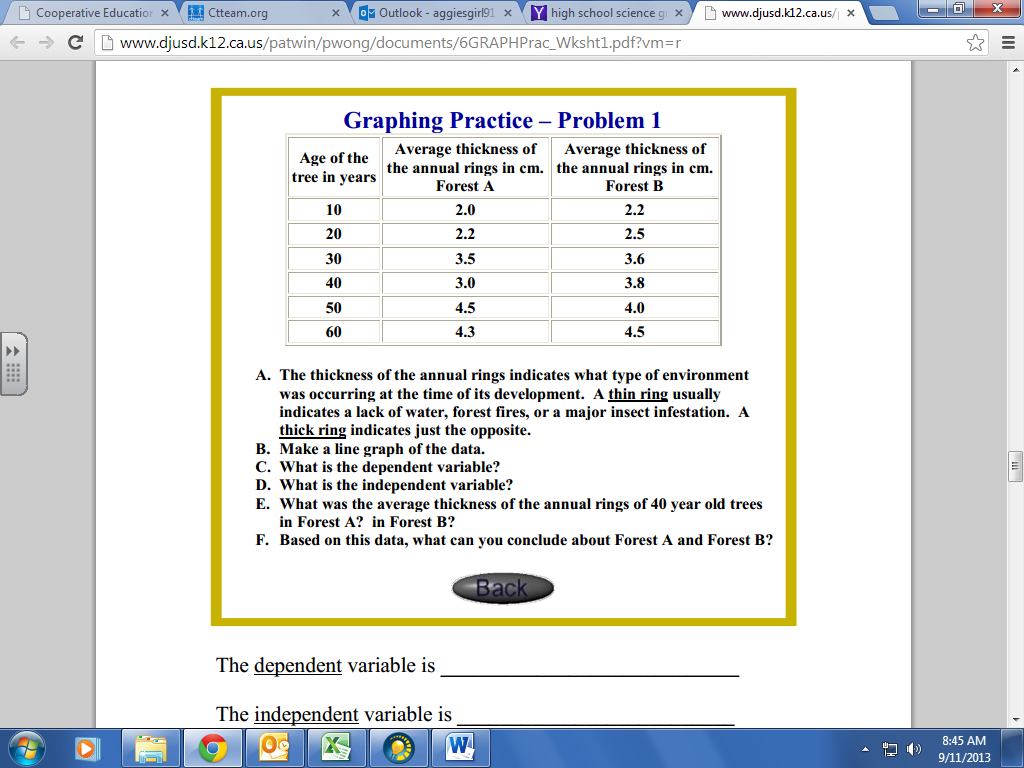
**Biology 21: Midterm Study Guide 2015-2016**

##### Introduction to Biology

* List and Define the characteristics of life

|  |  |
| --- | --- |
| Characteristic | Example |
|  |  |
|  |  |
|  |  |
|  |  |
|  |  |
|  |  |

