

**Biomolecule – General Knowledge**

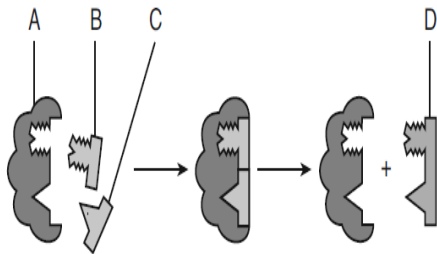
Macromolecule	Monomer (building block)	Function
		Short term Energy Storage
	Glycerol/Fatty Acid	
		Enzyme
Nucleic Acid		

1. What type of biomolecule is wax, oils, and fats?
2. What is the polymer of a nucleotide?
3. Which of the macromolecule groups include enzymes?

<b>Know the examples of each biomolecule below:</b>
<b>Carbohydrate:</b> cellulose, starch, glucose
<b>Lipid:</b> wax, fats, oils
<b>Protein:</b> enzymes
<b>Nucleic Acids:</b> DNA, RNA

5. Whales are marine organisms that typically live in extremely cold water. What macromolecule composes the thick layer of blubber that surrounds their internal organs?

**Enzyme Reactions**



1. What is the function of an enzyme?

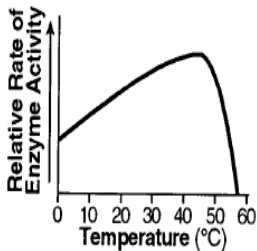
2. Label structures A, B and C on the diagram

A \_\_\_\_\_  
 B \_\_\_\_\_  
 C \_\_\_\_\_  
 D \_\_\_\_\_

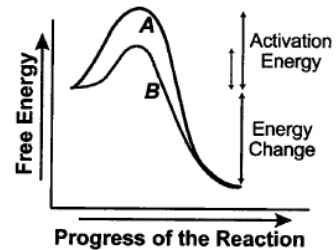


3. What is the function of the catalase in this reaction?
4. Identify the substrate in this reaction.
5. List 2 factors that could denature the catalase in this reaction.

**Enzyme-Graph Interpretation**



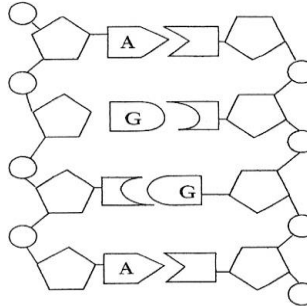
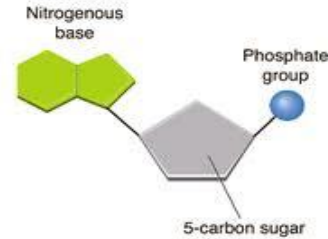
1. What is a valid conclusion based on the information in the graph?
2. Describe enzyme activity?
3. At what temperature has the enzyme begun to denature?
4. Identify the dependent variable based on the information in the graph.
5. What would be an appropriate title for this graph?



6. What is activation energy?
7. Line B in the given graph represents the reaction with a catalyst added to substrates. How did the catalyst affect the reaction?

## DNA Structure

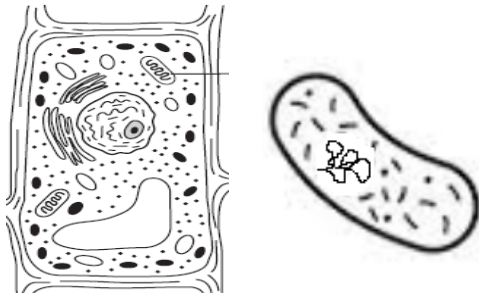
1. The structure to the right depicts a \_\_\_\_\_.
2. The "backbone" or sides of the DNA double helix are made up of alternating \_\_\_\_\_ and \_\_\_\_\_.
3. \_\_\_\_\_ is the sugar of DNA.
4. The genetic information is stored in the \_\_\_\_\_ of the DNA nucleotide.
5. How does DNA compare in all living organisms?
6. If the amount of cytosine equals 35%, what percentage of the bases is guanine? \_\_\_\_\_



7. Label the following on the DNA strand to the left.

- put a P on the phosphates
- put a S on the sugars
- put a ☆ on the hydrogen bonds
- circle ONE nucleotide
- label all the missing bases

## Cell Structure and Function



1. List three similarities between both cells.
2. List three differences between both cells.
3. How does the cell membrane help maintain homeostasis?
4. Which of the structures contains the information needed for protein synthesis?

