**PROTEINS GUIDED NOTES**

1. Proteins include some of the most diverse group of macromolecules (\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_). They contain \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, and \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_. Examples of proteins include:

 (1) \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

 (2) \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Proteins

 (3) \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

 (4) \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Proteins

 (5) \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

2. Proteins are composed of monomers called \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_. More than \_\_\_\_\_\_ different amino acids exist in nature.

3. Proteins can have up to \_\_\_\_\_\_\_\_\_ different layers of organization, and assume a \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ shape.

4. Proteins serve many different functions:

 1. Muscles provide structural support and motion (\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ and \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_)

2. Help fight \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ (antibodies)

3. \_\_\_\_\_\_\_\_\_\_\_\_\_\_ cell processes (hormones)

4. Transport substances into or out of cells (\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_)

5. Structural proteins provide \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_(keratin and collagen)

6. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ reaction rates )\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_)

5. Contractile proteins are responsible for \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_. Examples include \_\_\_\_\_\_\_\_\_ and \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_. These proteins are involved in muscle \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ and \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

 6. Proteins help fight \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ are specialized proteins involved in defending the body from \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ (foreign invaders). They can travel through the bloodstream and are utilized by the immune system to \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ and \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ against bacteria, viruses, and other foreign intruders.

7. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ are messenger proteins which help to regulate bodily activities and maintain \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_. Insulin regulates glucose metabolism by controlling the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ concentration.

8. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ proteins are proteins which move molecules from one place to another around the body. Hemoglobin transports \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ through the blood.

9. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ proteins are fibrous and stringy and provide support. Examples include \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ and \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_. Keratins strengthen protective coverings such as \_\_\_\_\_\_\_\_\_\_, \_\_\_\_\_\_\_\_\_\_\_\_, quills, feathers, horns, and beaks. Collagens provide support for connective tissues such as \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ and \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

10. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ are proteins that aid in biochemical reactions. Most chemical reactions require energy to begin. The energy required to start a chemical reaction is called \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ energy.

11. Enzymes are \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ which reduce the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ required for a chemical reaction to occur.

12. Enzymes are often referred to as \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ because they speed up chemical reactions. The catalyst does not \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ during the reaction!

13. Enzymes have an area called an \_\_\_\_\_\_\_\_\_\_\_\_\_ site. The active site is where the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ reaction occurs.

14. The active site of the enzyme fits with only one type of molecule known as the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_. The fact that the active site can only accept \_\_\_\_\_\_\_\_ type of substrate is known as \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ specificity.

15. There are two ways enzymes can work to bind to a substrate: (1) \_\_\_\_\_\_\_\_ and \_\_\_\_\_\_\_\_\_\_\_ model, and (2) the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Fit Model.

16. With the Lock and Key Model, the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ fits into the \_\_\_\_\_\_\_\_\_\_\_\_\_\_ site like a key into a lock. The enzyme puts stress on the bond which reduces the amount of \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ needed to break apart the substrate. The \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ of the reaction leave and make the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ available for more substrate.

17. In the Induced Fit model, the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ doesn’t quite fit into the active site. The substrate causes (\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_) the enzyme to change \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, which allows the substrate to fit into the active site. The enzyme stresses \_\_\_\_\_\_\_\_\_\_\_\_ on the substrate and reduces the amount of \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ energy required for the reaction to occur.

18. Enzymes are affected by two main factors:

(1) \_\_\_\_\_\_\_\_\_\_\_\_

(2)\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

19. Each enzyme functions best within a certain \_\_\_\_\_\_\_\_\_ range. For example, the enzyme \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, which works in your stomach, functions best in a strongly \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ environment. When the pH changes, the active site \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ and \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ enzyme function.

20. Chemical reactions \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ up as temperature is \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, so, in general, reactions will increase at a \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ rate at \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ temperatures. However, each enzyme has a temperature \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, and beyond this point the enzyme's \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ shape is lost. Boiling temperatures will \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ most enzymes.

21. Enzymes often end in the suffix \_\_\_\_\_\_\_\_\_\_\_. EX: Amylase - breaks down \_\_\_\_\_\_\_\_\_\_\_\_\_\_, Catalase – breaks down H2O2, DNA polymerase – joins DNA nucleotides to build DNA, Lipase – break apart \_\_\_\_\_\_\_\_, Lactase – breaks apart \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ (milk sugar), Protease- breaks apart \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ molecules.