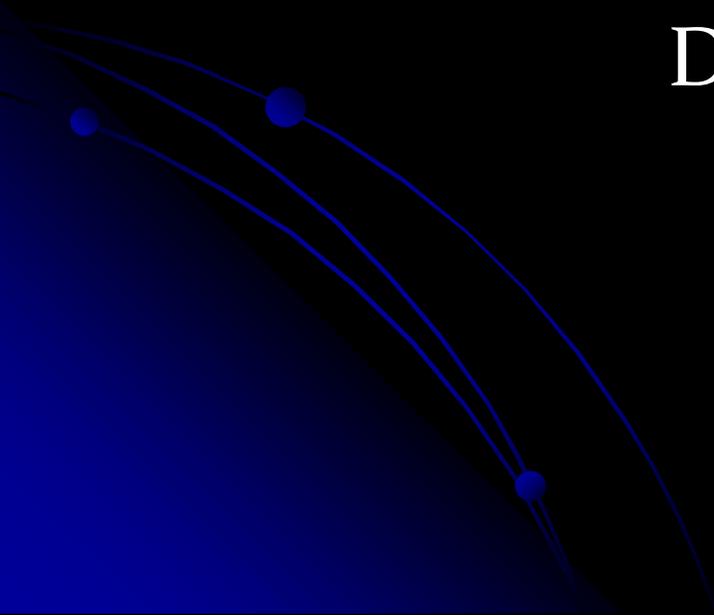


# Chapter.11

## DNA and Genes

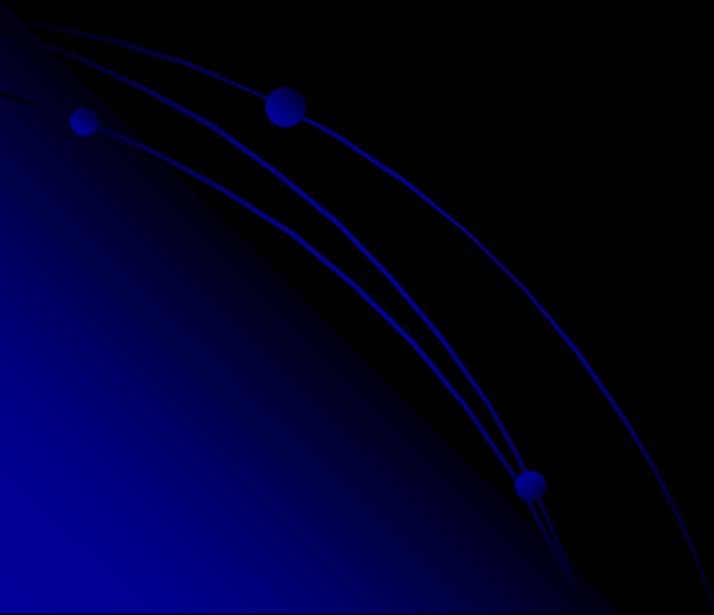


# Two Foldables

- DNA
- Nitrogenous base
- mRNA
- rRNA
- tRNA
- Transcription
- Translation
- mutation
- Frameshift mutation
- Point mutation

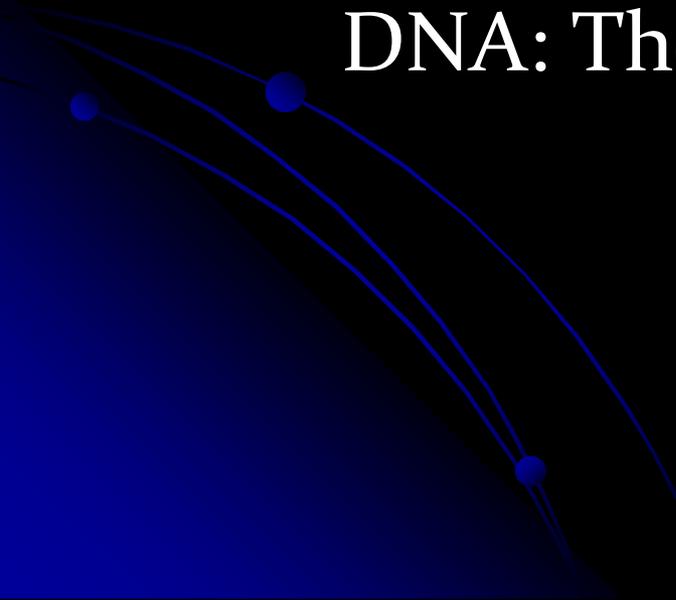
# November 29: I will understand the structure of a DNA molecule

- Get 11.1 Review and sit quietly
- DNA structure PowerPoint
- Build DNA Activity 😊
- 11.1 QUIZ TOMORROW!



# Section 11.1

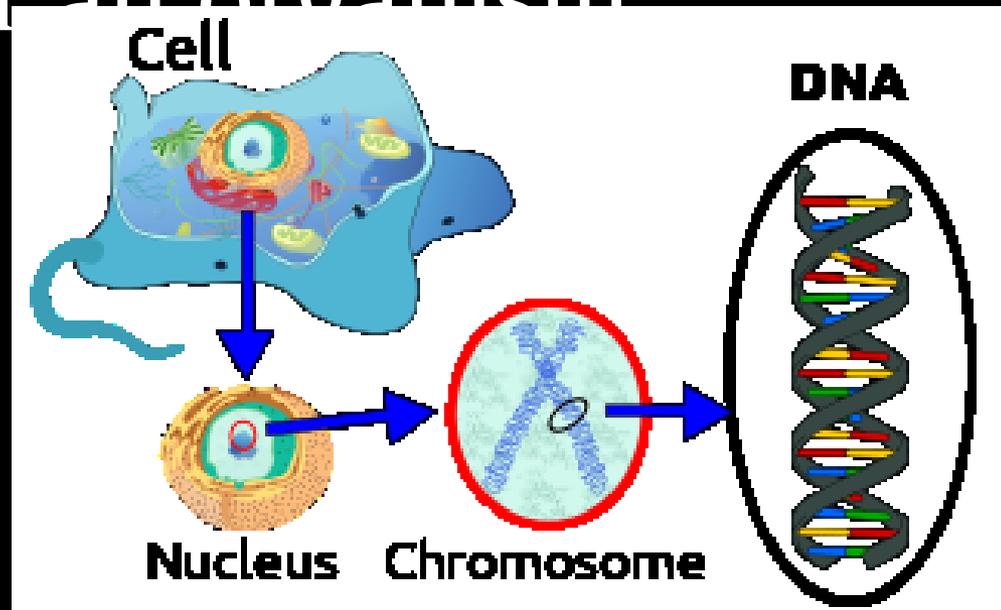
## DNA: The Molecule and Heredity



# What is DNA?

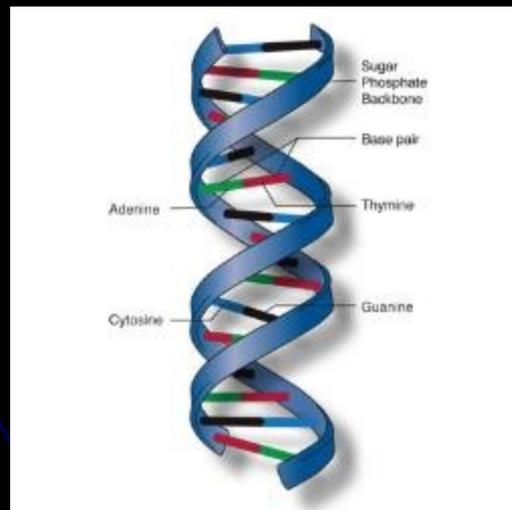
Deoxyribose Nucleic Acid\*\*

- DNA is the BLUEPRINT for life
- It's the complete instruction for building an organism and all of the proteins for an organism