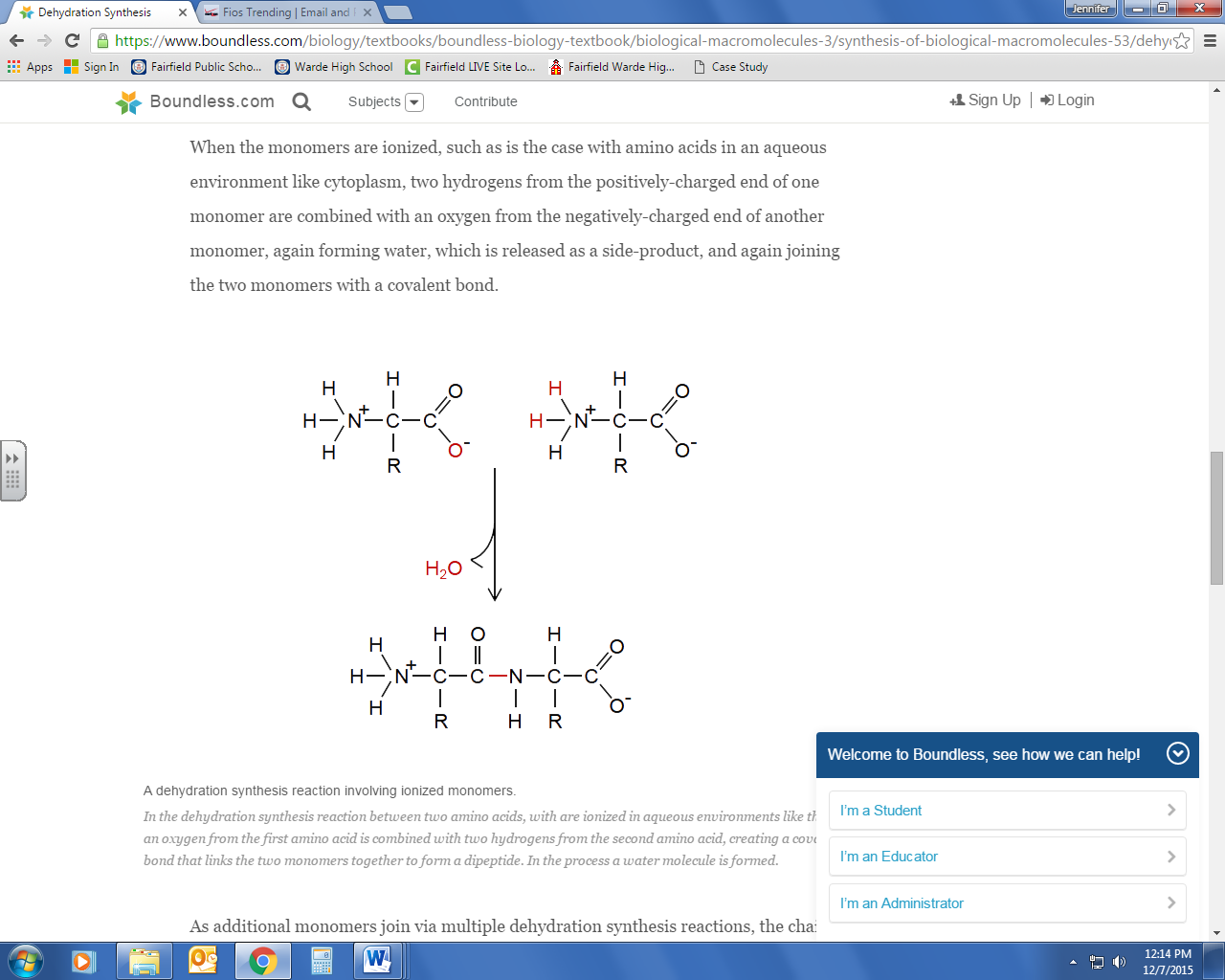


* Use the scientific method to design and analyze and experiment.
* Use and define the following: controlled experiment, independent variable, dependent variable, control group, variables held constant, validity
* Read graphs and create a graph with a title, plotted points and properly labeled axes.

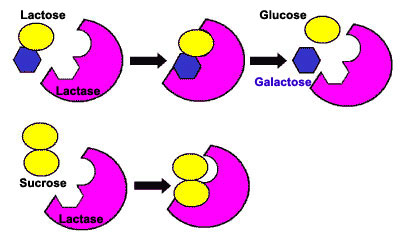
###### Biochemistry

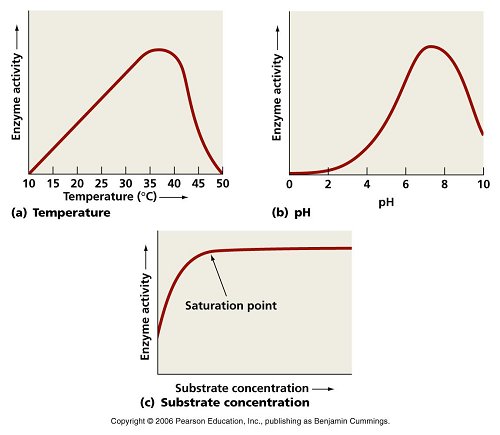
* Identify why all organic compounds all contain carbon
* State the structure and function of the four major types of organic compounds by completing the table:

|  |  |  |  |
| --- | --- | --- | --- |
| Macromolecule | Monomer | Polymer | Function |
| Carbohydrates |  |  |  |
| Proteins |  |  |  |
| Lipids |  |  |  |
| Nucleic Acids |  |  |  |

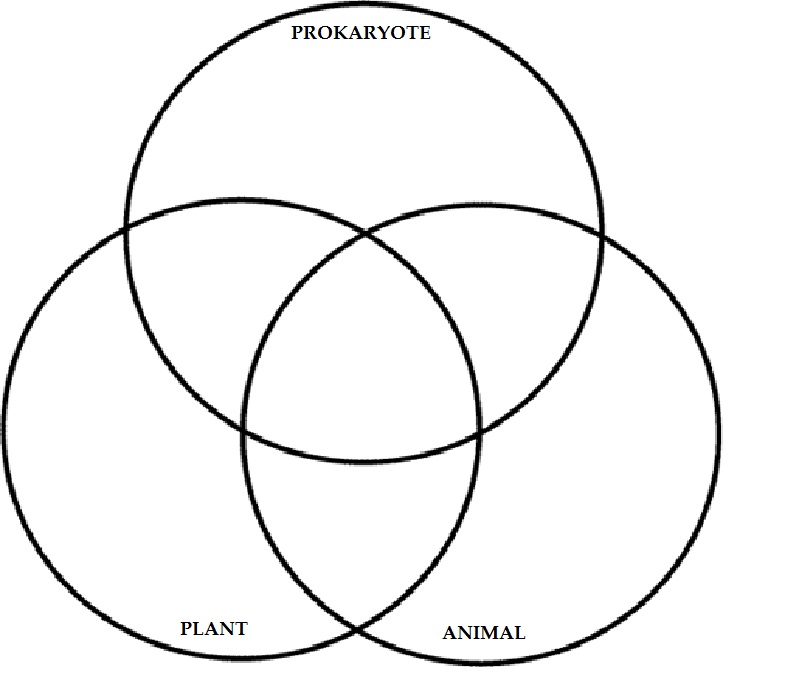


* Describe the creation of polymers and monomers by dehydration synthesis and hydrolysis.
  + Label the reaction and describe what is happening.
  + What is the monomer? What is the polymer?
* Describe enzyme specificity.



