

DNA

- deoxyribonucleic acid
- store genetic material
- code for all genes
- double helix
 - Watson & Crick
- made up of nucleotides



1. Phosphate group
2. Sugar
3. nitrogen-base
 - adenine
 - thymine
 - cytosine
 - guanine

Purines

- adenine & guanine
- contain 2 rings

Pure As Gold

Pyrimidines

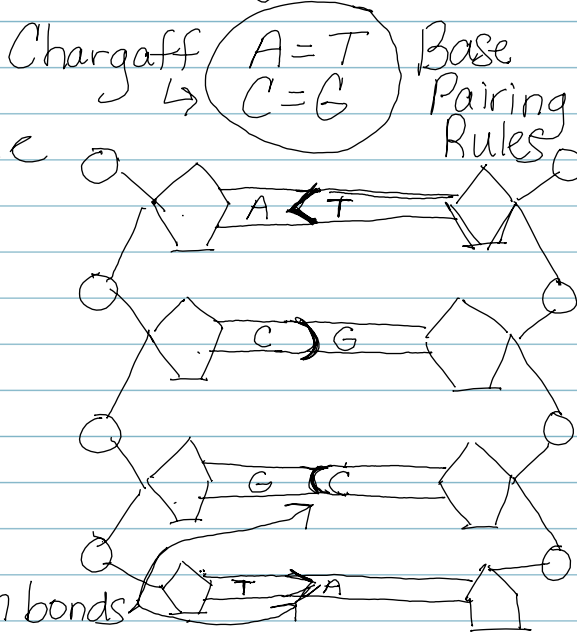
- cytosine & thymine
- contain 1 ring

"backbone" sides made up of:

- phosphate
- sugar

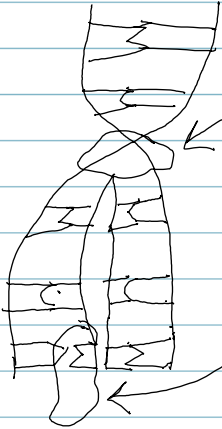
"rungs" made up of: bases

held together by hydrogen bonds



DNA Replication

- Copying one strand of DNA to get 2 identical strands



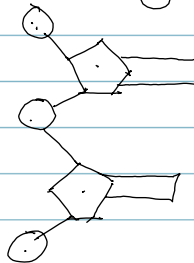
Helicase:
unzips the DNA
breaks the hydrogen
bonds

DNA Polymerase:
adds new bases
to each strand

Takes place in the
NUCLEUS!

RNA

- ribonucleic acid
 - contains the sugar ribose
 - single stranded
 - contains uracil but no thymine
- A = T or U



3 Types of RNA

1. Messenger RNA (mRNA)
 - carry genetic info from nucleus to the ribosomes
2. Ribosomal RNA (rRNA)
 - makes up ribosomes
3. Transfer RNA (tRNA)
 - move amino acids to the ribosome depending on the mRNA code

[Transcription]

- Synthesis of mRNA using a DNA strand as a template
 - occurs inside the nucleus
- ① DNA unzips (helicase)
 - ② One DNA strand acts as a template for RNA
 - ③ RNA polymerase will attach new nucleotides to make a new strand (mRNA)
 - ④ mRNA is released and leaves the nucleus

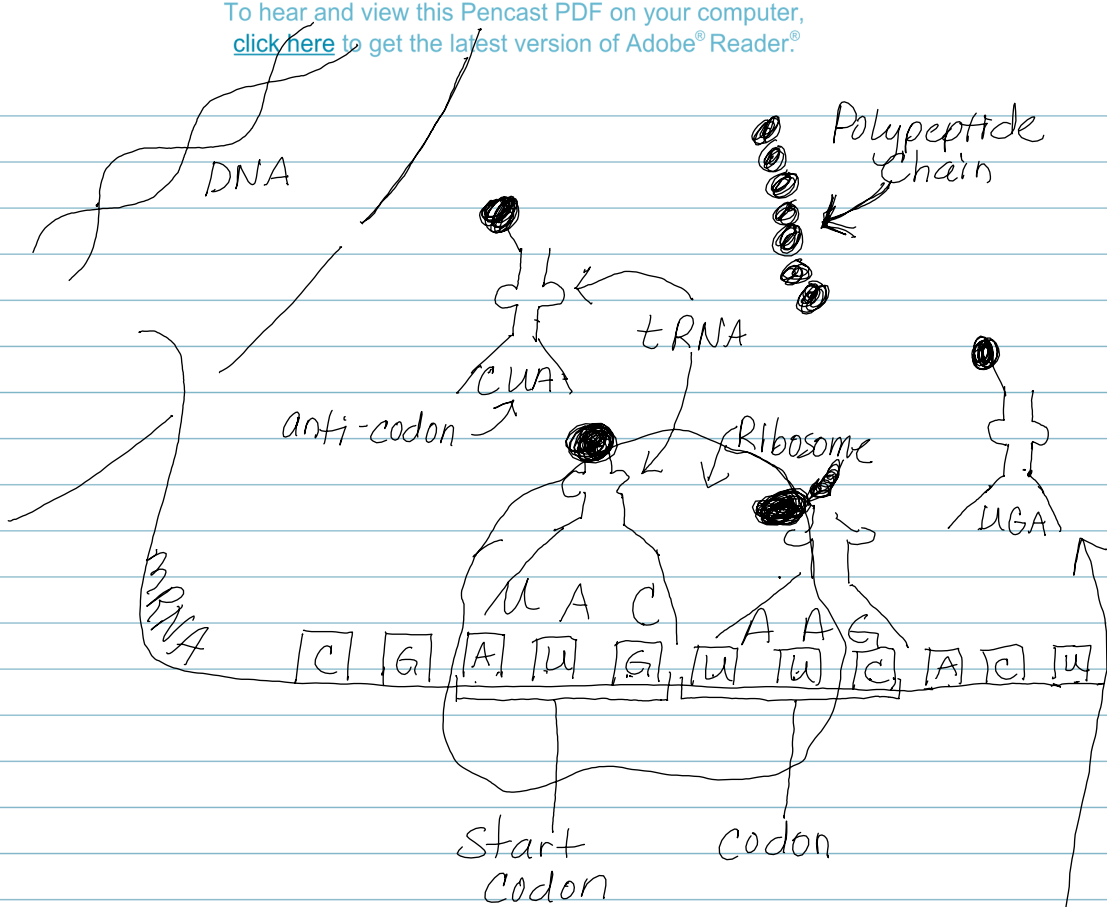
Translation } Protein Synthesis

- Use mRNA code to make a protein or polypeptide chain
- This chain is made up of amino acids
- order of amino acids is determined by the mRNA nucleotide sequence

Every 3 nucleotides (codon) is specific for a certain amino acid

ACU GCA GGA CGU
codons

1. mRNA codons match up to a specific tRNA anti-codon
2. this continues down the strand
3. amino acids (that are brought by tRNA) link together
4. new polypeptide chain is released



Start codon is always AUG
methionine

3 stop codons

tRNA molecule: Amino Acid
anti-codon

20 amino acids
64 codons

Gene mutation

Change in DNA sequence
that could result in a
change in gene expression

Point mutations:

1. Substitution: the wrong
nucleotide is
paired
- ATG
U A (A)

frameshift
mutation

2. Insertion: extra
nucleotide is
added
- ATG
U C A C

3. Deletion: nucleotide is
removed

Result
in major
changes!

ATG
U C

Mutations are beneficial
organism in many
cases!