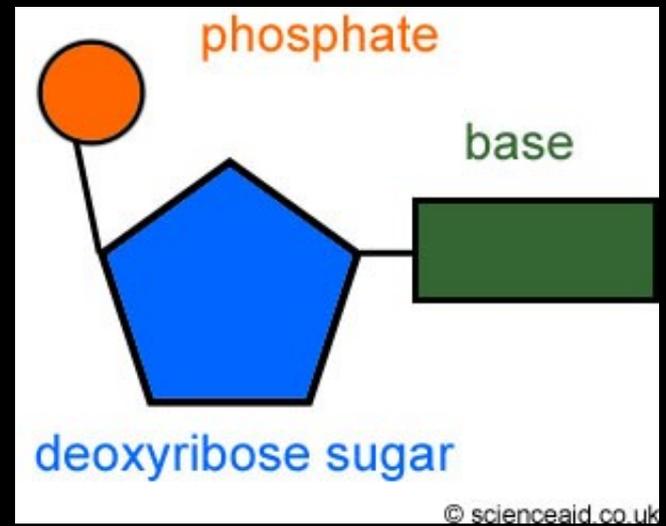
# DNA Structure

- **Watson and Crick** were the first to discover and suggest that DNA is the shape of a double helix \*\*
  - 1953 (only 63 years ago!!!)
- Double helix? Think of a twisted ladder!



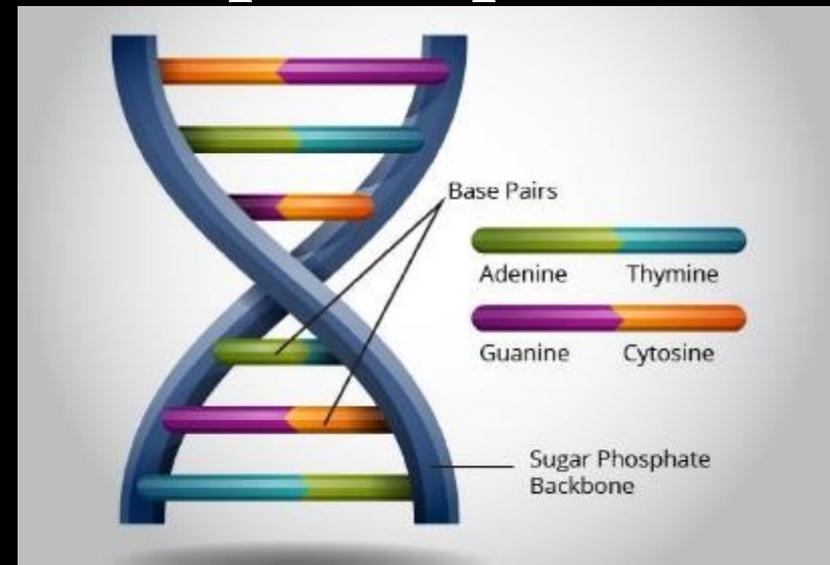
# DNA Structure

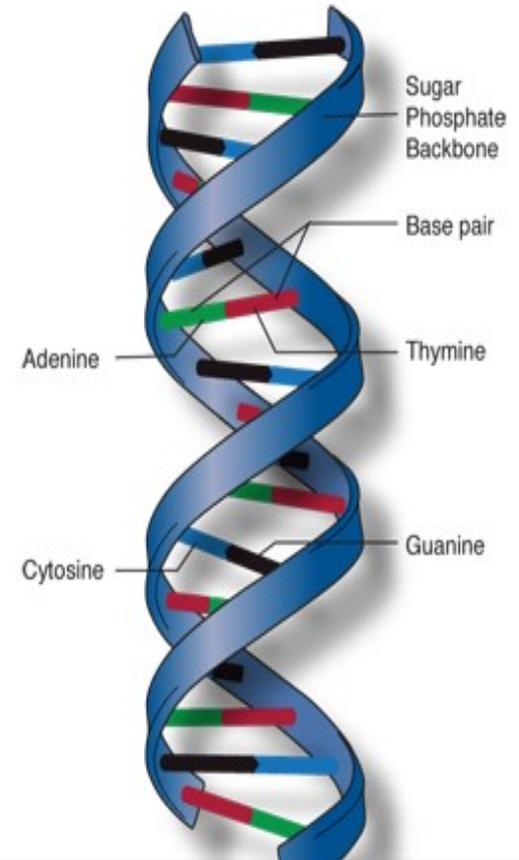
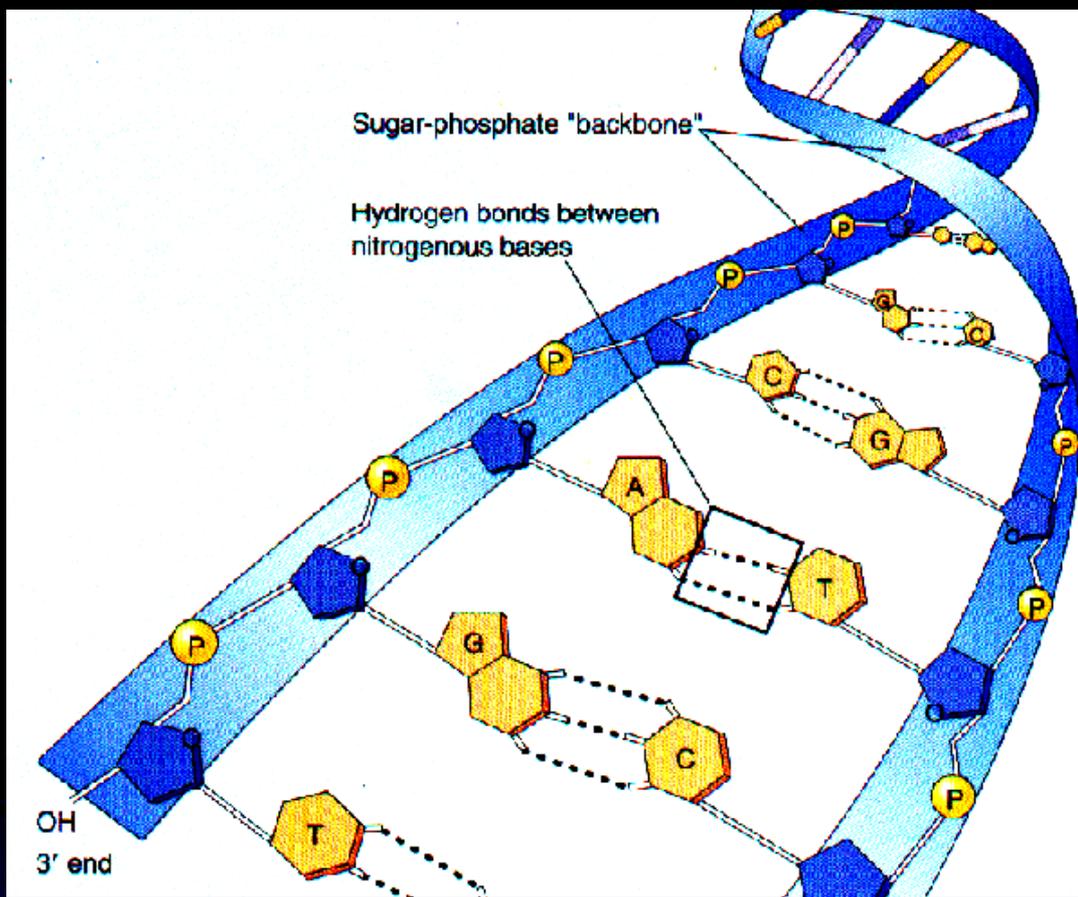
- It's made up of subunits called nucleotides
- Nucleotides have 3 parts \*\*
  - Deoxyribose sugar
  - Phosphate group
  - Nitrogenous base
  - 4 different bases