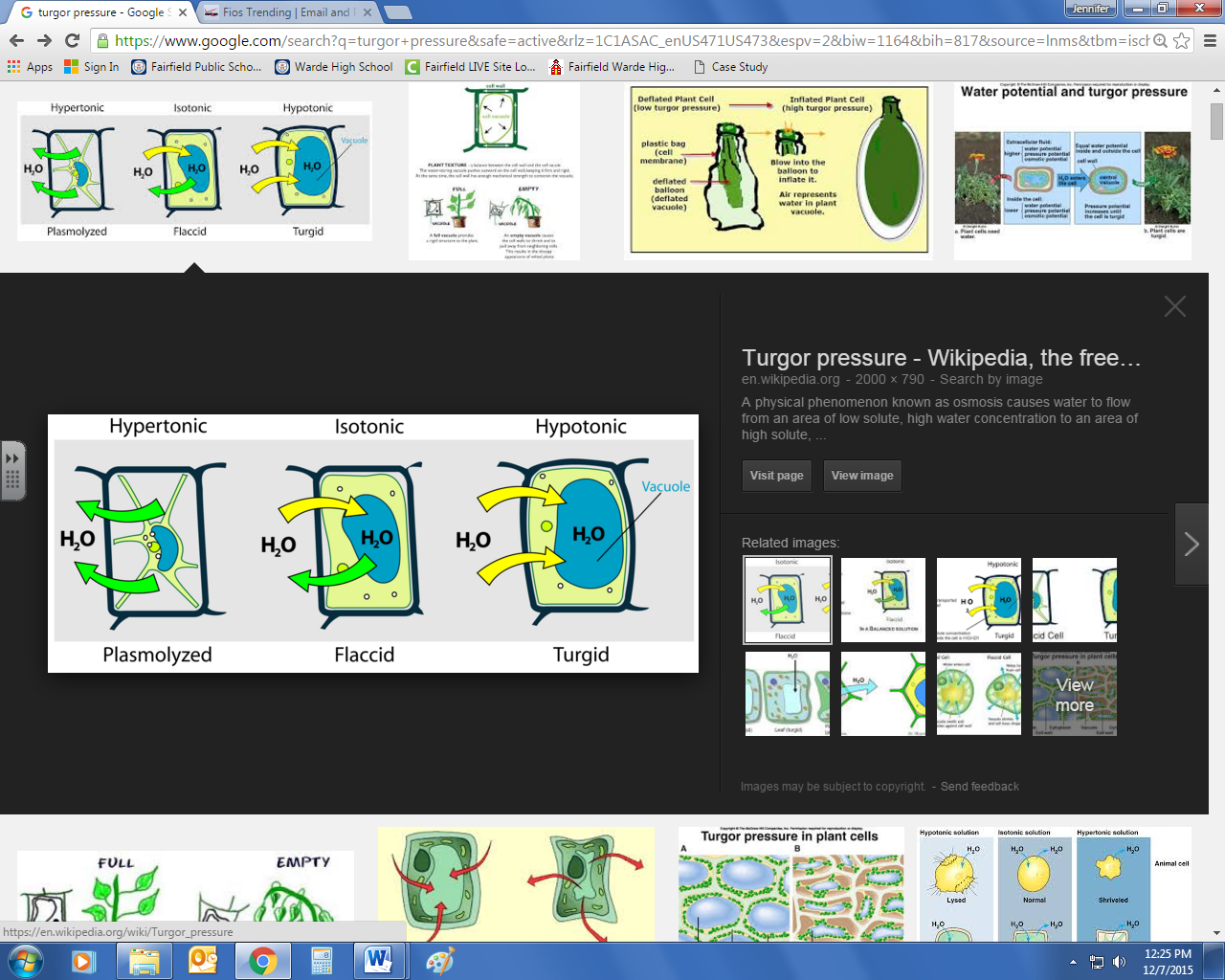
* Describe the structure and function of enzymes. Explain how enzymes do their function.
* Describe how factors affecting enzyme function (temperature and pH)

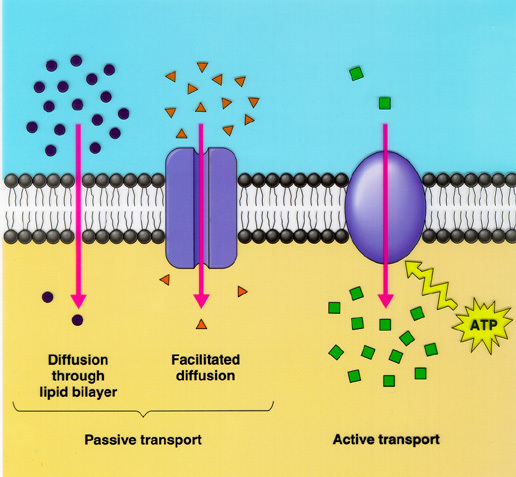
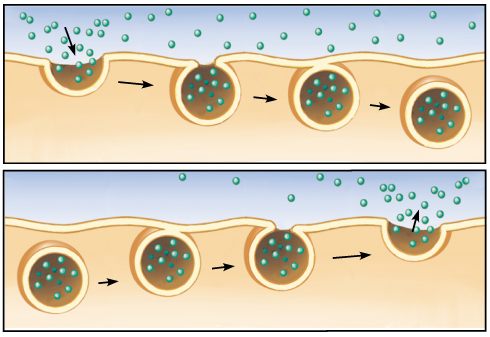
###### Cell Structure and Function

* Apply the Cell Theory
* Identify the difference between the cell structures in prokaryotes vs. eukaryote cells
* Compare and contrast the cell structure in plant vs. animal cells
* Describe the structure and function of the cell membrane, nucleus and other organelles (ribosome, vacuoles [food, water, contractile], lysosomes, Golgi body, mitochondria, chloroplast, cell wall)

|  |  |  |  |
| --- | --- | --- | --- |
| ORGANELLE | STRUCTURE | FUNCTION | IN WHAT TYPES OF  CELLS |
| Cell membrane |  |  |  |
| Nucleus |  |  |  |
| Ribosome |  |  |  |
| Food vacuole |  |  |  |
| Water vacuole |  |  |  |
| Contractile vacuole |  |  |  |
| Lysosome |  |  |  |
| Golgi body |  |  |  |
| Mitochondria |  |  |  |
| Chloroplast |  |  |  |
| Cell Wall |  |  |  |

* Describe how the various organelles work together to complete the functions of the cells.
* Identify molecules that can pass through a membrane passively and actively.



* Describe how osmosis will affect a plant and animal cell differently. (turgor pressure vs. cytolysis)
* Describe the process of endocytosis and exocytosis, including the organelles and how they are used.
* Describe the role of proteins in the cell membrane.
* Compare and contrast passive transport vs. active transport (concentration gradient, hypertonic, hypotonic, isotonic, ion pumps)

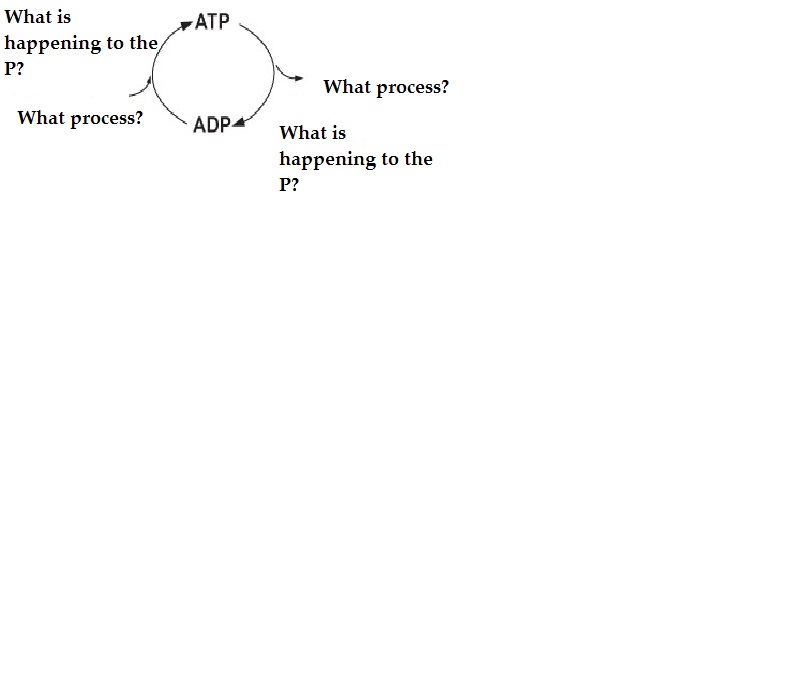
|  |  |  |  |
| --- | --- | --- | --- |
| **Type of Transport** | **Passive or**  **Active** | **Definition** | **Examples of Molecules Transported** |
| **Osmosis** |  |  |  |
| **Diffusion** |  |  |  |
| **Facilitated Diffusion** |  |  |  |
| **Ion Pumps** |  |  |  |
| **Exocytosis** |  |  |  |
| **Endocytosis** |  |  |  |

