

Benchmark Test Review

1 The Nature of Life

Use the information below to review the correct answers on the Chapter Test.

1. Single-celled and multicellular organisms can reproduce independently, but viruses depend on the machinery of a host cell to assemble new viruses. Note that viruses and all organisms rely on DNA to reproduce.
2. Shivering is rapid contraction and release of the body's muscles. This friction creates warmth for warm-blooded animals. Shivering is an effective way to raise the body's internal temperature if it falls and to restore the body to homeostasis, a state of balance.
3. The sun is part of a flower's environment, and as Earth rotates, the sun's position in the sky changes. In order to get the most benefit from the available sunlight and produce the most food during photosynthesis, the plant orients its leaves to allow the greatest amount of light possible to strike the leaves and the chloroplasts they contain.
4. Viruses do not use energy, and as a result do not need food in order to survive.
5. The characteristics of living things include being made up of cells, being able to reproduce, being based on a universal genetic code, being able to grow and develop, needing and using materials and energy, being able to respond to the environment, being able to maintain homeostasis, and being able to evolve.
6. All living things contain directions for inheritance carried by a molecule called DNA.
7. The four levels are 1) the sequence of amino acids; 2) the folding of the polypeptide chain; 3) the three-dimensional arrangement of the polypeptide chain; 4) the way the polypeptide chains are arranged in respect to each other (in a protein with multiple polypeptide chains).
8. Proteins in the body fulfill many functions, including acting as a means of communication. Hormones are an example of important protein communicators.
9. By controlling the passage of molecules through the cell membrane, this protein is fulfilling a transport function.
10. Collagen is an important structural protein, and is the main component of cartilage. Cartilage makes up humans' noses and ears, and cushions joints.

11. Wax is a form of lipid, and polysaccharides are types of carbohydrates.
12. Organisms use glucose and similar molecules to store energy within the molecules' bonds until it is needed.
13. Every amino acid contains an amino group, which includes a nitrogen atom.
14. Except for their R groups, amino acids all share a similar structure.
15. Enzymes, which are usually proteins, act to speed up chemical reactions that take place within cells. They accomplish this by lowering the activation energy of chemical reactions.
16. Based on the chart, the energy contained in the products of the reaction is less than that contained in the reactants; because energy cannot be created or destroyed, it must have been released during the reaction.
17. The enzyme pepsin is found inside the stomach, where the environment is acidic. It is also warm, and of the temperatures listed, 37°C is closest to the human body's normal temperature.
18. The heat used during cooking agitates the ovalbumin and other protein molecules within the egg white, causing them to move faster and slam into each other. These collisions break the weak bonds that hold the ovalbumin in its spherical shape, which makes the protein stretch out and bond to other ovalbumin molecules, forming a latticework of proteins. This latticework gives the cooked egg white its solid form.
19. Several types of bonds help proteins keep their shapes, including ionic and covalent bonds, hydrogen bonds, and Van der Waals forces.
20. Glucose and other sugars contain carbon, oxygen, and hydrogen, but not nitrogen. So, to form an amino acid from glucose, another reactant must supply an amino (-NH_2) group or another source of nitrogen.
21. Eukaryotic animal cells have nuclei that contain the DNA, ribosomes on the endoplasmic reticulum to create proteins, and a cell membrane that surrounds and supports the cell. Only plants have chloroplasts.
22. When a protein is exposed to a temperature or pH outside of its optimal range, the protein becomes denatured. This changes its shape, which renders it unable to perform its specific function.