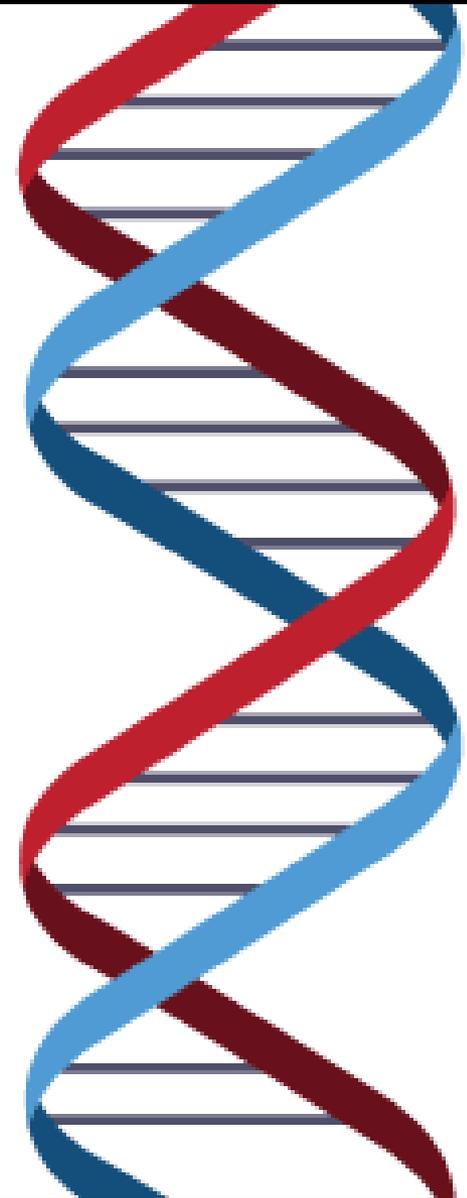
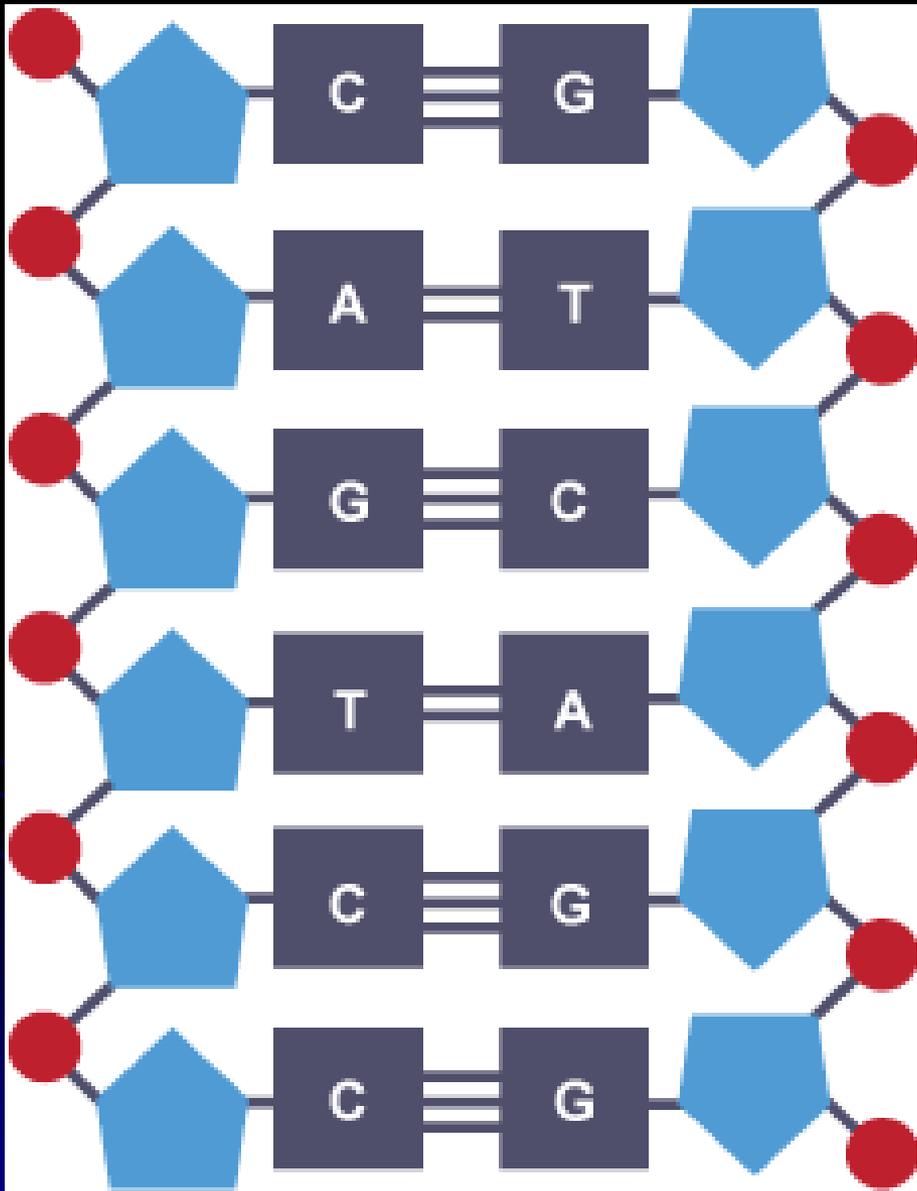
# The Structure of DNA

