
7. What is the normal diploid number for a human being? **46**
8. Are the cells being examined for this karyotype diploid or haploid? **diploid**