DNA

**The Nucleus: Control Centre of The Cell**

The instructions in the nucleus are carried in long, two-stranded molecules called \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_, or \_\_\_\_\_. The DNA molecule looks like a twisted \_\_\_\_\_\_\_\_\_\_. The two strands, or sides, of the DNA ladder wrap around each other in a spiral shape that scientists call a \_\_\_\_\_\_\_\_ \_\_\_\_\_\_ . The sides of the DNA ladder are made of \_\_\_\_\_\_\_\_ and \_\_\_\_\_\_\_\_\_\_. The steps of the ladder are made of four \_\_\_\_\_\_\_\_\_\_ bases, which are represented by the letters A (\_\_\_\_\_\_\_\_\_), G (\_\_\_\_\_\_\_\_\_), C (\_\_\_\_\_\_\_\_\_\_), and T (\_\_\_\_\_\_\_\_\_\_).

**The Arrangement of Bases in DNA Directs All Cell Activities**

Everything that occurs within a cell is the result of how the bases on the DNA molecule are \_\_\_\_\_\_\_\_\_\_. DNA molecules always join in a specific way:

* A always joins with \_\_\_
* G always joins with \_\_\_

However, the \_\_\_\_\_\_ and \_\_\_\_\_\_\_\_ of these bases can vary greatly within the DNA molecule. In humans, a single DNA molecule can be several \_\_\_\_\_\_\_\_\_ base pairs in length.

**DNA is Stored in Chromatin**

Most of the time, DNA exists in the nucleus in the form of \_\_\_\_\_\_\_\_\_\_. Chromatin is a substance that contains DNA and \_\_\_\_\_\_\_\_\_. Within each strand of chromatin is one molecule of DNA. When a cell is growing, the DNA is \_\_\_\_\_\_\_\_ and aids in the manufacture of proteins the cell requires. When a eukaryotic cell is ready to divide, each strand of chromatin coils up into a very compact, \_\_\_\_\_\_\_\_\_ structure called a \_\_\_\_\_\_\_\_\_\_\_.

**Every Organism has a Characteristic Number of Chromosomes**

Chromosomes within the nucleus are found in \_\_\_\_\_\_. Most human cells have \_\_\_\_ chromosomes arranged in 23 pairs, including one pair of chromosomes that help determine sex. In males, the 23rd pair of chromosomes is the \_\_\_ pair and in females is the \_\_\_ pair. Every living thing has a characteristic number of chromosomes.

**Genes are found on Chromosomes**

\_\_\_\_\_\_ are small segments of DNA located at specific places on a chromosome. Genes store the information needed to produce up to 100,000 different \_\_\_\_\_\_\_\_ used in the cells of your body. Genes can vary in length from hundreds to thousands of \_\_\_\_\_\_. Every chromosome carries thousands of \_\_\_\_\_\_\_ and therefore contains the information to make thousands of different proteins.

**Proteins Determine What Body Cells Will Become and How They Function**

Each of your body cells contains the \_\_\_\_\_ amount of genetic information stored within its 46 chromosomes, but only specific \_\_\_\_\_\_ are “read” in each cell to produce specific proteins. By making specific proteins, a cell becomes \_\_\_\_\_\_\_\_\_\_ to carry out a particular function. Therefore, proteins needed to make your muscles work are made only in your \_\_\_\_\_\_\_\_\_ cells. Thousands of different, specialized proteins called \_\_\_\_\_\_\_\_ speed up the hundreds of chemical reactions that occur within each cell. For example, digestive enzymes work in chemical reactions to break down \_\_\_\_\_\_ into nutrient molecules that provides \_\_\_\_\_\_\_\_ for the cell. Some proteins act as chemical messengers called \_\_\_\_\_\_\_\_\_\_. For example, growth hormone functions to prepare a cell for \_\_\_\_\_\_\_\_\_\_\_\_\_ by ensuring the cell has enough nutrients to divide.

**How Proteins are Produced**

1. The Nucleus receives a chemical signal to make a specific \_\_\_\_\_\_\_\_\_.
2. The DNA message for a specific protein is \_\_\_\_\_\_ into a small molecule called \_\_\_\_\_\_\_\_\_\_\_ \_\_\_ or RNA.
3. RNA leaves through a nuclear \_\_\_\_\_\_.
4. The RNA message is delivered to the \_\_\_\_\_\_\_\_\_\_\_, and the ribosomes make the protein.
5. The manufactured protein enters the \_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_.
6. A \_\_\_\_\_\_\_\_\_ forms off the end of the endoplasmic reticulum and carries the protein to the Golgi body.
7. The Golgi body repackages the protein for \_\_\_\_\_\_\_\_\_\_\_ out of the cell.
8. A vesicle forms off the end of the Golgi body to carry the protein to the cell \_\_\_\_\_\_\_\_\_\_.
9. The vesicle attaches to the cell membrane, and its protein contents are \_\_\_\_\_\_\_\_\_\_ out of the cell.