- DNA is made of two strands of nucleotides held together by nitrogenous bases
- Nitrogenous bases match pair up in a specific way!
  - Adenine – Thymine \*\*
  - Guanine – Cytosine \*\*





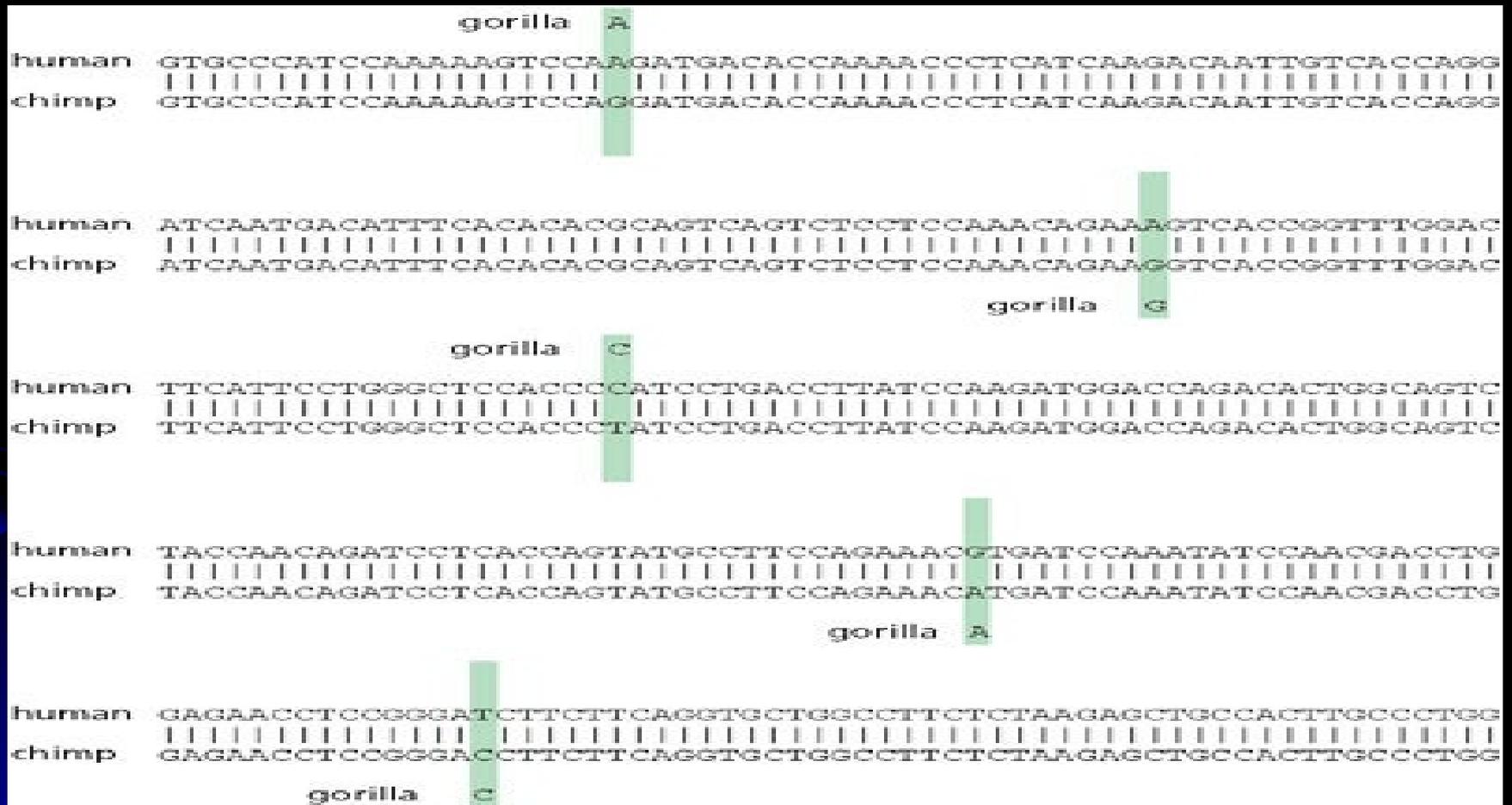
The backbone of DNA =  
Phosphate groups + Deoxyribose  
sugars\*\*



# The Importance of Sequences

- The DNA in **all organisms** is made up of the same 4 nucleotides (A, T, C, G)
- The DNA *sequence* is unique to each organism/individual
- The sequence is what determines the difference between a chimpanzee and a human being

