

DNA Study Guide Name: _____

Block: _____

DNA Standard 1: Describe the structure of DNA and how proteins are formed from this code.

- DNA has a _____ shape and is made of _____ strands. DNA is made up of many repeating parts called _____. These repeating parts are made of three components: _____, _____, & _____.
- DNA contains one of the four following _____ bases. They are: _____, _____, _____, or _____.
- Matching DNA nucleotides: Guanine & _____. Thymine & _____.
- The _____ bonds hold together nucleotides on each strand of DNA.
- The code in DNA serves as the template to make _____. This serves as the template to match with tRNA. The _____ of _____ matches with the _____ of tRNA. This **matching ensures the correct amino acids are delivered to the ribosome in the correct order.** This process ensures the correct type of protein is made by connecting multiple amino acids.
- **Draw and label a DNA nucleotide. How is it similar and different to a RNA nucleotide?**

Determine the sequence of amino acids for a protein from a segment of DNA.

DNA: ATG GTC GTT AAG ATC CCG CTA
 mRNA: _____

Amino Acids: _____

| | | Second letter | | | | |
|--------------|---|--|--------------------------------------|--|---|------------------|
| | | U | C | A | G | |
| First letter | U | UUU } Phe UUC } UUA } Leu UUG } | UCU } UCC } Ser UCA } UCG } | UAU } Tyr UAC } UAA } Stop UAG } Stop | UGU } Cys UGC } UGA } Stop UGG } Trp | U C A G |
| | C | CUU } CUC } Leu CUA } CUG } | CCU } CCC } Pro CCA } CCG } | CAU } His CAC } CAA } Gin CAG } | CGU } Arg CGC } CGA } CGG } | U C A G |
| | A | AUU } AUC } Ile AUA } AUG } Met | ACU } ACC } Thr ACA } ACG } | AAU } Asn AAC } AAA } Lys AAG } | AGU } Ser AGC } AGA } Arg AGG } | U C A G |
| | G | GUU } GUC } Val GUA } GUG } | GCU } GCC } Ala GCA } GCG } | GAU } Asp GAC } GAA } Glu GAG } | GGU } Gly GGC } GGA } GGG } | U C A G |

DNA is made of _____. _____ are coiled strands of DNA. Before prophase, DNA combined with histones and other proteins is called _____. Sections of the DNA/Chromosome that code or call for a specific trait (hair color, eye color, etc) are called _____. These create _____ which carry out the functions necessary by the cell.

DNA Standard 2: Explain the processes and enzymes involved in DNA replication and making proteins, and how mistakes in DNA replication or environmental factors can alter proteins.

Fill in the blanks and put the following steps to protein synthesis in the correct order.

Transcription

_____ mRNA leaves the _____ to attach to a ribosome in the _____.

_____ The genetic code stored in DNA is copied into a strand of _____.

_____ (process)

_____ tRNA delivers more amino acids until mRNA stop _____ is reached and mRNA is released from ribosome.

_____ Ribosome connects additional _____ to the first amino acid.

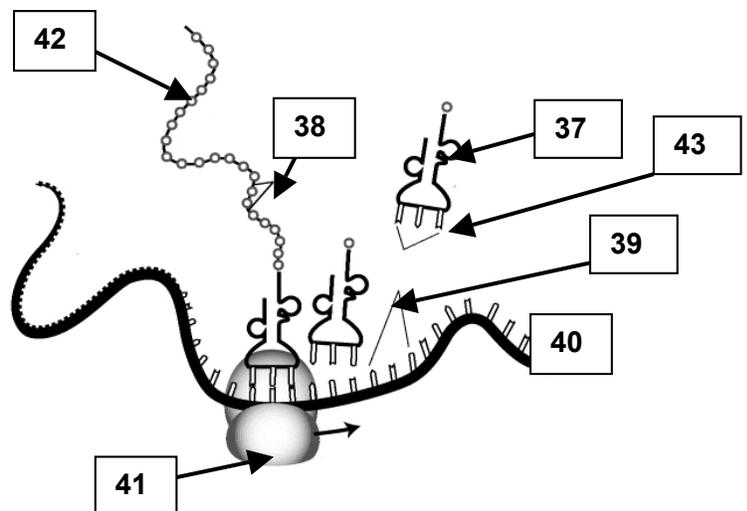
_____ tRNA matches its anti-codon to the mRNA _____.

_____ tRNA brings the _____ that matches the mRNA's codon.

_____ An amino acid chain is folded to create a _____.

Directions: Identify the following structures.

- 37. _____
- 38. _____ (Type of Bond)
- 39. _____
- 40. _____
- 41. _____
- 42. _____ (Long chain)
- 43. _____



Compare types of RNA:

| | mRNA | tRNA | rRNA |
|-------------------|-------------|-------------|-------------|
| Shape | | | |
| Where it is found | | | |
| Jobe/Role | | | |

DNA Replication:

DNA Replication occurs during _____ of the cell cycle. It begins by _____ “unzipping” the DNA strand and breaking the _____ bonds between _____ . DNA _____ follows and adds new nucleotides to the original DNA strands. This process results in _____ identical strands of _____.

Causes of Mutations:

- 1.

- 2.

Types of Mutations: *complete the chart*

| Type of Mutation | Substitution | Insertion | | Frameshift |
|-------------------------|---------------------|---------------------------------------|-----------------------------------|--|
| What happens: | | | Section of DNA is lost or deleted | |
| Outcome: | | Different amino acid or no amino acid | | Creates mixed up or illegible (can't be read) proteins. Type of insertion/deletion |

DNA Standard 3: Describe the outcome of the cell cycle (interphase and mitosis).

- Draw a pie graph to represent the different stages of the cell's life cycle (all of mitosis can be grouped as one):

- What is the result of Interphase?

- What is the result of mitosis?

- How are sister cells genetically identical to the parent cell?

- DNA replication occurs during _____ of the cell cycle.