###### Cell Energetics (Cellular Respiration and Photosynthesis)

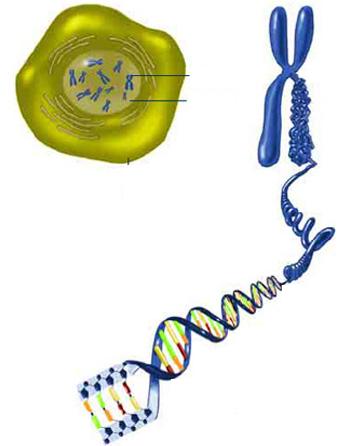
* Describe the complementary roles of photosynthesis in producers and cellular respiration in all living things
* Compare and contrast autotrophs and heterotrophs.

|  |  |  |  |
| --- | --- | --- | --- |
|  | **LOCATION** | **SUMMARIZE** | **END PRODUCT** |
| **GLYCOLYSIS** |  |  |  |
| **AEROBIC** |  |  |  |
| **ANAEROBIC** |  |  |  |
| **FERMENTATION** |  |  |  |
| **PHOTOSYNTHESIS** |  |  |  |

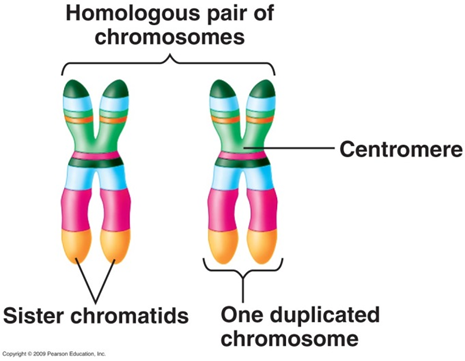
* Identify the location and summarize each of the following processes: glycolysis, aerobic and anaerobic energy pathways (including fermentation)
* Identify the end products of fermentation, aerobic respiration and photosynthesis.

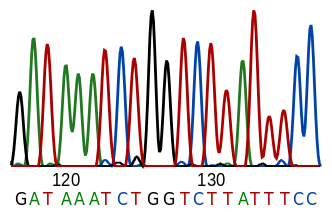


* Describe the ADP and ATP cycles.
* Describe how humans are affected by a lack of oxygen.
* Compare and contrast the production of ATP through aerobic vs. anaerobic pathways



