**Bio.3.1 Explain how traits are determined by the structure and function of DNA.**

Bio.3.1.1 Explain the double-stranded, complementary nature of DNA as related to its function in the cell.

Bio.3.1.2 Explain how DNA and RNA code for proteins and determine traits.

Bio.3.1.3 Explain how mutations in DNA that result from interactions with the environment (i.e. radiation and chemicals) or new combinations in existing genes lead to changes in function and phenotype.

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| **DNA Structure:** | | | | |
| http://allaboutanimaldna.weebly.com/uploads/1/2/2/7/12274146/3478424_orig.gif?155  Shape Called:  3 Individuals who studied the shape of DNA:  1.  2.  3.  **Backbone**  Sides (“backbone”) of DNA are made up repeating:  Name:  Shape:  **&**  Name:  Shape:  Nitrogen Bases are held together by a  sugar phosphate.JPG | | | nitrogen bases.JPG **Nitrogen Bases** | |
| **base pair rule.JPGLabel the nucleotide:**  In a strand of DNA, 15% is composed of thymine. How much of the DNA is Guanine?  **nucleotide.JPG**  **Base Pair Rule:** | | | | |
| **DNA Vs. RNA** | | | | |
| 1. **Structure**   DNA is  DNARNA1.JPGRNA is | 1. **Bases**   DNA has  DNA bases.JPGRNA Has  RNA bases.JPG | | | 1. **Sugar**   DNA has  RNA has  sugarrna.JPGsugar.JPG |
| **DNA Replication** | | | | |
| DNA Replication occurs during:  Because… | | cell cycle.JPG | | |
| The Process of DNA Replication: | | | | |
| 1. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_   Unzips the DNA   1. Nucleotides pair up next to the parent strand forming a \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ 2. 2 new strands of DNA are made; each made of 1 new \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ and 1 old parent strand | | http://lc.brooklyn.cuny.edu/smarttutor/corc1321/images/instruc/4.replication.gif | | |
| DNA Replication.jpg | | | | |
| **Transcription** | | | | |
| * The process by which DNA makes a disposable copy of itself called \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_. * Occurs in the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_. * The strand of mRNA travels to the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ to be translated. | | transcription3.JPG | | |
| **Translation** | | | | |
| * The process in which mRNA is read and converted into a protein is called \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_. * Occurs at the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.   (rRNA)   * mRNA is read 3 bases at a time called a \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.   + Start Codon: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ * tRNA also contain 3 bases called an \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_. * When a codon on the mrNA matches an anticodon on the tRNA, the tRNA brings the correct \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ to the ribosome. * The ribosome links the amino acids together with a strong \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ bond. * This chain of amino acids is called a \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, also called a protein! | | translation 3.JPGCodon.jpgtranslation 1.JPGtrnamodified.JPG | | |
| **Cells & Their Proteins** | | | | |
| Cells respond to their environment by producing different types/amounts of protein. | | Ex: | | |
| All of your cells have the same DNA:   * Some \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ get turned on, some get turned off. * This allows cells to \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_. * Phenotypes: | | Ex:   |  |  |  | | --- | --- | --- | | Cell Type | Protein | Function | | Red Blood Cell |  |  | | Eye Cells |  |  | | | |
| Activated \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ 🡪 Produce specific \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ 🡪 Specialized Function | | | | |
| **Mutations** | | | | |
| A change in the base sequence of DNA. | | | | |
| **POINT MUTATION** | | **FRAMESHIFT MUTATION** | | |
| A MUTATION AT ONE LOCATION WHERE ONLY ONE AMINO ACID MAY BE PRODUCED INCORRECTLY. | | A MUTATION THAT CAUSES SEVERAL AMINO ACIDS TO BE PRODUCED INCORRECTLY. | | |
| Ex: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_:  **substitution mutation.jpg** | | Ex: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_  addition mutation.jpg  Ex: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_  deletion mutation.jpg | | |
| Mutations can be  1.  Or  2. | | | | |