

DNA

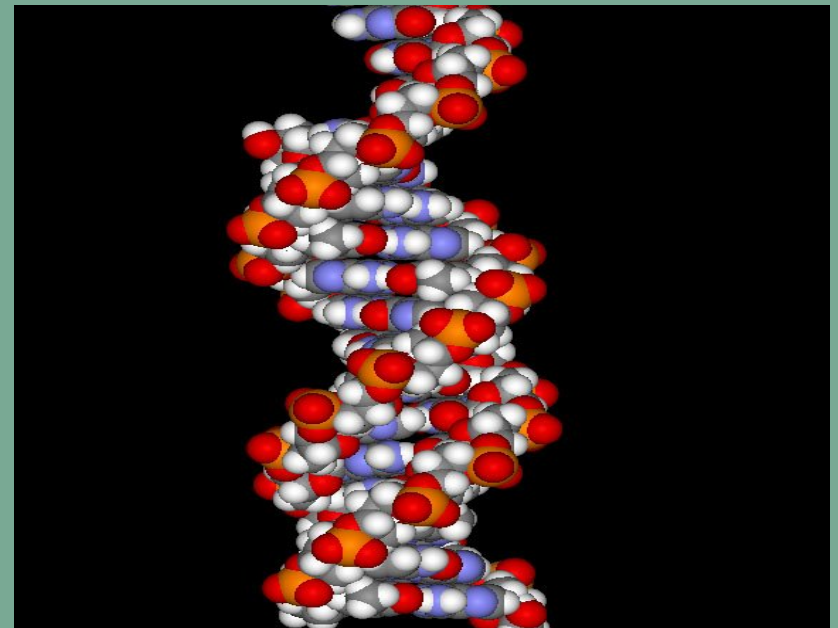
(Deoxyribonucleic Acid)

- DNA is made up of 4 bases:

- A=Adenine
- G= Guanine
- C= Cytosine
- T=Thymine

- Note:

- “A” only bonds with “T”
- “C” only bonds with “G”



How many
codons are in
each example?

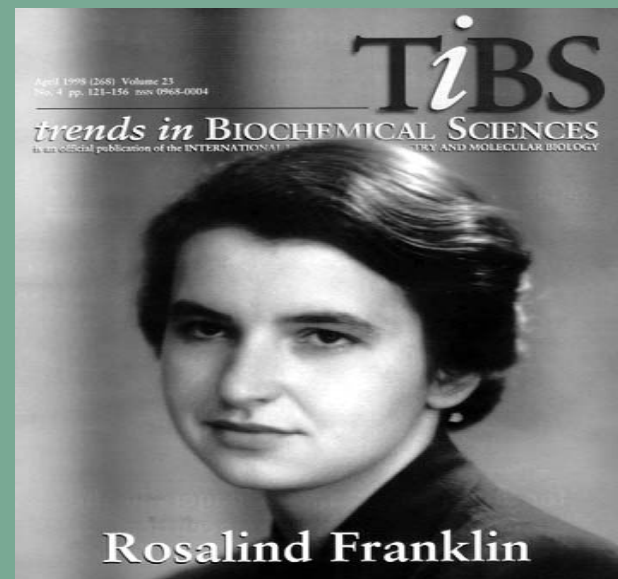
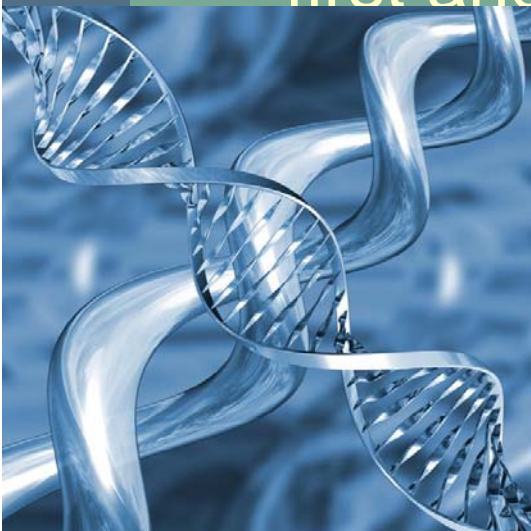
- 3 bases = 1 CODON
- Practice:
- Ex #1
- ATG CCA TGA