# Human, Chimp, and Gorilla DNA sequences

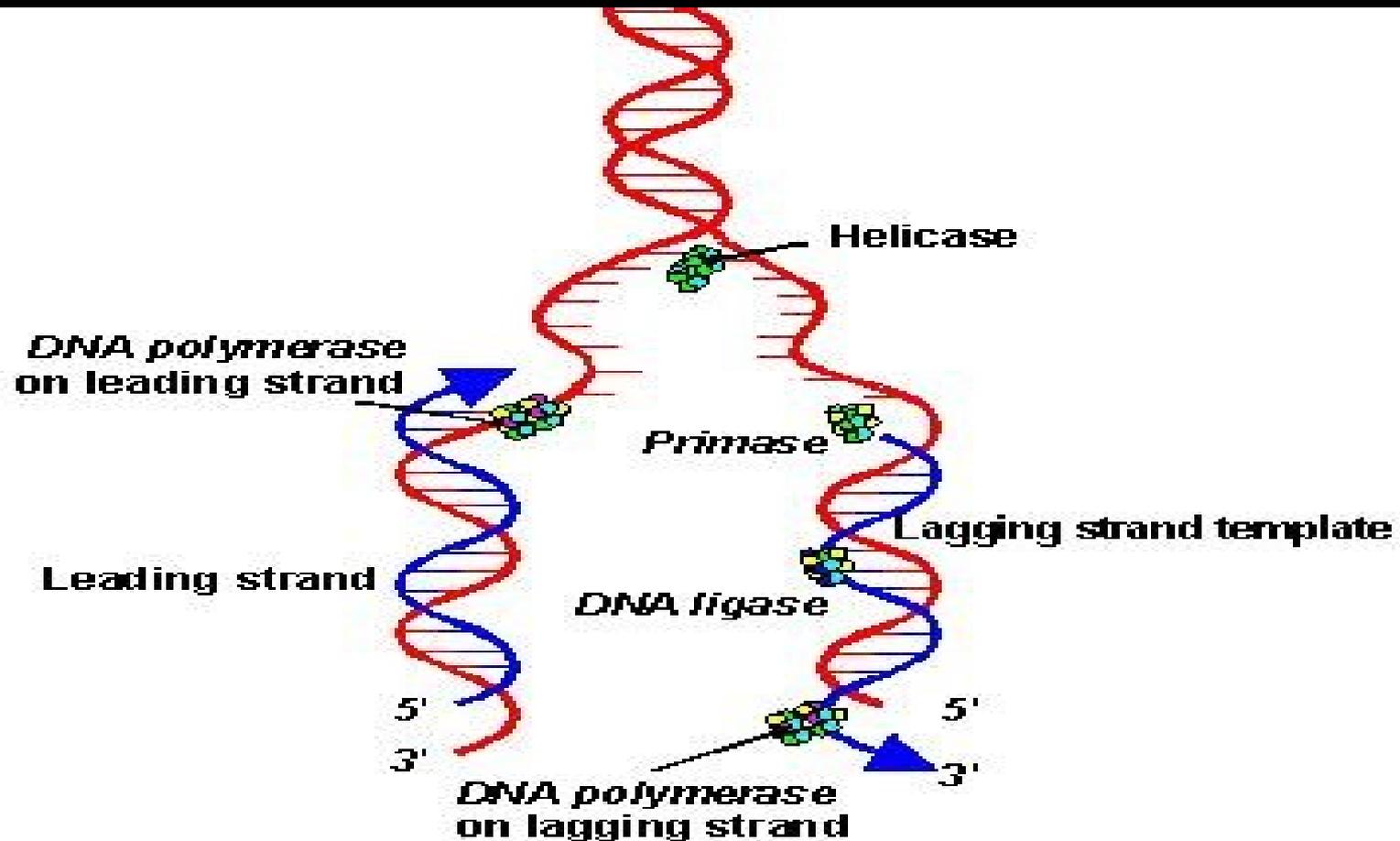




# DNA Replication

- DNA makes a copy of itself by replication \*\*
  - Each strand of DNA works as a template to make a new DNA molecule
  - Remember the Cell Cycle and Interphase.....
- 

# DNA Strands Splitting Apart



# Chapter 11.2

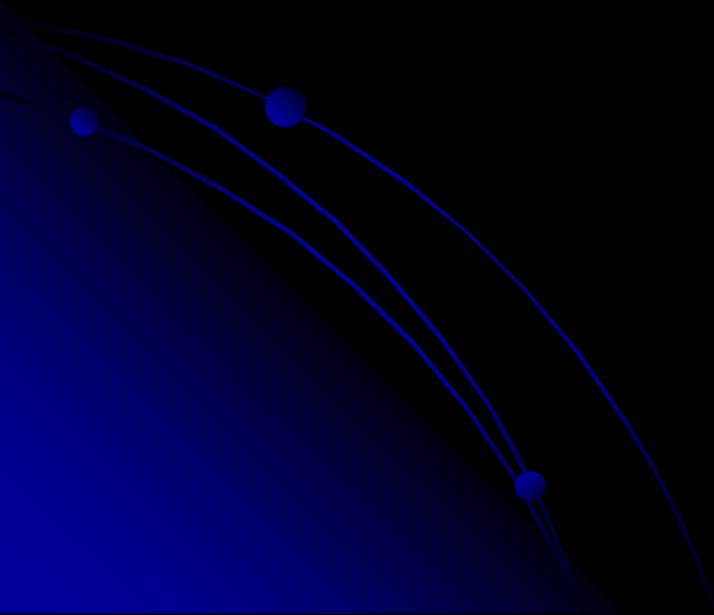
## From DNA to Protein





# December 1 Bell Ringer

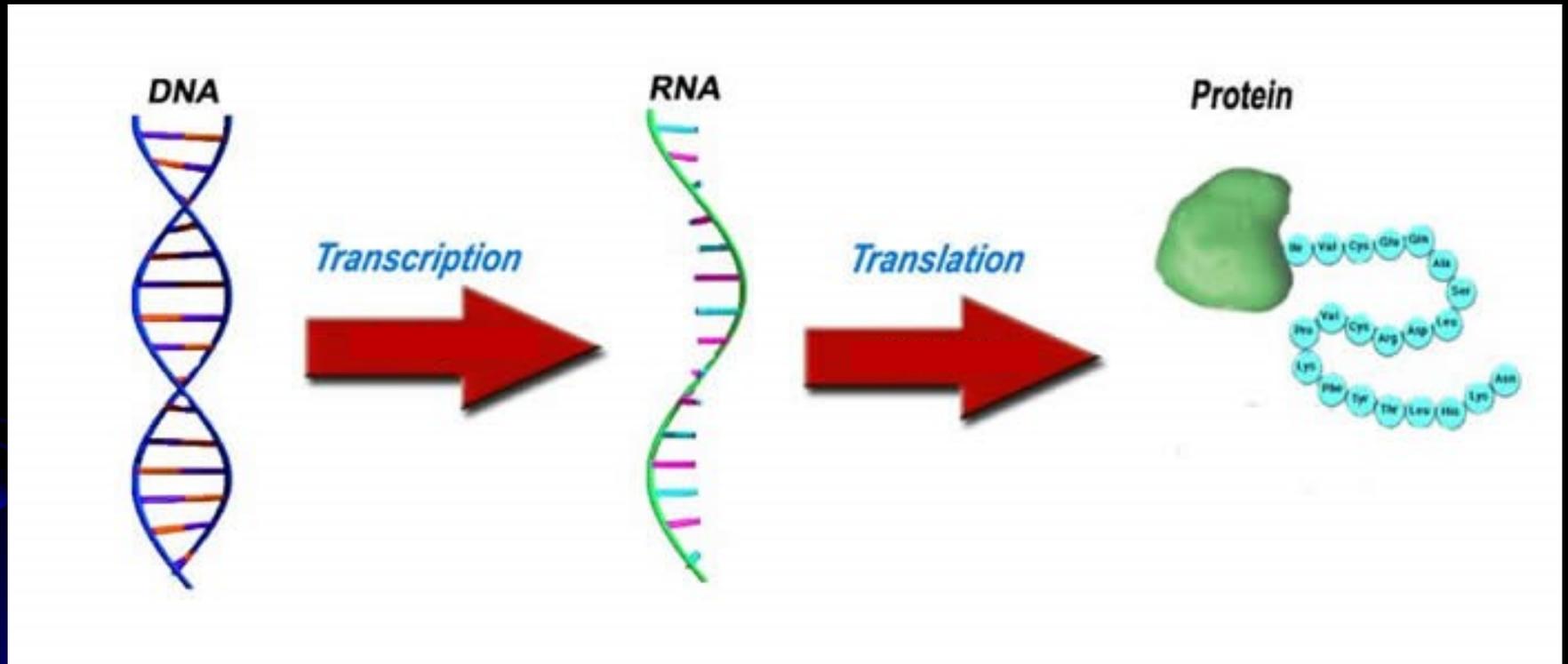
- Take out a sheet of paper
- Answer: How many different nucleotides are there in a DNA molecule?



# Genes and Proteins

- One of the most important jobs for DNA is to make protein
- DNA holds a “secret code” for what proteins should be made!
- Those proteins become muscle tissues, enzymes, and other important structures.

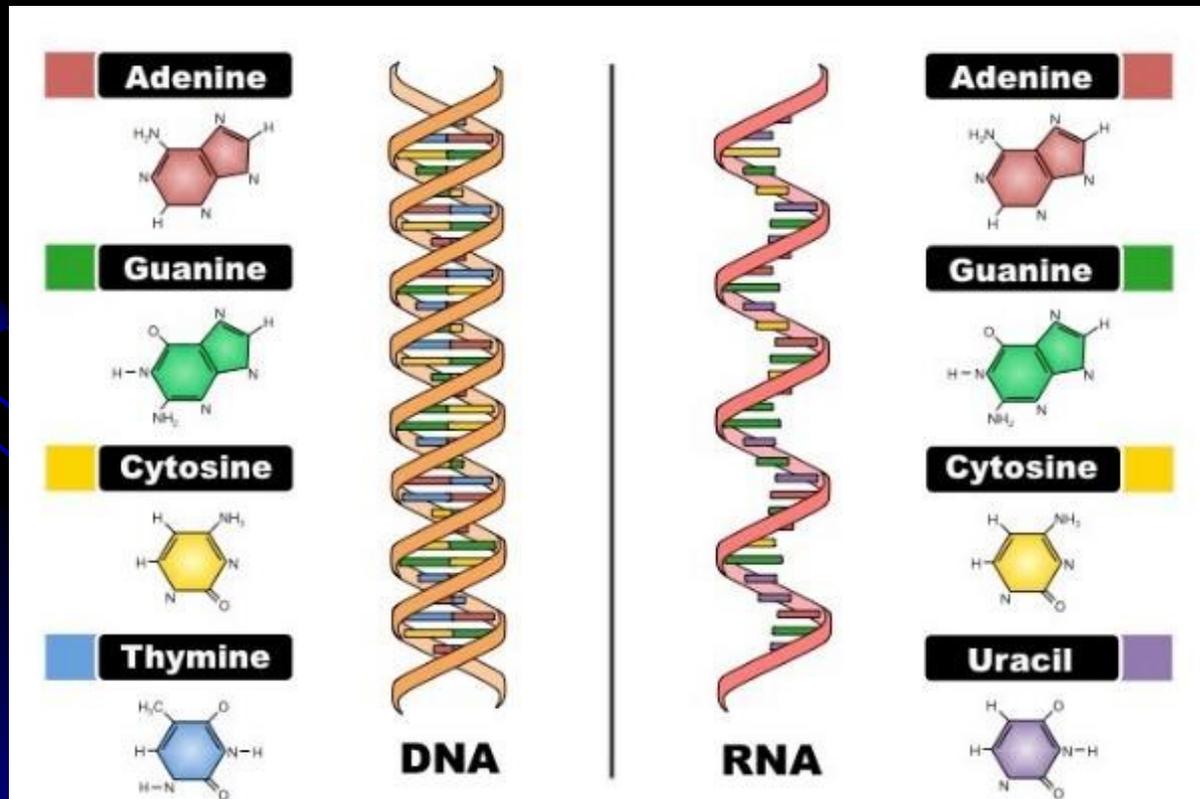
# DNA → RNA → Protein



What do you notice that is different  
• between DNA and RNA?

# DNA v. RNA

RNA is like DNA, it is made of subunits called nucleotides \*\*





# The 3 Types of RNA

- All 3 types help to build proteins.
- \*\*Messenger RNA\*\* - Brings instructions from DNA to the cytoplasm.
- Ribosomal RNA - Uses instructions to assemble amino acids.
- Transfer RNA - The supplier.

# DNA → RNA → Protein

- There are 2 steps to
  - 1. Transcription
  - 2. Translation



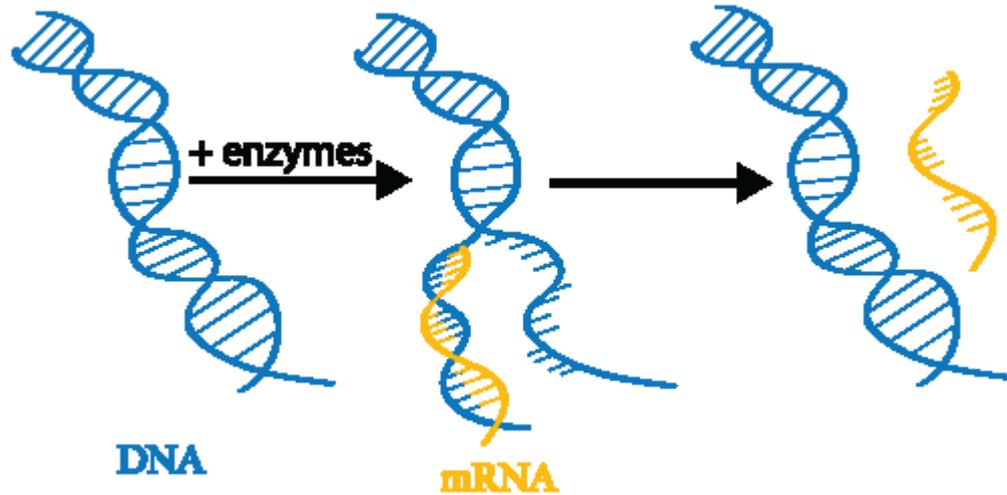
# 1. Transcription

Messenger RNA is formed during Transcription \*\*

- **Goal:** Get the info from DNA (nucleus) to ribosome's
- **How to do this:**
  - Make a mRNA copy of a portion of a DNA strand
  - mRNA travels to the ribosome