## Prokaryotic vs Eukaryotic Cells

1. What cell structures do prokaryotes and eukaryotes have in common?

2. Label the cells below as prokaryote or eukaryote.

2. Cell Type:		
Characteristic	Present	Not Present
Free floating genetic material	X	
Ribosome	X	
Cytoplasm	X	
Cell Membrane	X	

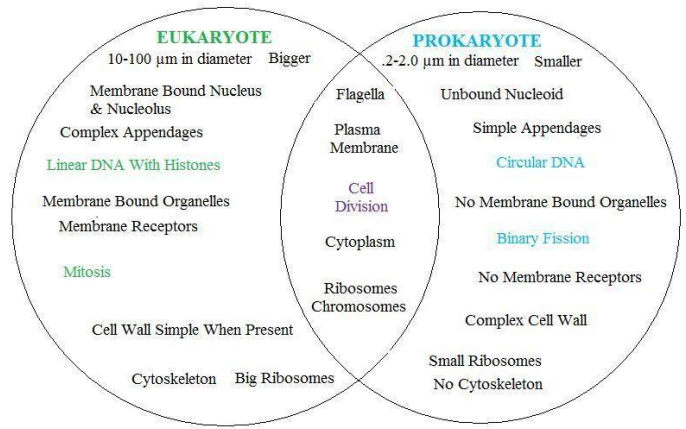
3. Cell Type:		
Characteristic	Present	Not Present
Nucleus	X	
Ribosome	X	
Cytoplasm	X	
Cell Membrane	X	

4. Cell Type:		
Characteristic	Present	Not Present
Mitochondria	X	
Vacuole	X	
Endoplasmic Reticulum	X	
Ribosome	X	

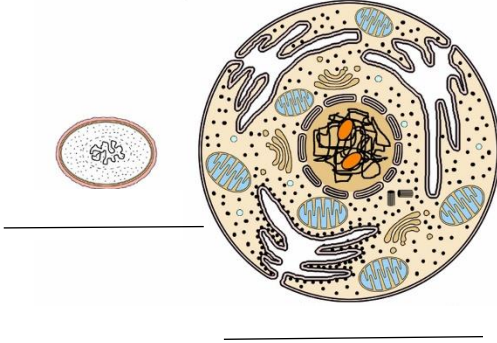
5. Cell Type:		
Characteristic	Present	Not Present
Nucleus		X
Cell Membrane	X	

Answer the following with prokaryote, eukaryote or both:

- Which cell type is larger? \_\_\_\_\_  
 Which cell type has a nucleus? \_\_\_\_\_  
 Which cell has ribosomes? \_\_\_\_\_  
 Which cells contain cell walls? \_\_\_\_\_  
 Which cell type is simpler? \_\_\_\_\_

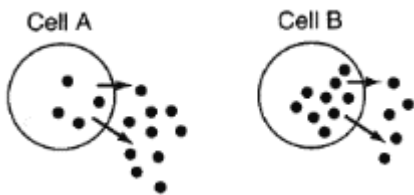


Label the cells below prokaryote or eukaryote



### Cell Transport and Homeostasis

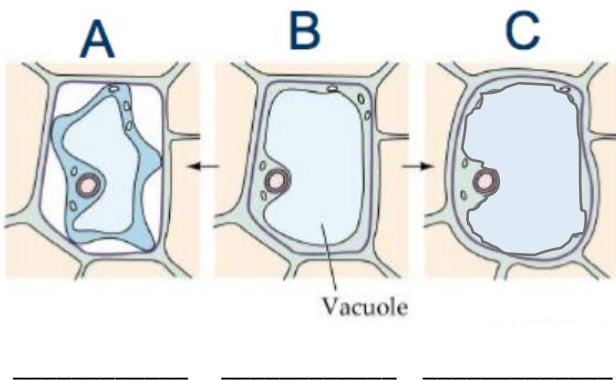
#### Transport



- ATP would be used in which of these cells to transport the molecules?
- Identify the type of transport as active or passive.