- Ex # 2
- AAA GTA CAT TTG



DNA structure

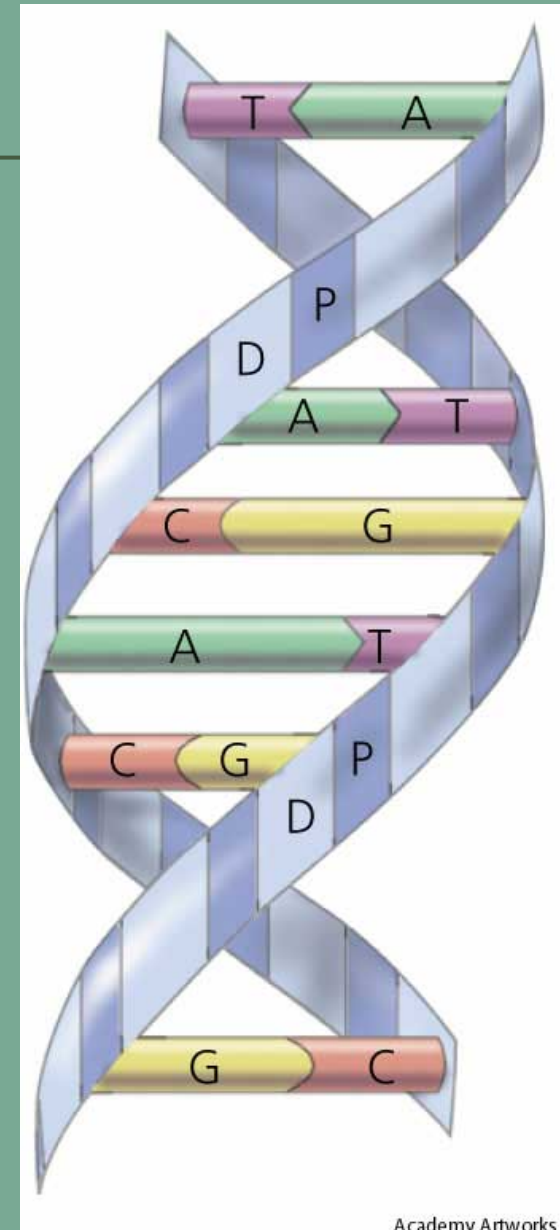
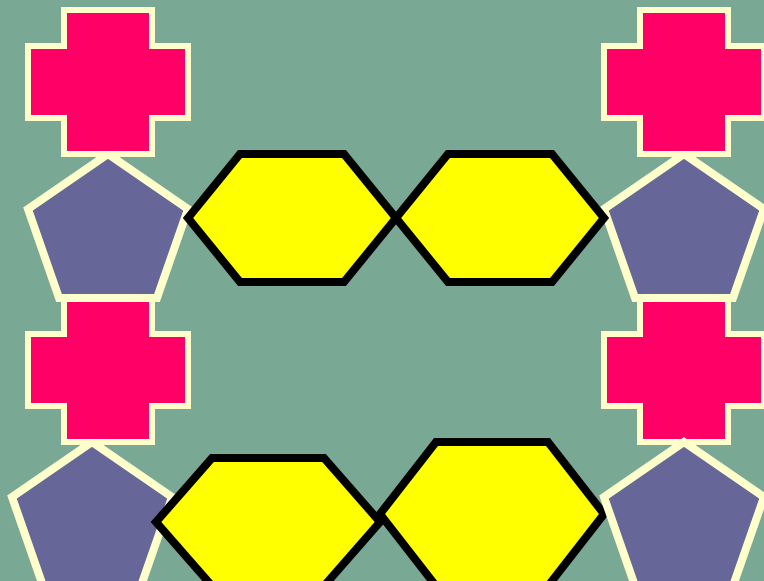
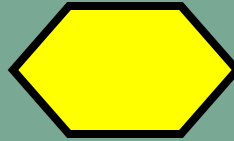
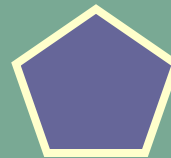
- The DNA double helix structure was discovered in 1953 by Watson and Crick.
- Rosalind Franklin took pictures of DNA first and got no credit.

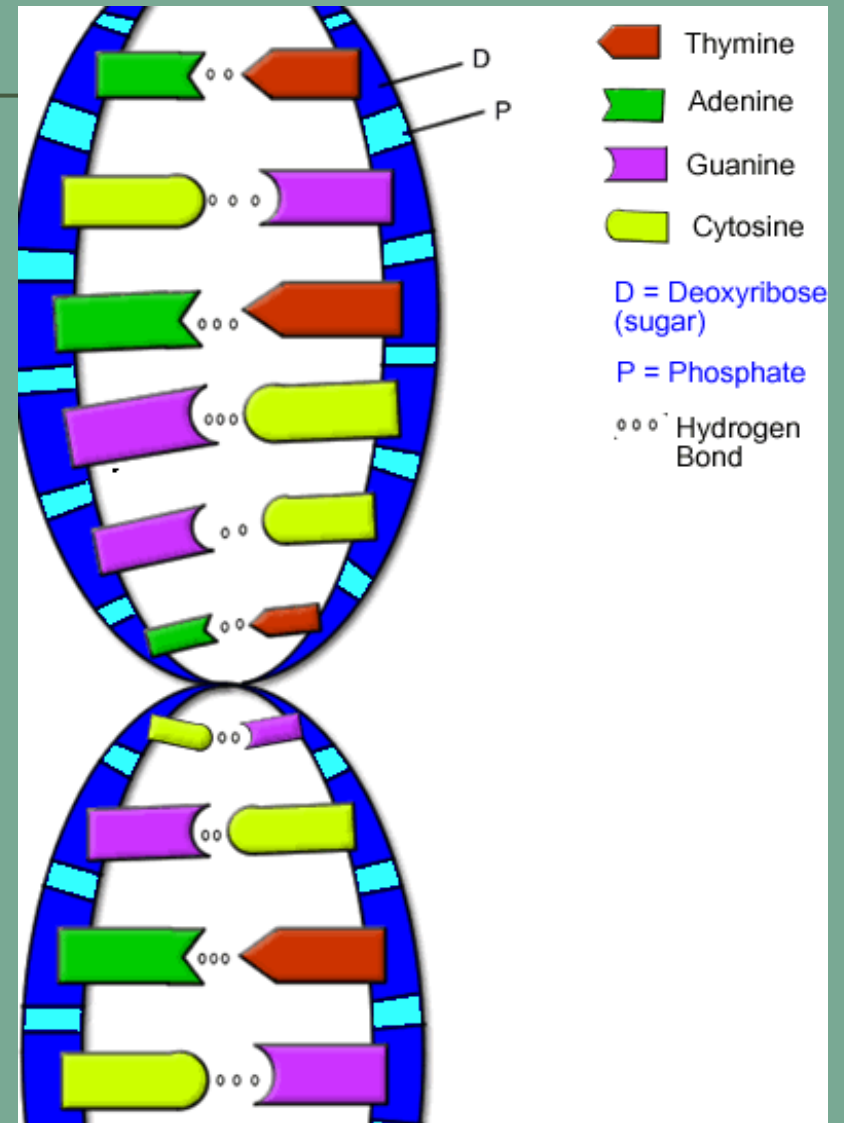
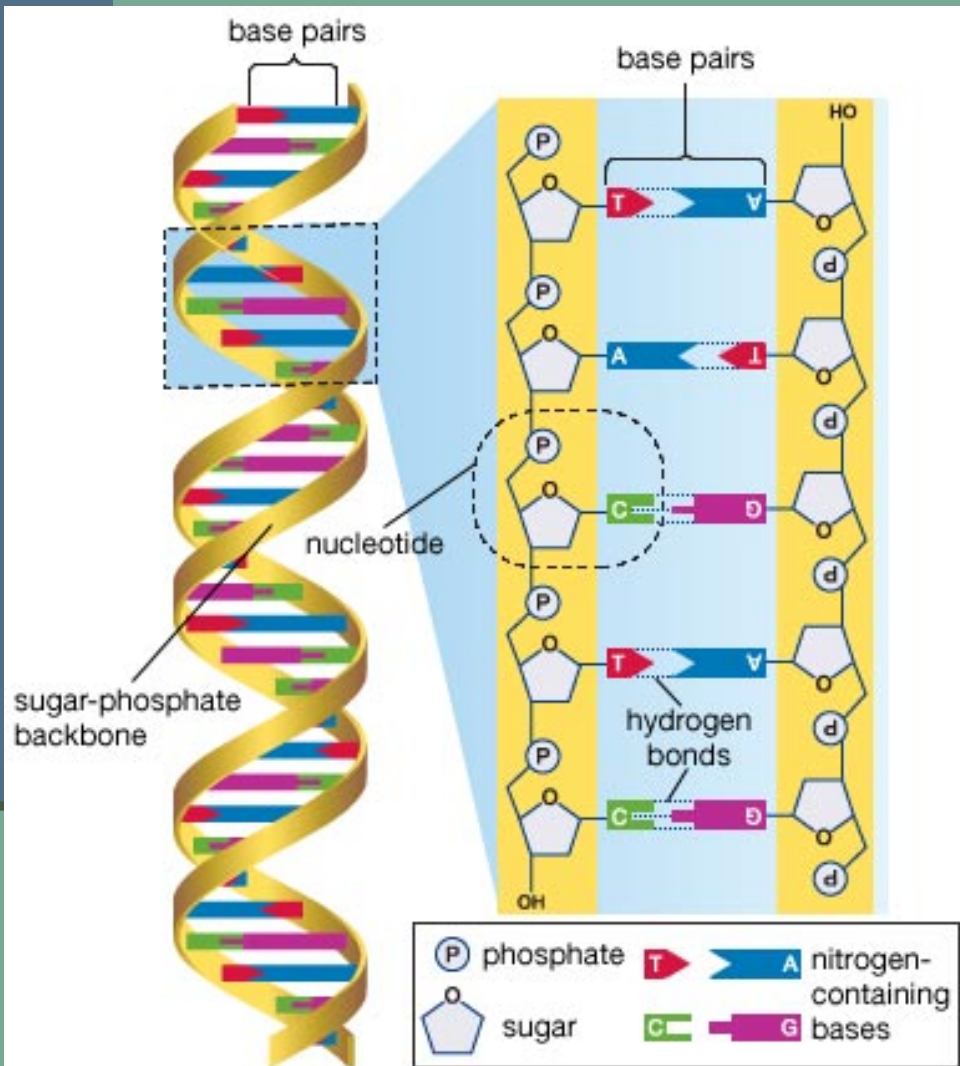