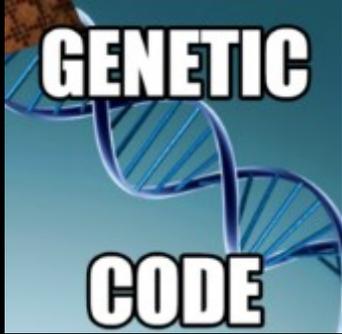


# 1. Transcription



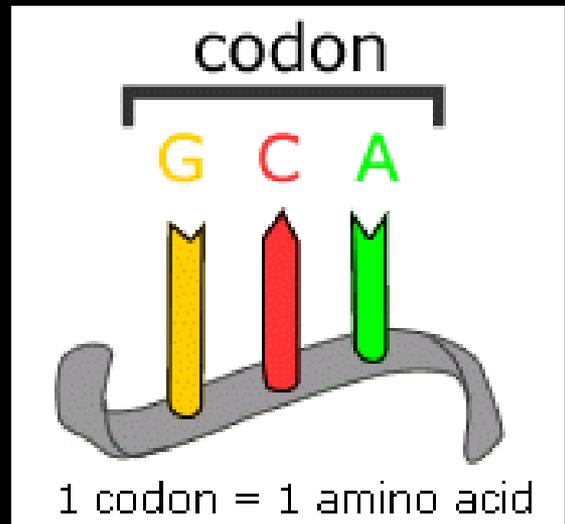
1. DNA unzips
2. mRNA nucleotides begin binding to a DNA strand
3. mRNA strand leaves to bring message to ribosome
4. DNA zips back up

DNA Base Sequence	→	mRNA codon	→	tRNA Anticodon	Amino Acid
	→		→		
	→		→		



# The Genetic Code

- The sent from mRNA is like a genetic message.
- **Codon**- A group of three contiguous bases in mRNA.



# RNA Processing

- Not all of the nucleotides in the DNA of eukaryotic cells carry instructions
- Genes contain long nucleotide sequences that are scattered

## 2. Translation

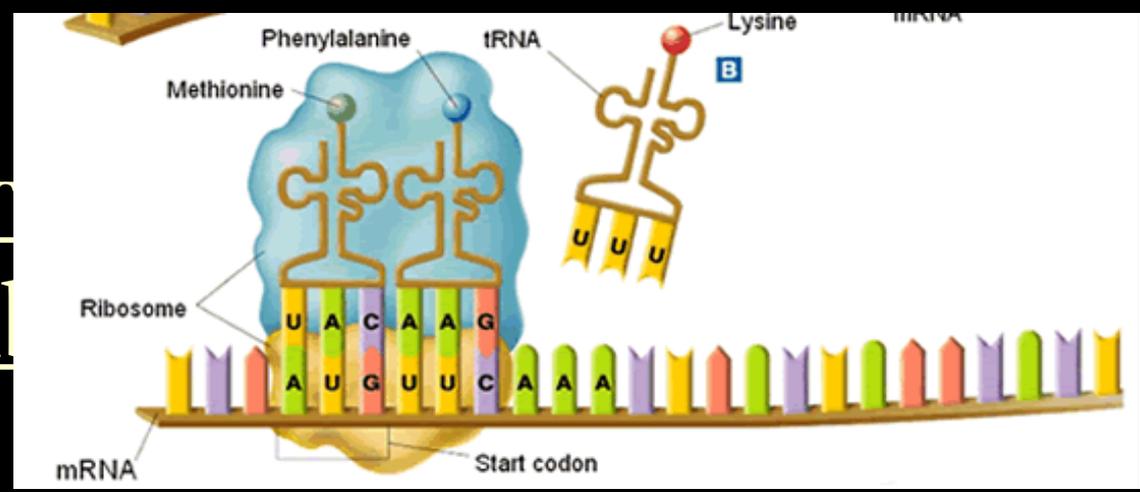
- **Goal:** Make proteins using mRNA
- **How to do this:** *Translate* mRNA “code” into Amino Acids
- Takes place at the ribosome

**Time Out! What are the building blocks of proteins? \*\***  
**Amino Acids**



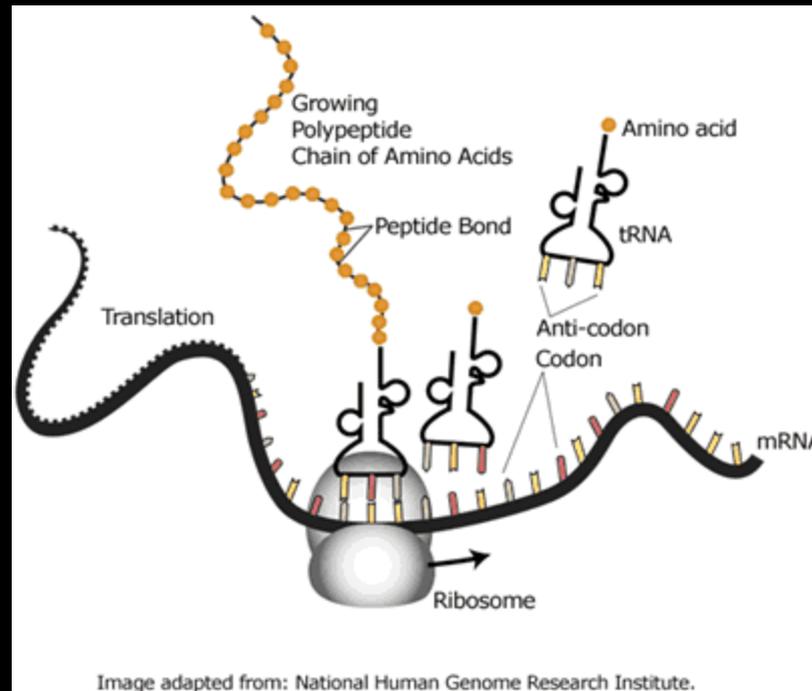
- mRNA attaches to the ribosome
- tRNA molecules come in one-by-one
- Each tRNA has an “Anticodon” that complements the a mRNA codon

