In Biology we study the biochemical structure of living things. In this webquest you will learn some basic chemistry and then you will learn about the four macromolecules all living things are made of: carbohydrates, proteins, lipids, and nucleic acids!

PART I Basic Chemical Concepts
To review atomic structure go to: https://www.youtube.com/watch?v=o-3I1JGW-Ck

- substances that cannot be broken down by chemical activity

Atom-

- Structure
  - Proton: ______________ charged
  - Neutron: ______________ charged
  - Electron: ______________ charged
    - Electrons exist ______________
    - Protons and neutrons are the same ___________ and make up the nucleus
- Identification
  - ______________ ______________: the number of protons
  - Atomic mass number: number of __________ + neutrons
  - Atoms can lose or gain electrons and they are known as ______________
  - Atoms with a different number of neutrons are called _______________

Now go to http://www.ptable.com to fill in the blanks

<table>
<thead>
<tr>
<th>Element</th>
<th>Symbol</th>
<th>Atomic number</th>
<th>Atomic mass</th>
<th># protons</th>
<th>#electrons</th>
<th>#neutrons</th>
<th>type of element</th>
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</table>

Go to http://www.phschool.com/science/biology_place/biocoach/biokit/chnops.html

What are the six most common elements in living things?
What is the acronym to help us remember these elements?
PART II Isotopes
Go to http://www.youtube.com/watch?v=w3eGLevylGE to fill in the blanks:
- Two atoms with the same _______ number but different atomic mass numbers. Differ only in the number of _______. Some are radioactive (radioisotopes).
  - E.g. isotopes of hydrogen:
    - H-1 has a mass number of 1 and no neutrons
    - H-2 has a mass number of 2 and only one neutron
    - H-3 has a mass number of 3 and two neutrons
- Identify the following isotopes. How many neutrons are found in each isotope?
  - C-12
  - C-14

PART III Compounds and Bonding
https://www.ducksters.com/science/chemistry/chemical_bonding.php

Describe the difference between covalent and ionic bonds:

- Covalent bond: when atoms ____________ electrons
  - Form single, ____________, or triple bonds
  - Sharing of ____________ holds the atoms together

- Draw the Lewis dot diagram for carbon dioxide below:

PART IV Macromolecules

Carbohydrates Tutorial
Click on the link provided and read the tutorial about carbohydrates. You may need to scroll up and down on the small screen at the top of the tutorial for more information. When you finish go to Step 2 Lipids.

Internet Links:
Carbohydrates http://www.wisc-online.com/objects/index_tj.asp?objid=AP13104

- Carbohydrates provide the raw fuel for _____________ ___________ ___________.
  - Give 2 examples of monosaccharides.
    a. 
    b. 
  - _________ is the 6 carbon sugar found in blood.
  - _________ is the sugar that sweetens fruit.
  - _________ is the sugar found in milk.

Glucose can have a straight line of carbon atoms or form a ________ structure.
The 5 carbon sugars called pentose are used in nucleic acid synthesis are _______________ and _______________.

Give 2 examples of disaccharides.

a.  

b.

Polysaccharides include _______________, ____________, and ____________.

_____________ is the storage molecule made from glucose by plants.

_____________ is made by plants for cell wall construction.

Glycogen is the carbohydrate storage molecule found in ____________ and ____________.

**Lipids Tutorial**

Click on the link below and answer the questions on your sheet about lipids. When you finish the lipid portion on your worksheet go to Step 3 to view Protein tutorial. Answer the questions on your sheet about Proteins.

**Internet Links:**


Lipid Tutorial

- Lipids are organic molecules that are ________________ in water.
- Give 3 examples of lipids.

a. 

b. 

c.

Neutral fats are also called ________________ because they have 3 fatty acids.

4. Neutral fats 3 functions:

a. 

b. 

c.

5. The building blocks of neutral fat molecules are __________ and ______________.

6. ______________ fatty acids originate from animal sources and are __________ at room temperature.

7. ______________ fats originate from plants and are __________ at room temperature.

8. ______________ are the chief components of all cell membranes.

1. ______________ helps to stabilize cell membranes and is used by the body to break down steroids.

**Protein Synthesis**

Click on the Protein link below to view the Protein tutorial. Answer the questions on your Biochemistry worksheet while viewing tutorial. After you have finished go to the Step 4 link on Nucleic Acids (DNA).

**Internet Links:** [http://www.wisc-online.com/objects/index_tj.asp?objid=AP13304](http://www.wisc-online.com/objects/index_tj.asp?objid=AP13304)

Protein Tutorial

Proteins make up _______ % to _______% of cell mass.
Examples of proteins in an organism.

a. 

b. 

c. 

d. 

Proteins are built from _______ common building blocks called _______________.
The primary structure of protein is determined by the sequence of ________________ connected by ________________ bonds.

**Nucleic Acids**

**DNA Tutorial**

Internet Links:  

**Intro**

DNA comes with a complete set of ______________ to make an entire organism. Using only ____ letters the DNA molecule builds everything from a bug to a human.

**Role of DNA**

While you are growing you need DNA to produce more ___________.

As an adult you also need DNA to:

a. 

b. 

c. 

**The Cell**

DNA directs the entire operation by issuing instructions to make things you need such as __________.

DNA allows organisms to make _______________ of themselves which is a requisite of life.

**Chromosomes**

Inside the nucleus you find DNA packaged into _________________.

You get 1 set of chromosomes from your ______ and 1 set of chromosomes from your ________.

Each cell has _______ chromosomes arranged into _______ pairs.

**Watson and Crick**

What are the 4 nitrogen bases found in DNA?

a. 

b. 

c. 

d. 

What is the shape of DNA? ________________

Now use Google to find three differences between DNA and RNA:

a. 

b. 

c. 