Nucleotides (building blocks of DNA)

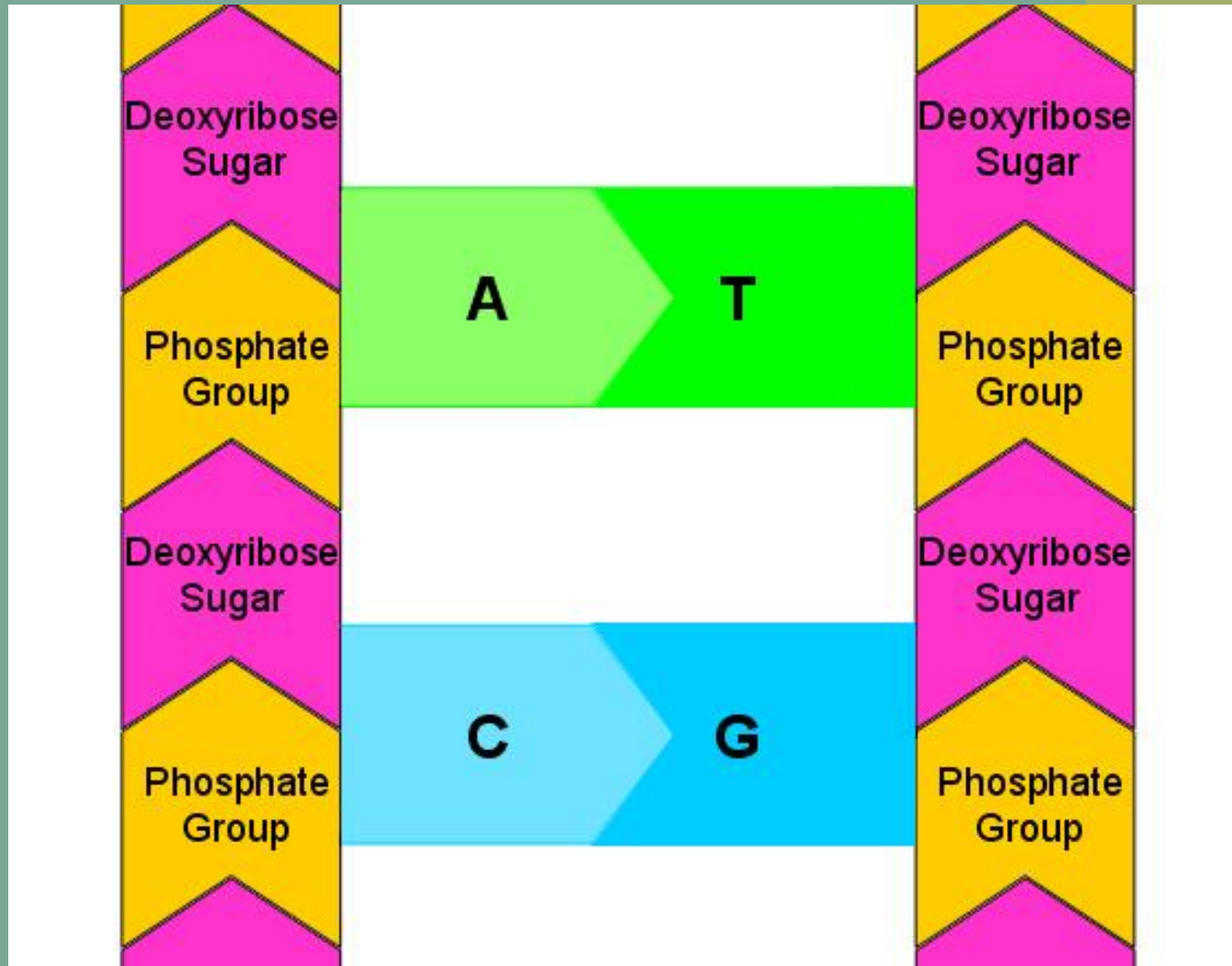
3 Parts:

