

4. A closer look at the Periodic Table: Label the parts with the following terms: atomic number, element name, element symbol, atomic weight

6	_____
C	_____
Carbon	_____
12	_____

- a) What is an isotope?
- b) What is the atomic weight?
- c) What does atomic weight have to do with isotopes?

Brainpop: Periodic Table: Take Notes: _____

Day 3 Part 2: Chemistry of Living Systems

#6 Chemistry of Living Systems (Life Sciences): Principles of chemistry underlie the functioning of biological systems.

- a. Carbon, because of its ability to combine in many ways with itself and other elements, has a central role in the chemistry of living organisms.
- b. Living organisms are made of molecules consisting largely of carbon, hydrogen, nitrogen, oxygen, phosphorus, and sulfur.
- c. Living organisms have many different kinds of molecules, including small ones, such as water and salt, and very large ones, such as carbohydrates, fats, proteins, and DNA.

Brainpop: Chemistry of living things: Take Notes: _____

HWK before the Lecture: Turn to page 407. Read all 3 paragraphs on the page & answer the questions

1. What are organic compounds? _____

2. Why is carbon such an important 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	

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



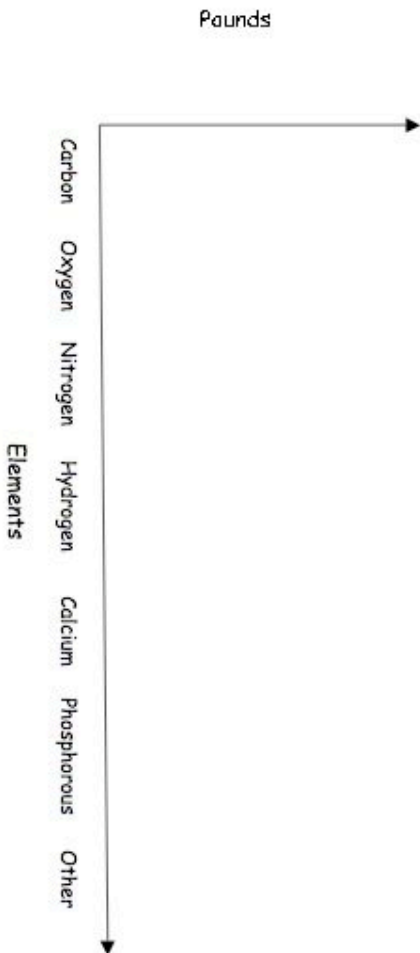
Time to figure out what this is in pounds! First, how much do you weigh?

Total Weight: _____ pounds.

Fill out the table below:

Element	In Body	Decimal	Pounds Decimal x your weight
Carbon	53%	.53	.53 x _____ = _____
Oxygen	21%		
Nitrogen	9%	.09	
Hydrogen	8%		
Calcium	4%		
Phosphorous	3%		
Other Elements	2%		
Total:	100%	1.0	

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



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.

1. 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 _____
10. Why is DNA called the "Blueprint of Life"?

Color the structure of DNA attached. Label the parts
DNA Structure Coloring Instructions

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

Color the thymines orange.

Color the adenines green.

Color the guanines purple.

Color the cytosines yellow.

Note that the bases attach to the sides of the ladder at the sugars and not the phosphate.

The DNA helix is actually made of repeating units called nucleotides. Each nucleotide consists of three molecules:

a sugar (deoxyribose),

a phosphate which links the sugars together, and then one of the four bases.

Two of the bases are purines - adenine and guanine. The pyrimidines are thymine and cytosine.

The two sides of the DNA ladder are held together loosely by hydrogen bonds. The DNA can actually "unzip" when it needs to replicate - or make a copy of itself. DNA needs to copy itself when a cell divides, so

that the new cells each contain a copy of the DNA. Without these instructions, the new cells wouldn't have the correct information. The hydrogen bonds are represented by small circles.

Color the hydrogen bonds grey.