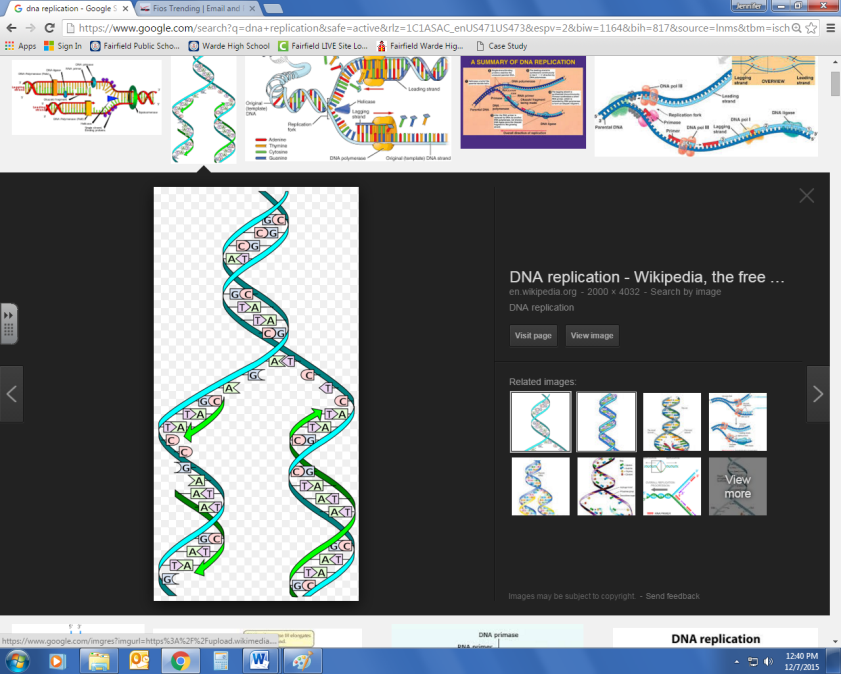
###### DNA, RNA, and Protein Synthesis

* Describe the relationship between nucleotides, genes, chromosomes and DNA.
* Identify the structure of a chromosome and the importance of replicated strands and homologous chromosomes.
* Describe how adenine, guanine, cytosine, thymine and uracil are complementary.

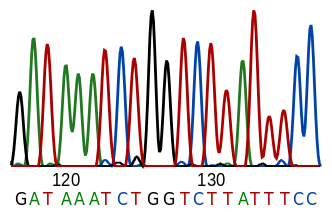


* Compare and contrast the structure and function of DNA and RNA (mRNA and tRNA)

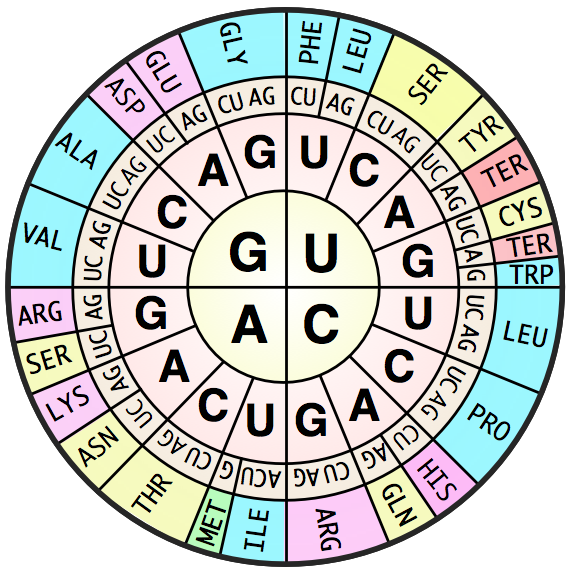
|  |  |  |
| --- | --- | --- |
|  | Structure | Function |
| DNA |  |  |
| mRNA |  |  |
| tRNA |  |  |

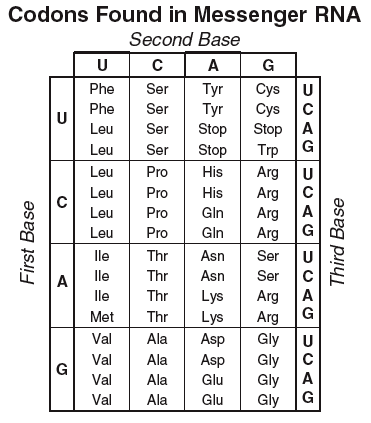


* Describe the process of DNA replication
* Define and describe transcription (DNA to mRNA)
* Define and describe translation (mRNA to protein)
* Translate and transcribe a nucleotide sequence.

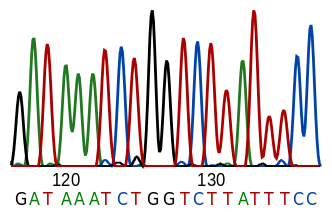


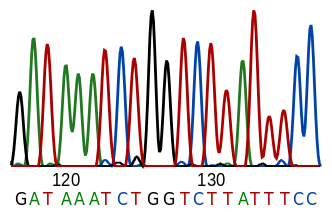
* Use the codon chart to determine the amino acid sequence of a gene

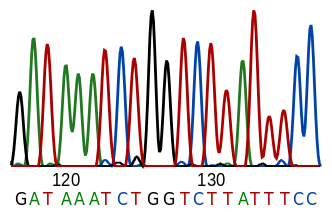




* Identify DNA mutations (deletion, substitution, frame-shift)







* Read and analyze a karyotype (male or female? Is it “normal?” What is wrong?)