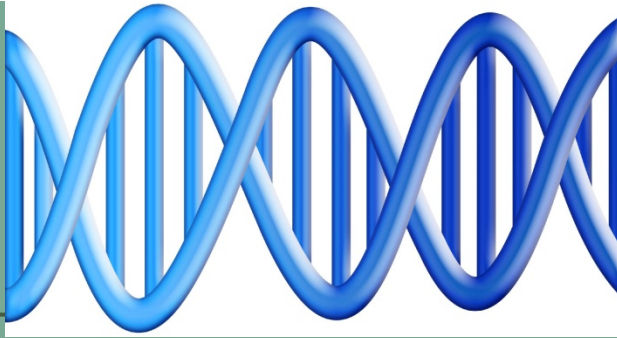
1. Phosphate
2. Pentose Sugar
3. DNA base





Structure of DNA





- DNA codes for all genetic information in our bodies.
- DNA is structured in a double helix, and it looks like a twisted ladder

Draw example DNA untwisted and twisted/label the rungs



- DNA bases are held together by weak hydrogen bonds

RNA (Ribonucleic Acid)

- RNA is made up of 4 bases:

A=Adenine

G=Guanine

C=Cytosine

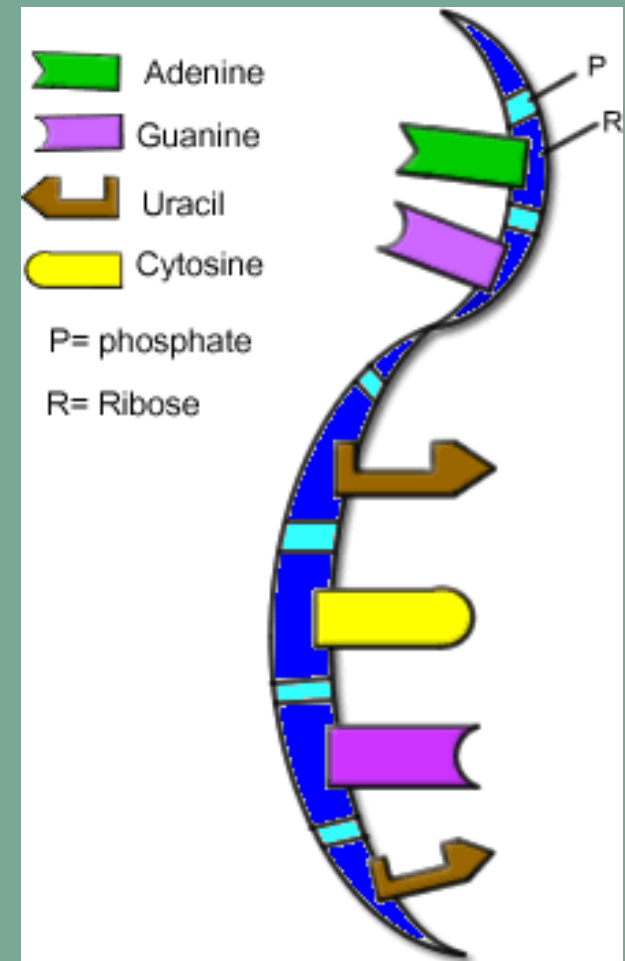
U=Uracil

NOTE:

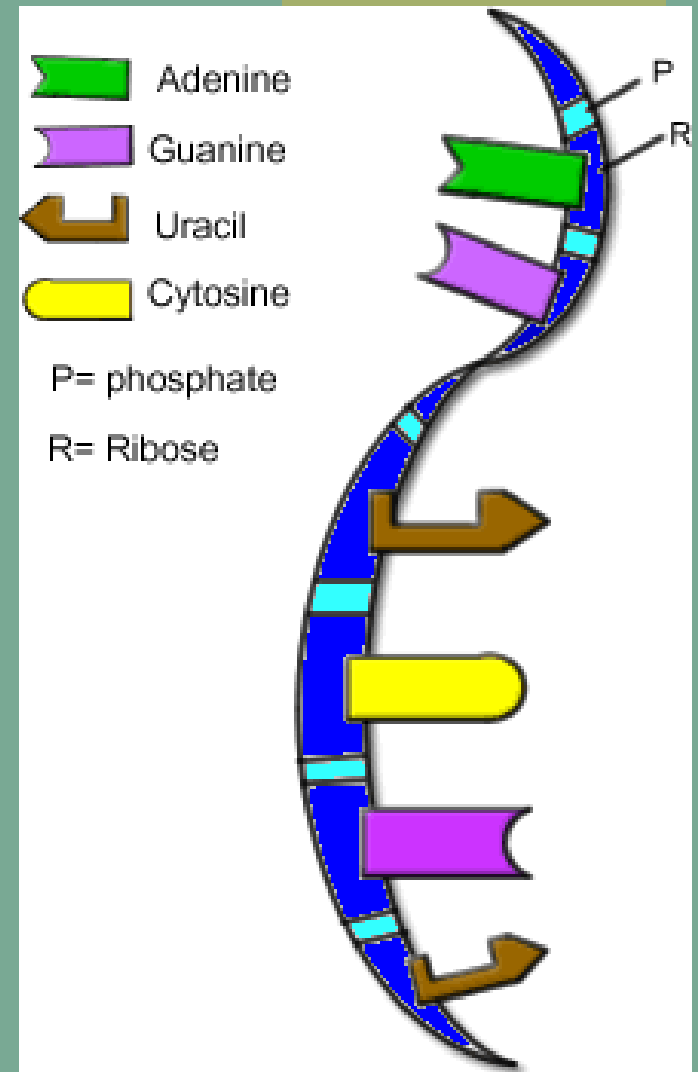
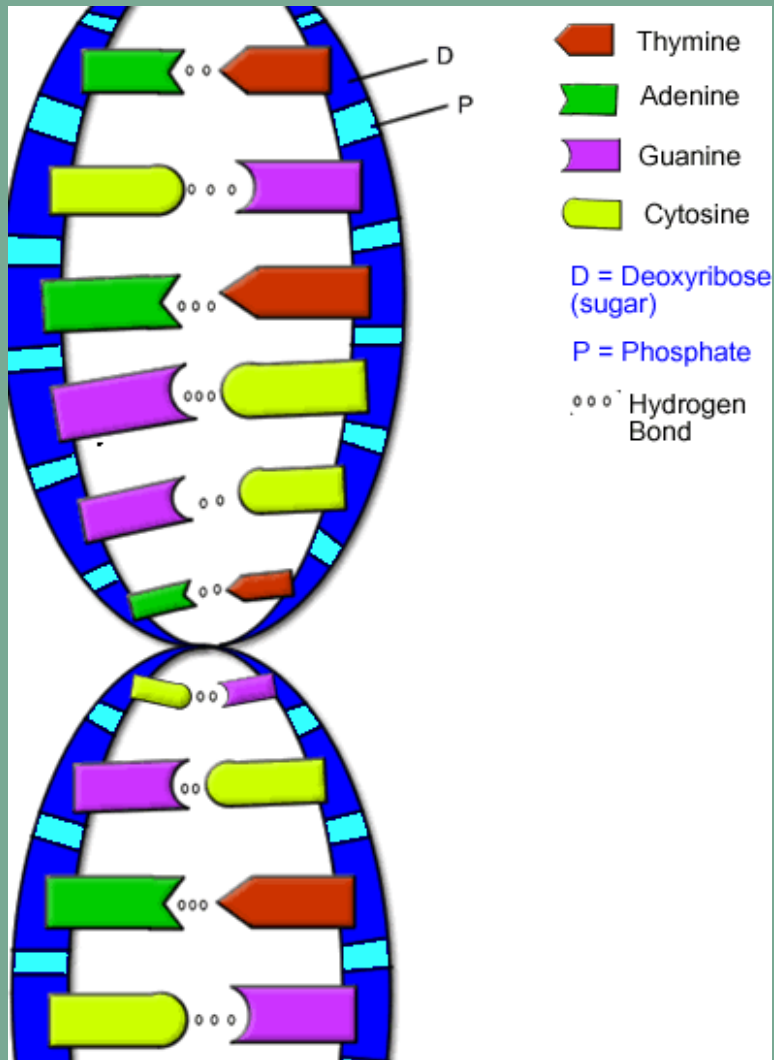
“A” only bonds with “U”

“G” only bonds with “C”

Note: “U” replaces “T”



DNA vs RNA



Practice and Vote

- Ex # 1

ATT CGA TAG GAT (DNA Strand)
(RNA Strand)

- Ex # 2

CCA GAT GAA TTT AAA (DNA Strand)
(RNA Strand)

DNA Replication

(occurs during interphase during S-phase)

Step 1- DNA is in a double helix

Step 2-DNA untwist and WHB's are cut by helicase (enzyme)

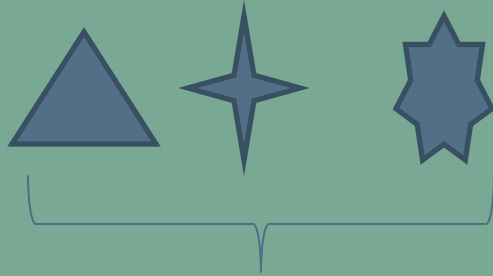
Step 3- DNA Polymerase adds nucleotides to parent strands

Step 4 DNA is replicated

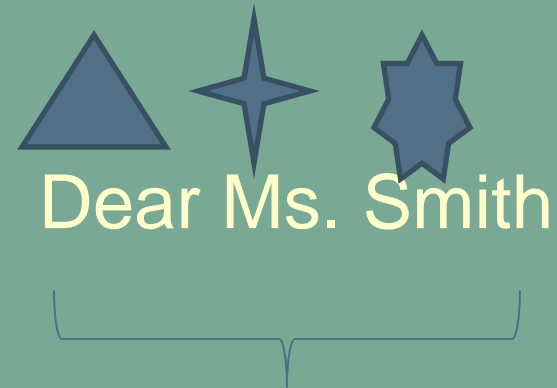
Protein Synthesis

- Proteins are the genetic code

- Dear Ms. Smith



Transcription



Translation

3 Types of RNA

TYPE	Short Name	Location
Messenger RNA	mRNA	Nucleus & Cytoplasm
Transfer RNA	tRNA	Cytoplasm
Ribosomal RNA	rRNA	Cytoplasm