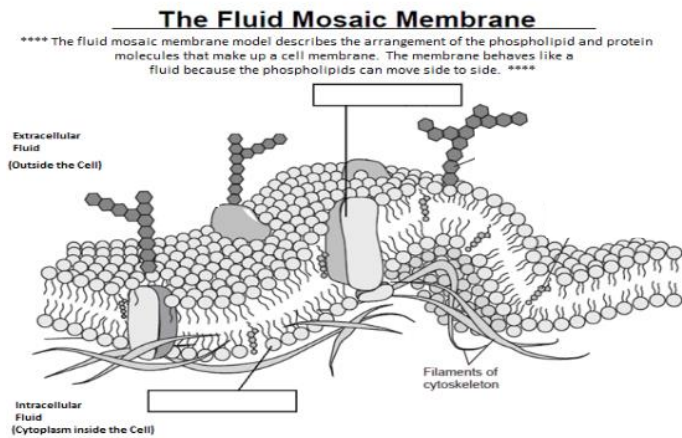
Cell A= \_\_\_\_\_ Cell B= \_\_\_\_\_

- Based on your previous knowledge, where is ATP manufactured within the cell?



- Which illustration on the left would best represent what would happen to a fresh water plant cell placed in a 25% salt solution?
- Which illustration to the left would best represent what would happen to a 2% salt water plant cell placed in fresh water (0% salt)?
- What plant cell structure most likely prevents a plant cell from bursting open?
- Underneath each cell, write: **into** cell, **out of** cell or **no change** to describe direction of water flow.

Label the phospholipids and proteins below:



Which biomolecule is the main component of the cell membrane? \_\_\_\_\_

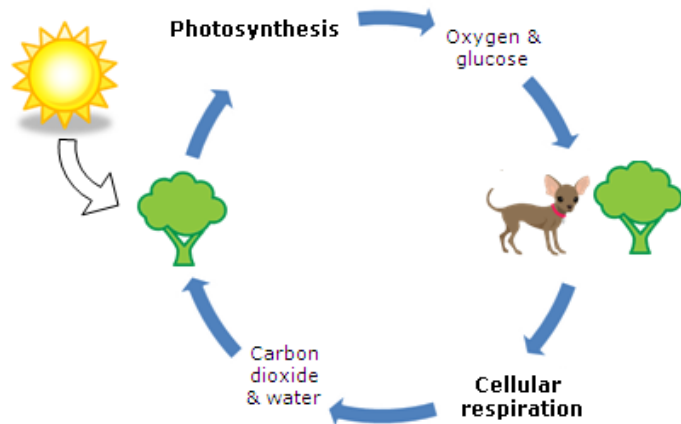
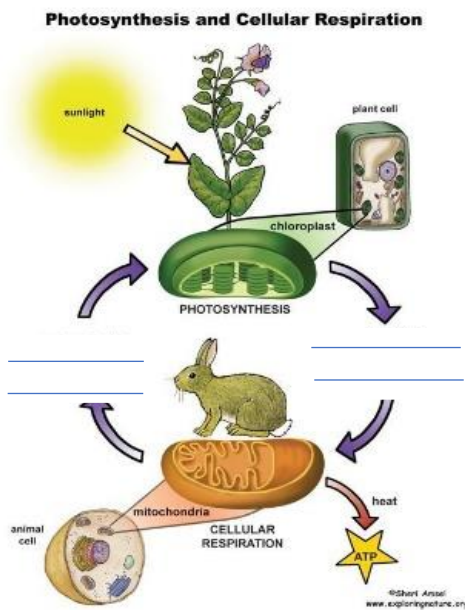
The cell membrane is a bilayer. How many layers is it? \_\_\_\_\_

Explain why phospholipids form a bilayer.

Why is the cell membrane considered selectively permeable?

**Cell Processes/Energy**

- Label the products and reactants in the diagram on the left.

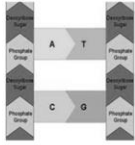


- How do the products of photosynthesis and the reactants of cellular respiration relate?
- What organelle is involved in cellular respiration?
- What organelle is involved in photosynthesis?

