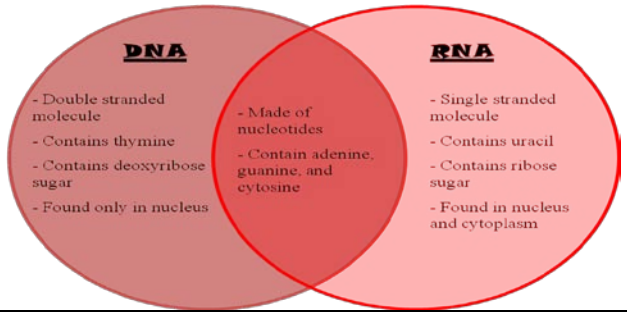
Class Notes *Protein Synthesis* **Questions/Main Idea:**	Name: _____ Period:_____ Date: _____ **Notes:**
The function of DNA	• The DNA molecule contains all your hereditary information in the form of genes • A **gene** is a coded section of DNA; it tells our cells how to build specific proteins • Genes code for EVERYTHING our body needs and does (saliva, bones, eye shape) • Because DNA is so large, it is stuck inside the nucleus • It needs a messenger to move the information from nucleus to protein production locations (ribosomes!)
DNA needs RNA!	• RNA is a nucleic acid messenger between DNA and ribosomes • 3 differences between DNA and RNA: – RNA has ribose sugar – RNA is single stranded – RNA contains a nitrogen base called **uracil (U)** instead of thymine.
Compare and contrast DNA and RNA	
3 types of RNA	• Messenger RNA (mRNA): – copies DNA in the nucleus and carries the info to the ribosomes (in cytoplasm) • Ribosomal RNA (rRNA): – makes up a large part of the ribosome; reads and decodes mRNA • Transfer RNA (tRNA): – carries amino acids to the ribosome where they are joined to form proteins
Protein synthesis	• **Protein synthesis** is the assembly of amino acids (by RNA) into proteins • Involves two steps: – 1. **Transcription** – copying DNA code into mRNA – 2. **Translation** – reading the mRNA code and assembling amino acids into a polypeptide chain (protein)
Transcription	• Performed in nucleus by mRNA • mRNA "reads" single DNA strand and forms the complementary copy

How transcription works	1. DNA strand splits, exposing the active strand 2. Complementary mRNA nucleotides line up opposite the active strand, forming mRNA 3. mRNA leaves the nucleus
Translation	• Translation occurs in ribosomes (in cytoplasm) • All three types of RNA work together during translation to produce proteins
Decoding mRNA (translation)	• The sequence of bases in an mRNA molecule serves as instructions for the order in which amino acids are joined to produce a polypeptide • Ribosomes decode the instructions by using **codons**, sets of 3 bases that each code for 1 amino acid • Each codon is matched to an **anticodon**, or complementary sequence on the tRNA to determine the order of the amino acids
Using a codon chart	• A **codon chart** is used to determine the sequence of the amino acids in the polypeptide • The sets of 3 mRNA bases (codons) are used to find the amino acid
Decoding Practice	**Codons Found in Messenger RNA**
Example 1	DNA: T A C G C A T G G A A T mRNA: Amino Acids:
Example 2	DNA: C G T G G A G A T A T T mRNA: Amino Acids:

Second Base / *First Base* / *Third Base*

First Base	Second Base U	Second Base C	Second Base A	Second Base G	Third Base
U	Phe	Ser	Tyr	Cys	U
	Phe	Ser	Tyr	Cys	C
	Leu	Ser	Stop	Stop	A
	Leu	Ser	Stop	Trp	G
C	Leu	Pro	His	Arg	U
	Leu	Pro	His	Arg	C
	Leu	Pro	Gln	Arg	A
	Leu	Pro	Gln	Arg	G
A	Ile	Thr	Asn	Ser	U
	Ile	Thr	Asn	Ser	C
	Ile	Thr	Lys	Arg	A
	Met	Thr	Lys	Arg	G
G	Val	Ala	Asp	Gly	U
	Val	Ala	Asp	Gly	C
	Val	Ala	Glu	Gly	A
	Val	Ala	Glu	Gly	G

Summary: