1. Define **valence electrons -**
2. Elements are considered \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ when they have \_\_\_\_\_\_ valence electrons.
3. This is called the \_\_\_\_\_\_\_\_\_\_\_ rule.

|  |  |  |
| --- | --- | --- |
| **Element** | **# of Valence Electrons** | **Stable or Reactive?** |
| Helium |  |  |
| Potassium |  |  |
| Chlorine |  |  |

1. Carbon has exactly \_\_\_\_\_\_\_\_\_\_\_ valence electrons. This makes it easiest to \_\_\_\_\_\_\_\_\_\_\_\_

electrons with other elements, forming \_\_\_\_\_\_\_\_\_\_\_\_\_\_ bonds.

1. Define **organic compounds –**
2. *Review question: Look at the organic molecules at the bottom of the slide. Which three have both double and single covalent bonds?*
3. Define **macromolecules –**
4. The four classes of macromolecules are:






1. Define **polymer –** 
   1. What is the only organic molecule that is NOT a polymer?
2. From the same three types of simple sugars, you can make…
3. Based on the picture, starch is a polymer. ( True / False )

**Carbohydrates**

1. Carbohydrates are \_\_\_\_\_\_\_\_\_\_\_\_\_\_.
   1. They are made of what three elements?
2. Carbohydrates are the main source of \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ for all life.
3. Define **monosaccharides –**
4. The three types of monosaccharides are:
5. Monosaccharides serve as a \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ and as

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

1. Define **disaccharides –** 
   1. **Sucrose:**
   2. **Lactose:**
   3. **Maltose:**
2. Polysaccharides are made of \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ sugars.
3. The two main purposes of polysaccharides is:
4. Starch is a \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ polysaccharide that is only found in \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.
5. Starch is made of which monosaccharide?
6. Glycogen is a \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ polysaccharide that is found only in \_\_\_\_\_\_\_\_\_\_\_\_\_\_.
   1. What two organs is glycogen stored in?
   2. What happens when an athlete “hits the wall”?
7. Cellulose makes the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ in plants.
   1. What monosaccharide is cellulose made from?
   2. Why can’t we digest cellulose?
8. What animals can digest cellulose?
   1. What do they have that allows them to do this?
9. Chitin is a structural polysaccharide found in what two organisms?

**Lipids**

1. Lipids do not form \_\_\_\_\_\_\_\_\_\_\_\_\_\_.
2. Lipids are considered **hydrophobic**, meaning \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.
3. What two molecules are fats made of?

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ + \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

1. What is the purpose of glycerol?
2. What is the purpose of the three fatty acids?
3. What are the two ways that fatty acids can vary?



1. Saturated fatty acids have the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ and

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

1. Unsaturated fatty acids have \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

1. Saturated fatty acids come from \_\_\_\_\_\_\_\_\_\_\_\_\_ sources and are \_\_\_\_\_\_\_\_\_\_\_\_\_ at room

temperature.

1. Unsaturated fatty acids come from \_\_\_\_\_\_\_\_\_\_\_\_\_\_ or \_\_\_\_\_\_\_\_\_\_\_\_\_\_ and are

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ at room temperature.

1. What is different about a phospholipid?
   1. What part of the phospholipid is hydrophobic?
   2. What part of the phospholipid is hydrophilic?
2. When phospholipids are added to water, they form a \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.
3. Draw and label a phospholipid bilayer:

**Proteins**

1. Proteins account for more than \_\_\_\_\_\_\_\_\_\_\_of the mass of cells.
2. List the five functions of proteins:
3. Proteins are made of \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.
   1. How many different amino acids are there?
4. The \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ determines the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

1. Define **primary structure –** 
   1. What determines the primary structure of a protein?
2. Define **secondary structure –** 
   1. What determines secondary structure?
3. Give the two types of secondary structure:
4. Define **tertiary structure –** 
   1. What determines tertiary structure?
   2. Define **disulfide bonds –**
   3. What two effects do disulfide bonds have on hair?
5. Define **polypeptide –**
6. Define **quaternary structure –** 
   1. How many polypeptides is hemoglobin made of?

**Sickle-Cell Anemia**

1. A slight change in \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ can drastically change \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

1. When a protein changes shape, it \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.
2. Define **sickle-cell anemia –**
   1. What is the main symptom of sickle-cell anemia?
3. Draw a normal blood cell:
4. Draw a sickle-cell:
5. This single gene that is affected changes \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ in the

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ of hemoglobin.

1. This affects the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, which affects the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_,

which affects the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ structure.

1. Protein shape can also be affected by \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ and

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

1. When a protein loses its normal shape, this is called \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.
   1. A denatured protein is \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.
   2. Denaturing is \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

**Enzymes**

1. Define **enzyme –**
2. Enzymes can perform their functions \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.
3. Define **chemical reaction –**
4. Energy and mass can \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ in chemical reactions but they cannot be

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ or \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

1. Reactants \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ a chemical reaction and are turned into

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

1. Write the chemical formula for Hydrogen combining with Oxygen:
2. Every chemical reaction has an \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.
3. Define **activation energy –**
4. What is needed before magnesium can react with oxygen?
5. Enzymes \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ the activation energy of a chemical reaction.
   1. This makes the reaction occur more \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ and \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.
6. Enzymes are \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ protein molecules based on \_\_\_\_\_\_\_\_\_\_\_\_\_\_.

**Digestive System**

1. There are hundreds of \_\_\_\_\_\_\_\_\_\_\_\_\_ in the human body.
2. Which system uses the most enzymes?
3. What is mechanical digestion?
4. Saliva contains two enzymes: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ and \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.
5. What reaction does amylase catalyze?
   1. What is the optimal pH of amylase?
6. What reaction does lipase catalyze?
   1. What is the optimal pH of lipase?
7. What is the pH of the stomach?
   1. What acid is present in the stomach?
   2. What ion makes something acidic?
8. The main enzyme of the stomach is \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.
   1. What is the optimal pH of pepsin?