Day 3: Periodic Table & Chemistry of Living Systems (3pts ec)

#7 Periodic Table: The organization of the periodic table is based on the properties of the elements and reflects the structure of atoms.

a. Know how to identify regions corresponding to metals, nonmetals, and inert gases.

covalent bonding

more than 4 valence

nonconductor

electrons

- b. Each element has a specific number of protons in the nucleus (the atomic number) and each isotope of the element has a different but specific number of neutrons in the nucleus.
- **c.** Substances can be classified by their properties, including their melting temperature, density, hardness, and thermal and electrical conductivity.

Homework to do BEFORE the Lecture:

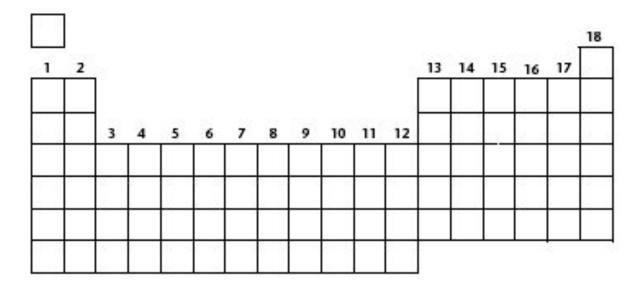
semiconductors

lustrous

conductive

 1. Development of the Periodic Table Use chapter 13 (pages 326 – 343). • Who was the chemist responsible for the first periodic table? • He arranged the table according to the element's properties. List some of these properties. 							
Currently, the periodic table is arranged according to what?							
2. Metals, Nonmetals, &	Metalloids: Label each property with	n a Metal (M), Nonmetal (N) or Metalloid (D).					
malleable	metallic bonding	receives electrons in chemical reactions					
ductile	brittle	gives away electrons in chemical reactions					

On the periodic table below, color the metals blue, the metalloids green, & the nonmetals yellow.



possesses properties of both metals & nonmetals

typically have a half set of valence electrons

gaseous at room temperature

less than 4 valence electrons

3. Follow the directions below to color in the

Periodic Table.

- 1. Label the square for hydrogen with an H. Color it yellow.
- 2. Label the 2 groups of very reactive metals red. Write their family names in each column.
- 3. Label the noble (also known as INERT) gases in green. Label the family "Noble Gas".
- 4. Color and label the halogens in green.
- 5. Color the transition metals blue.
- 6. Using black, mark the zigzag line that shows the position of the metalloids.
- 7. Color the metalloids green.
- 8. Use yellow to color all of the nonmetals
- 9. Color the *metals* in Groups 13–16 brown.

4. A closer look at the element symbol, atomic we		abel the parts with the following terms: atomic number, element name,		
a) What is an isotope?		a) What is an isotope?		
c		b) What is the atomic weight?		
Carbon 12		c) What does atomic weight have to do with isotopes?		
Brainpop: Periodic Table:	Take Notes:			
	Day 3 Part	2: Chemistry of Living Systems		
a. Carbon, because of inchemistry of living	its ability to combine g organisms.	es): Principles of chemistry underlie the functioning of biological systems. in many ways with itself and other elements, has a central role in the consisting largely of carbon, hydrogen, nitrogen, oxygen, phosphorus, and		
sulfur.		nds of molecules, including small ones, such as water and salt, and very		
large ones, such as	s carbohydrates, fats,			
——————————————————————————————————————	- Take Not	105		
HWK before the Lectur 1. What are organic compo		07. Read all 3 paragraphs on the page & answer the questions		
2. Why is carbon such an i	mportant element?			

Fill out the table below, using pages 408-411.

Biochemicals: The Compounds of Life

	What is it?	Examples	Picture (example) & Structure
Carbohydrates "Carbs"		•	
Lipids "Fats"		•	
Proteins		•	
Nucleic Acid "DNA"		• DNA • RNA	

Paunds element/bar a different shade. Oxygen Nitrogen Elements Hydrogen Calcium Phosphorous

Other

Below, make a bar graph of pounds on the y-axis and the 7 elements on the x-axis. Color each

Other Elements

Total:

100%

1.0

Phosphorous

3%

2%

4%

Calcium

Hydrogen

8% 9%

9

Nitrogen Oxygen

Composition of the Human Body

Did you know that your body is made out of the following (minus water)?

- 53% Carbon
- 21% Oxygen
- 9% Nitrogen
- 8% Hydrogen
- 4% Calcium 3% Phosphorous

2% Sulfur, Sodium, and all other elements

Time to figure out what this is in pounds! First, how much do you weigh? Total Weight:

Fill out the table below:

Element

In Body

Decimal

Carbon

53% 21%

53

.53 ×

Decimal x your weight Pounds



The Blueprint of Life

Every cell in your body has the same "blueprint" or the same DNA. Like the blueprints of a house tell the builders how to construct a house, the DNA "blueprint" tells the cell how to build the organism. Yet, how can a heart be so different from a brain if all the cells contain the same instructions? Although much work remains in genetics, it has become apparent that a cell has the ability to turn off most genes and only work with the genes necessary to do a job. We also know that a lot of DNA apparently is nonsense and codes for nothing.

Write out the full name for DNA.				
2.	What is a gene?			
3.	Where in the cell are chromosomes located?			
4.	What two scientists established the structure of DNA?			
5.	What is the shape of DNA?			
6.	What are the sides of the DNA ladder made of?			
7.	What are the "rungs" of the DNA ladder made of?			
8.	What sugar is found in DNA?			
9.	How do the bases bond together? A bonds with G bonds with			
	D. Why is DNA called the "Blueprint of Life"?			

a phosphate which links the sugars together

a sugar (deoxyribose),

molecules:

called nucleotides. Each nucleotide consists of three The DNA helix is actually made of repeating units ladder at the sugars and not the phosphate. Note that that the bases attach to the sides of the

Color the cytosines yellow Color the guanines purple Color the adenines green

Color the thymines orange

and then one of the four bases.

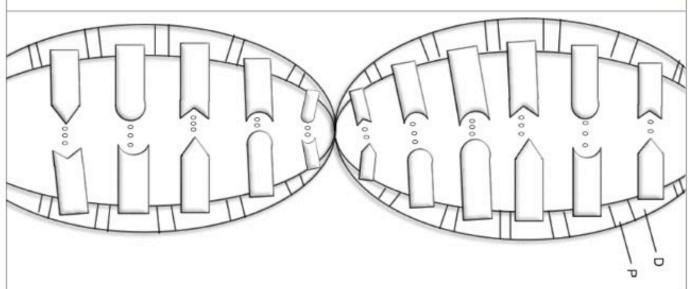
The pyrimidines are thymine and cytosine.

Two of the bases are purines - adenine and guanine.

Color the hydrogen bonds grey represented by small circles. have the correct information. The hydrogen bonds are Without these instructions, the new cells wouldn't that the new cells each contain a copy of the DNA. itself. DNA needs to copy itself when a cell divides, so loosely by hydrogen bonds. The DNA can actually "unzip" when it needs to replicate – or make a copy of The two sides of the DNA ladder are held together

DNA Structure Coloring Instructions

ATGCACATA would code for a different gene than along a strand of DNA. The order of these bases is nitrogen bases. The bases are known by their coded bases. (For simplicity, the image only contains a few.) AATTACGGA. A strand of DNA contains millions of the code the contains the instructions. For instance the "Base-Pair Rule". The bases can occur in any order Guanine will only bond with cytosine. This is known as certain way. Adenine will only bond to thymine. letters A, G, T, C. These bases always bond in a The rungs of the ladder are pairs of 4 types of



Color the structure of DNA attached. Label the parts