Match the following:

- |                  |                      |
|------------------|----------------------|
| 1. _____ Sun     | A. Chemical energy   |
| 2. _____ Glucose | B. Mechanical energy |
| 3. _____ ATP     | C. Radiant energy    |

## DNA vs RNA



(A)



(B)



(C)

1. Which structure to the left, most accurately depicts the structure of DNA?
2. The shape of DNA is called a \_\_\_\_\_.
3. What model above represents a RNA structure?
4. DNA and RNA have similarities and differences. Fill in the table below using your previous knowledge.

DNA	BOTH	RNA

## Protein Synthesis

1. The process of going from DNA to mRNA is known as \_\_\_\_\_. This process occurs only in the \_\_\_\_\_ of a cell.

2. The process of going from mRNA to a chain of amino acids is known as \_\_\_\_\_. This process occurs only in the \_\_\_\_\_ of the cell.

3. The monomer of a protein is a(n) \_\_\_\_\_.

4. In what cellular organelle does protein synthesis occur?

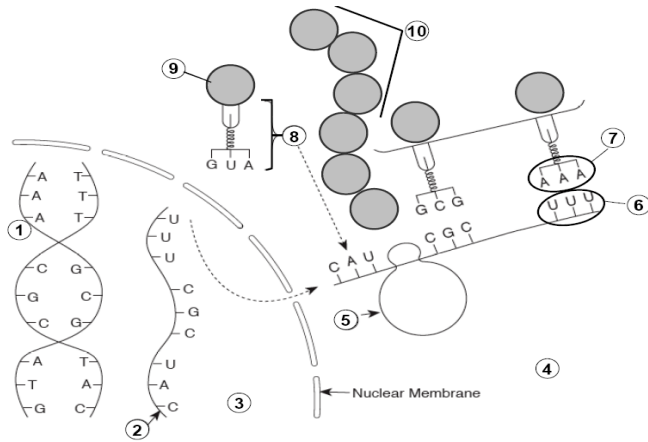
5. What 3 organelles are involved in making and distributing proteins?

5. Complete the following table. Use the codon chart to determine the amino acid.

DNA	ATC		TAT
mRNA		CCC	
Amino Acid			

		2nd base in codon					
		U	C	A	G		
1st base in codon	U	Phe Phe Leu Leu	Ser Ser Ser Ser	Tyr Tyr STOP STOP	Cys Cys STOP Trp	U C A G	3rd base in codon
	C	Leu Leu Leu Leu	Pro Pro Pro Pro	His His Gln Gln	Arg Arg Arg Arg	U C A G	
	A	Ile Ile Ile Met	Thr Thr Thr Thr	Asn Asn Lys Lys	Ser Ser Arg Arg	U C A G	
	G	Val Val Val Val	Ala Ala Ala Ala	Asp Asp Glu Glu	Gly Gly Gly Gly	U C A G	

## Protein Synthesis Labeling

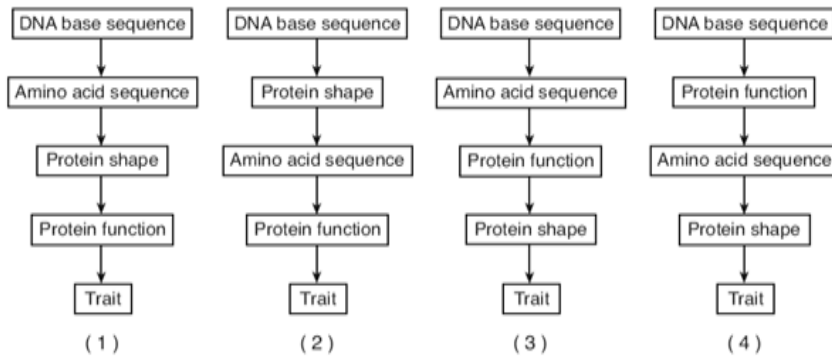


Label each number in the diagram

1. \_\_\_\_\_
2. \_\_\_\_\_
3. \_\_\_\_\_
4. \_\_\_\_\_
5. \_\_\_\_\_
6. \_\_\_\_\_
7. \_\_\_\_\_
8. \_\_\_\_\_
9. \_\_\_\_\_
10. \_\_\_\_\_

Cytoplasm	DNA	Ribosome	Anticodon
tRNA	Codon	Amino acid	mRNA
Protein	Nucleus		

1. What cellular process is illustrated between numbers 1 and 2?
2. What cellular process is illustrated from numbers 6 through 10?
3. Which of the following sequence best represents the relationship between DNA and traits?



1. What two environmental factors affect gene expression in some organisms?
2. Why do cells look and function differently if DNA is the same in every cell of an organism?



## Mutations

For each of the following scenarios locate and circle the mutation and then answer the questions.

Original DNA	ATC	TTT	GCG	CAA	TGT
Mutation 1	ATC	TTT	GCG	GAA	TGT

Mutation Type: \_\_\_\_\_

Original DNA	ATC	TTT	GCG	CAA	AGT
Mutation 2	ATC	TTT	CGC	GCA	ATG T

Mutation Type: \_\_\_\_\_

Original DNA	ATC	TTT	GCG	CAA	AGT
Mutation 3	ATC	TTG	GCG	AAT	GT

1<sup>st</sup> Mutation Type: \_\_\_\_\_ 2<sup>nd</sup> Mutation Type: \_\_\_\_\_

1. What type(s) of mutation would be the least harmful to an organism?  
\_\_\_\_\_ Why?

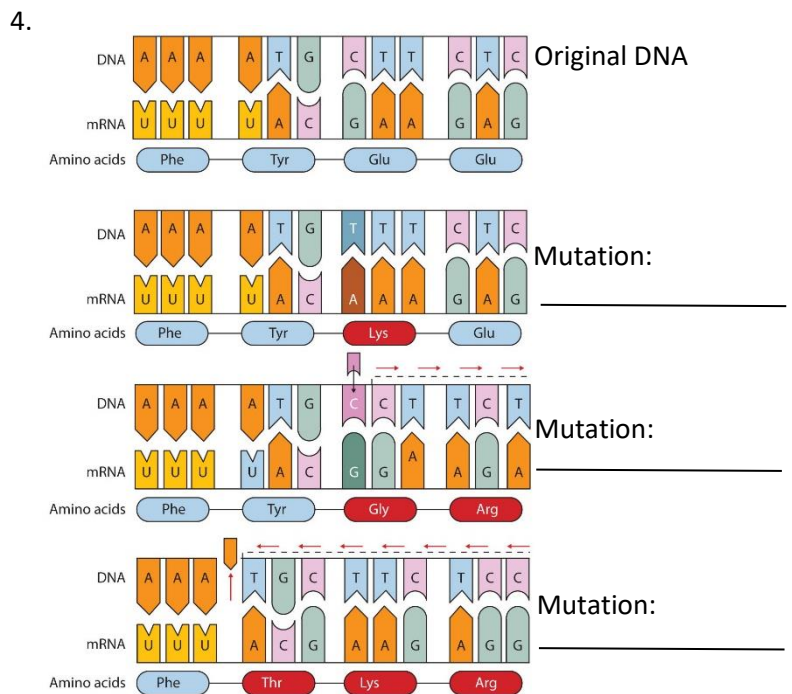
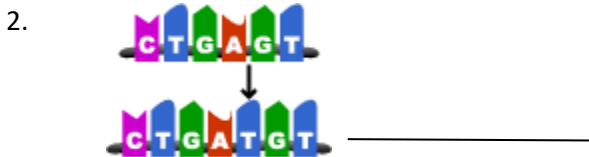
2. What type(s) of mutation would be the most detrimental to an organism?  
\_\_\_\_\_ Why?

3. Are mutations always bad? Why or why not?

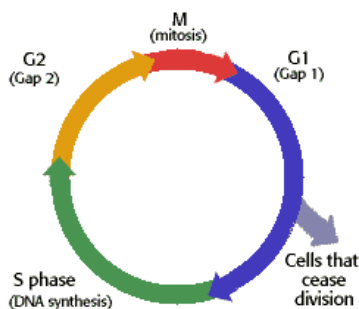
4. Give two examples of frameshift mutations:

