**DNA and Protein Synthesis Review**

**Questions**

* What are genes

Short strtches of DNA that code for protein

* Proteins are made of chains of \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

Amino acids

* How do cells use proteins?

For structural and functional uses such as transport and chemical reactions

* The subunits making up polypeptides are called \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

Amino acids

* How many amino acids exist?

20

* DNA is found in the NUCLEUS of a cell and begins the process of making a PROTEIN.
* Where are proteins made?

The cytoplasm

* The first step in making a protein is to make a copy of the \_\_\_\_\_\_\_\_\_\_\_ in the nucleus.

DNA or Gene

* What nucleic acid contains the master code for making proteins?

DNA

* What nucleic acids acts as a blueprint in copying the master code?

 mRNA

* Compare and contrast the nitrogen bases on DNA and RNA.

Both have ACG DNA has T RNA has U

* RNA is made of a SINGLE strand, while DNA is a DOUBLE stranded molecule.
* What is the function of mRNA?

Take the code (nucleotide/codon sequence) from the gene to the ribosome.

* What is the function of tRNA?

 To transport amino acids to the protein based on the order of codons on mRNA

* What bases pair together on RNA?

 A:U and G:C

* What is a codon?

 A set of three nucleotides found on DNA or RNA

* What process occurs at the ribosomes?

Translation

* Each codon codes for an \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

Amino acid

* Can amino acids have more than one codon?

yes

* There are 20 amino acids and 64 possible codons.
* Use the genetic codon table and name these amino acids:

GGC UCA? CAU? GCA? AAA?

Gly Ser His Ala Lys

* What molecule does tRNA transport?

Amino Acid

* Opposite the attachment site on tRNA are 3 nucleotide bases called the \_\_\_\_\_\_\_\_\_\_\_\_\_\_.

 Anticodon

* A codon on mRNA is complementary to an \_\_\_\_\_\_\_\_\_\_\_\_\_ on tRNA.

Anticodon

* What anticodon is complementary to the codon - ACU?

 UGA

* What is protein synthesis.

A process that joins amino acids together to make a protein based on the order of nucleotides on a gene

* Define transcription and explain where it occurs.

Transcription occurs in the nucleus and is a process that copies the sequence of a gene in the form of mRNA

* What RNA copies DNA?

mRNA

* Can either strand of DNA copied?

YES!

* What enzyme is required to copy DNA to make more DNA?

DNA Polymerase

* The DNA strand that is copied is called the \_\_\_\_\_\_\_\_\_\_\_\_\_ strand.

Template

* What would be the complementary RNA sequence for the DNA sequence- 5'- GCGTATG-3'?

CGCAUAC

* What enzyme adds complementary nucleotides to the DNA template strand to make mRNA.

RNA Polymerase

* \_\_\_\_\_\_\_\_\_\_\_ are regions on DNA where RNA polymerase binds to start transcription.

 Promoters

* Other sequences on DNA called \_\_\_\_\_\_\_\_\_\_ signals tell the RNA polymerase when to stop transcribing.

Terminators

* How do ribosomes "read" mRNA?

They bring in tRNAs that have the correct anticodon to match the codon

* The RIBOSOME moves along the mRNA strand ONE codon at a time.
* Once an amino acid is joined to the growing polypeptide chain, the tRNA leaves the RIBOSOME to pick up another Amino Acid
* When a tRNA leaves the ribosome, the ribosome moves down the mRNA strand allowing another tRNA and its amino acid to enter.
* The sequence of amino acids in the polypeptide chain is called the PRIMARY protein structure.
* A MUTAGEN can consist of a chemical or high energy radiation and cause mistakes in DNA replication.
* 1 SUBSTITUTION 2 INSERTION 3 DELETION are the three common kinds of mutations found in DNA
* What is a frameshift mutation?

A mutation that upsets the order of codons and therefore the order of amino acids