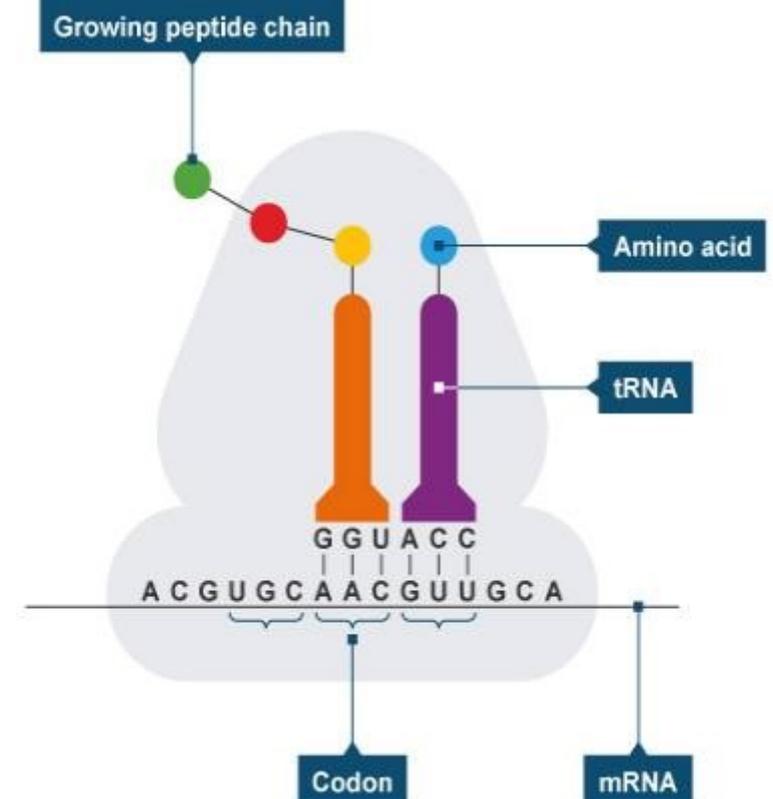
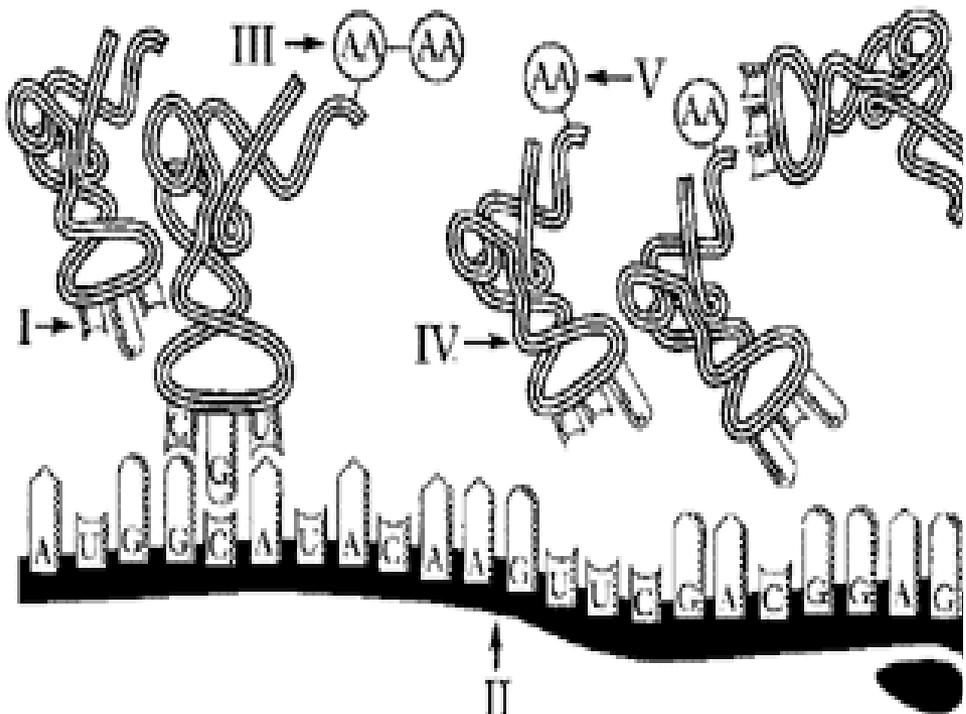
● <https://www.v=B6O6uR>



# Translating the mRNA Code

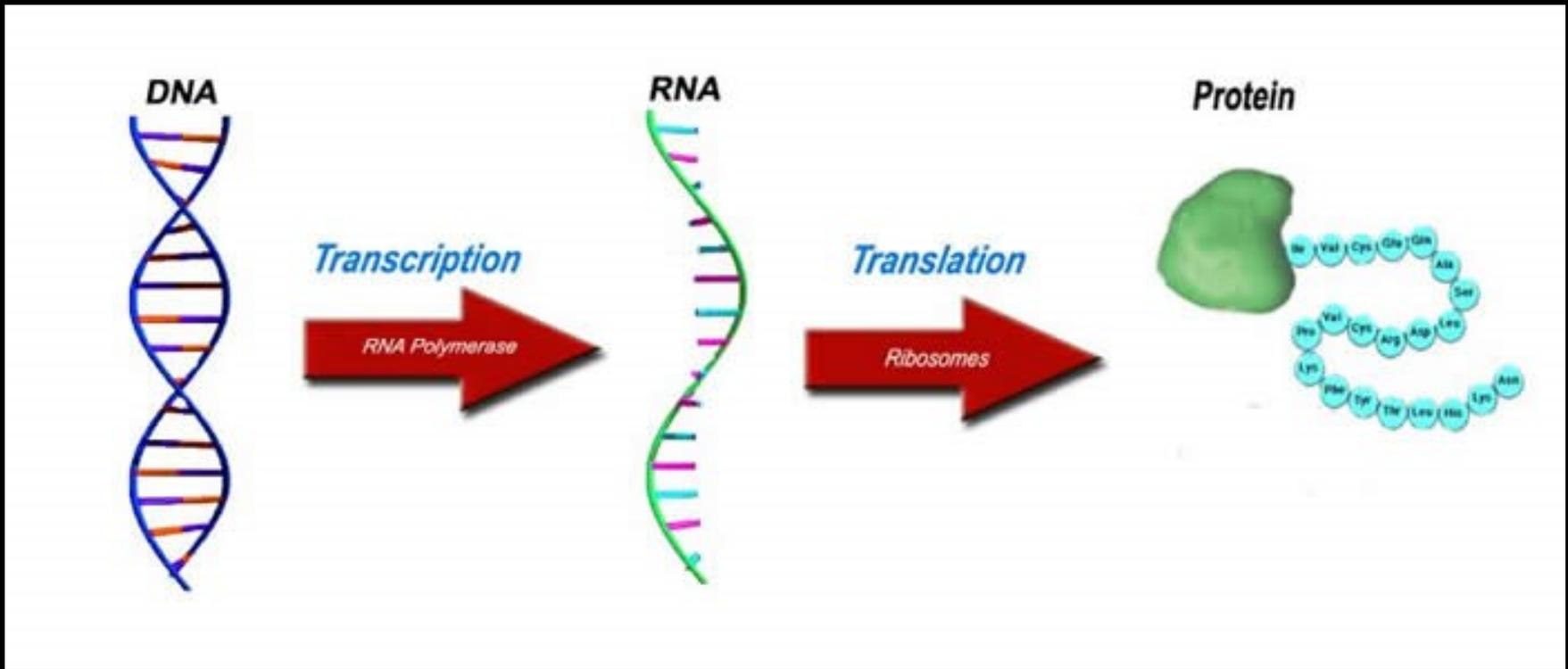
- The tRNA molecule brings amino acids → amino acid chains → proteins





^^ This one is on your quiz \*\*

Know what process it is showing,  
 where it is located, and each  
 structure\*\*



**Main goal of Transcription: DNA → mRNA**  
**Main goal of Translation: mRNA → Protein**

- <http://www.youtube.com/watch?v=NJxobgkPEAo>
  - <https://www.youtube.com/watch?v=zwibgNGe4aY> \* Overview
- 