5. What is another name for a point mutation?

Label the following mutations Insertion, Deletion or Substitution



## Cell Cycle



1. Explain what occurs at the following:

a. G1- make materials

b. S –

c. G2- repair and prepare

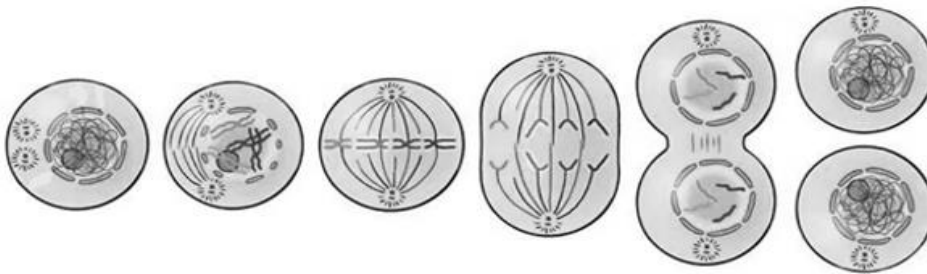
2. What does mitosis produce?

3. Explain why it is important that mitosis occurs after DNA replication takes place.

4. A mutation occurred at M stage and caused uncontrolled cell growth, also known as \_\_\_\_\_ What stage in interphase is skipped? \_\_\_\_\_

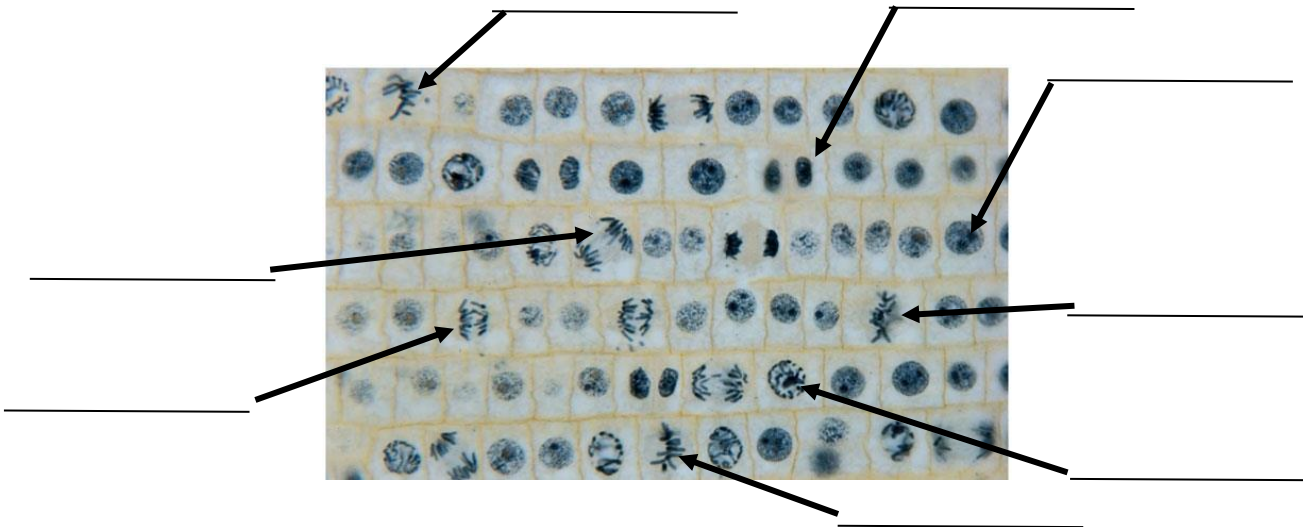
**Cell Cycle - Mitosis**

1. How many cells are produced at the end of mitosis? \_\_\_\_ What type of cells are these? \_\_\_\_\_
2. How do these new cells compare to each other? \_\_\_\_\_
3. Label the diagram below:



4. What process does DNA go through during S phase of Interphase? \_\_\_\_\_

**Identify the Cell Cycle phases:**

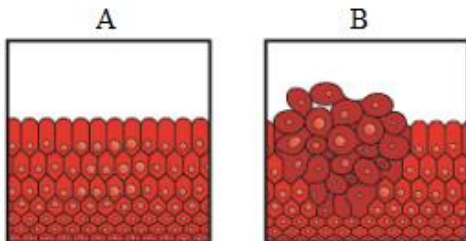


Why is the cell cycle important, what is it for?

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**Changes in the Cell Cycle**

Circle which diagram best depicts a group of cancerous cells.



Explain your choice.

1. What environmental factors can potentially lead to disruption in mitosis?

2. What does uncontrolled cell growth lead to?

3. What is the resting stage in Interphase that cancer cells do not enter?