Protein Synthesis

- DNA = the code
- Transcription  Translation

- EX #1 DNA

- DNA - ATC GAC

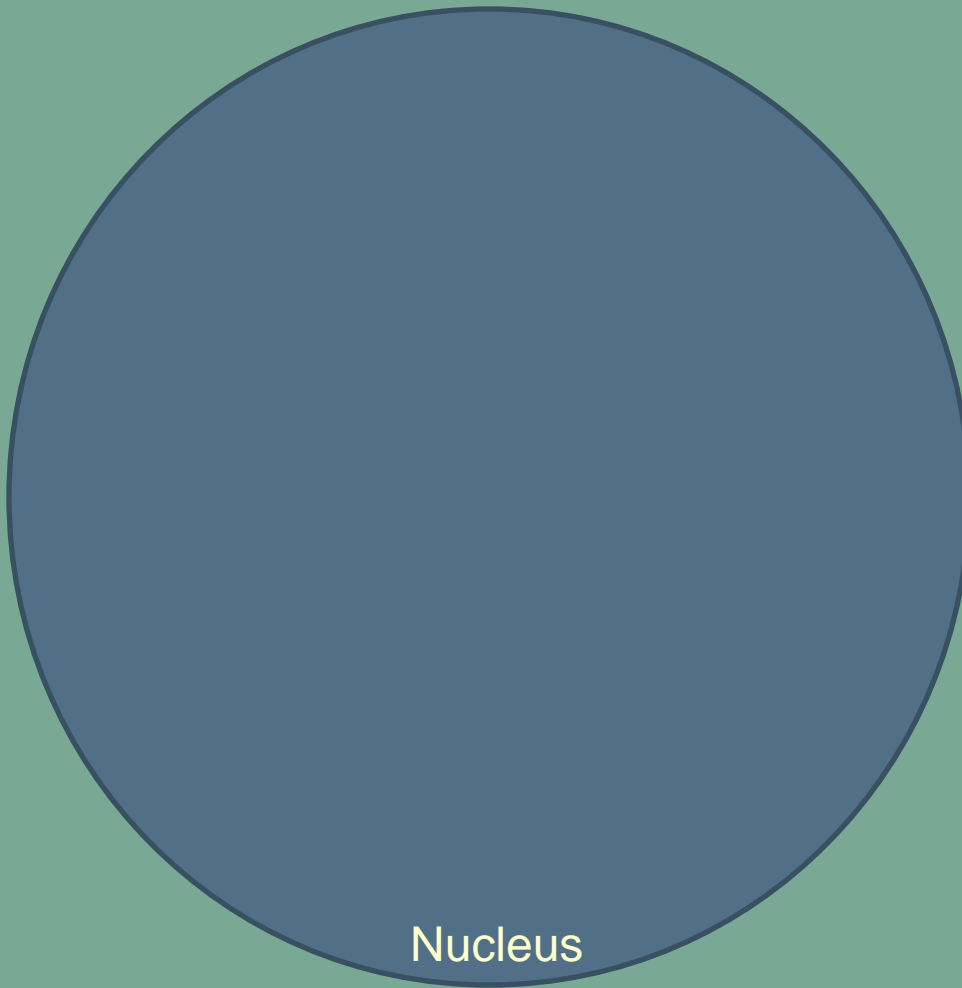
- mRNA-

} Transcribed

Step #1 “In the nucleus”

- RNA polymerase binds to DNA & separates the strands
- RNA polymerase uses 1 strand of DNA as the template
- DNA is transcribed

Step #1 “In the nucleus”



tRNA

tRNA

tRNA

Cytoplasm

TAA CGGATC

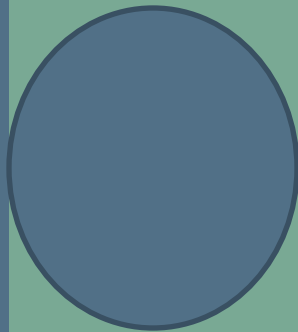
Transcription Video (56 secs)

- <http://www.youtube.com/watch?v=vJSmZ3DsntU&feature=related>

Step 2 “In the Cytoplasm”

- mRNA exits the nucleus and enters the cytoplasm & attaches to a ribosome
- tRNA begins translation process to create proteins (polypeptide chains)

Step #2 “In the cytoplasm”



Nucleus

Iso
|
tRNA
|
UAA

Ala
|
tRNA
|
CGG

STOP
|
tRNA
|
AUC



Ribosome

AUUGCCUAG

-
- TAA CGG ATC - DNA “code”
 - AUU GCC UAG - mRNA “codon”
 - UAA CGG AUC - tRNA “anti-codon”

- Note:

- A gene is the segment of DNA that codes for a protein

DNA Replication and Protein Synthesis Rap (3:30)

- <http://www.youtube.com/watch?v=d1UPf7IXeO8&feature=related>

Practice Codons

Transcribe → Translate

1. TAC

AAG

CGC

ACG

2. ACG

CAT

TAC

ACC

3. AAT

GGG

ACA

TTC

4. GTA

ATA

ATG

ATG

Practice Codons

Transcribe → Translate

1.	TAC	AAG	CGC	ACG
2.	ACG	CAT	TAC	ACC
3.	AAT	GGG	ACA	TTC
4.	GTA	ATA	ATG	ATG

Practice Codons
Transcribe → Translate
ANSWERS

1. TAC	AAG	CGC	ACG
AUG	UUC	GCG	UGC
(Met)	(Phe)	(Ala)	(Cys)

2. ACG	CAT	TAC	ACC
UGC	GUA	AUG	UGG
(CYS)	(Val)	(Met)	(Trp)

Practice Codons
Transcribe → Translate
ANSWERS

3.	AAT	GGG	ACA	TTC
	UUA	CCC	UGU	AAG
	(Leu)	(Pro)	(Cys)	(Lys)

4.	GTA	ATA	ATG	ATG
	CAU	UAU	UAC	UAC
	(His)	(Tyr)	(Tyr)	(Tyr)

Quick Practice

How many codons? How many bases?

Practice #1 DNA to DNA

GTA TTA CAT TAT

Practice #2 DNA to RNA

GTA TTA CAT

How are DNA and RNA different in the cell? (location, size, fct, & structure)

DNA

RNA