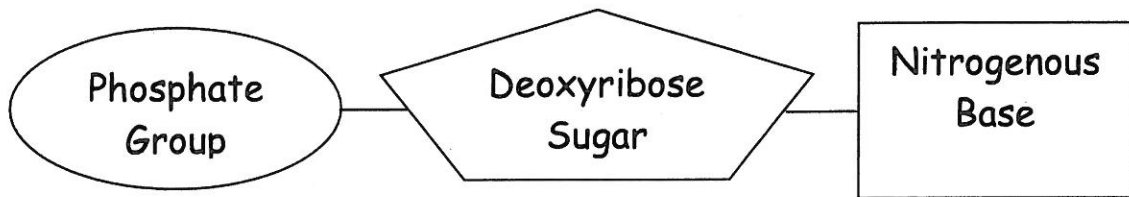


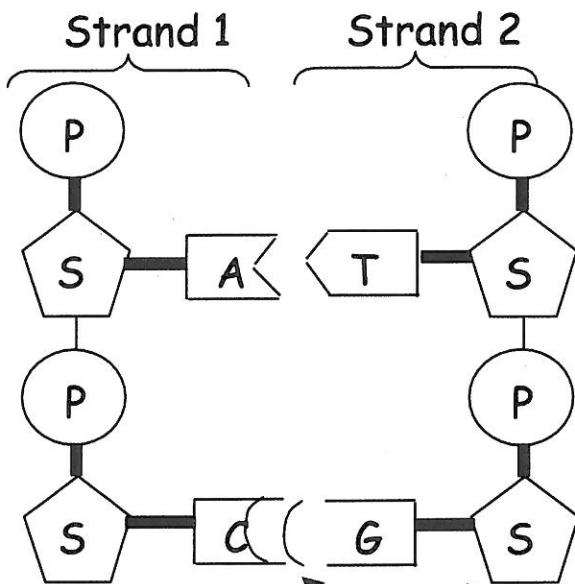
## DNA

- Deoxyribonucleic acid
- Is a type of nucleic acid
- What chromosomes (and genes) are made of
- Made up of repeating nucleotide subunits
- 1 nucleotide looks like:



4 types: ↑  
 Adenine (A)  
 Guanine (G)  
 Cytosine (C)  
 Thymine (T)

- 2 strands so bases can pair up
  - A binds T only
  - C binds G only



Phosphates + sugars  
on the outside

Bases on the inside (Bases fit  
like puzzle pieces)

Remember

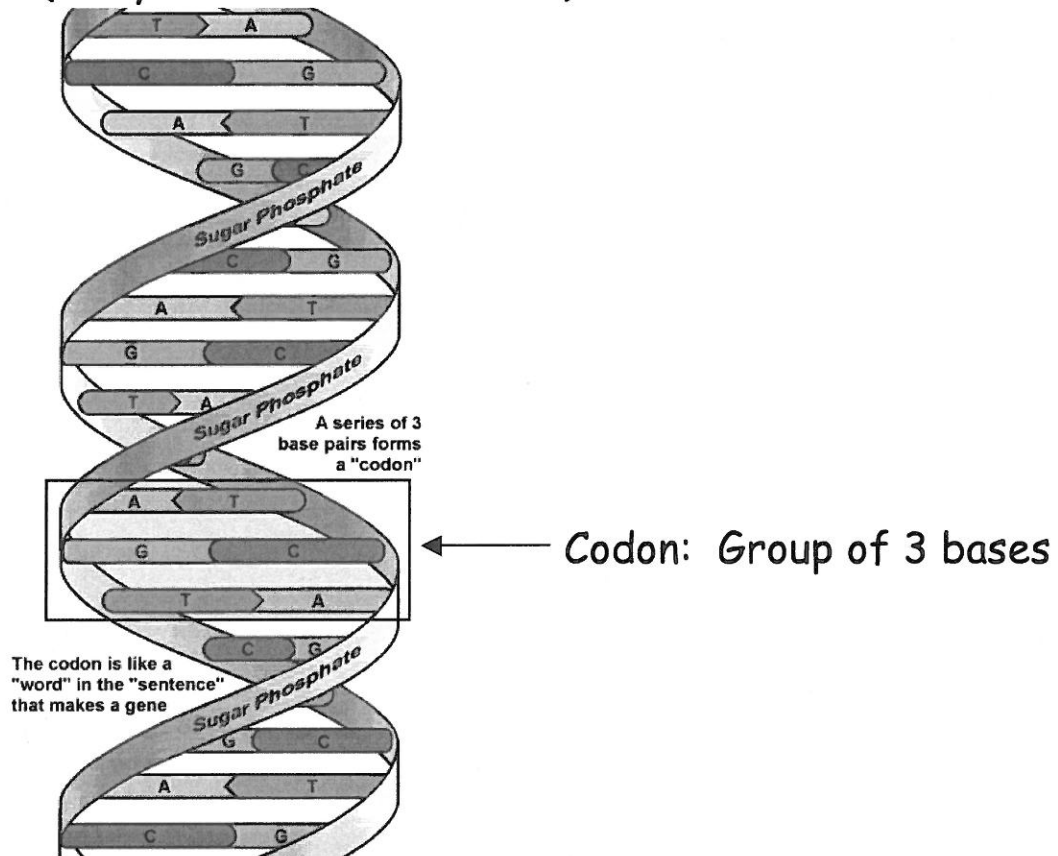


DNA is like an Oreo

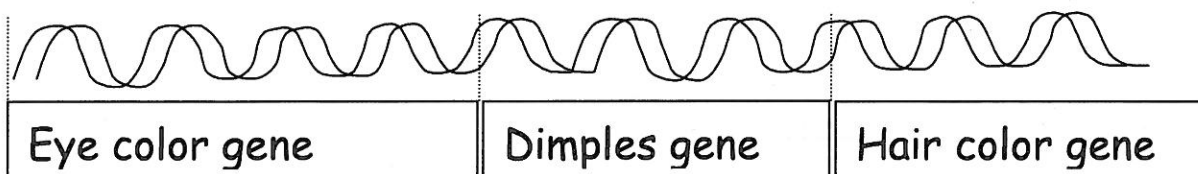


Phosphates + sugars = cookies  
 Bases = cream filling

- Shape is a double helix
  - Double helix: 2 spirals wound around each other
  - Rosalind Franklin took an X-ray photo of DNA
  - James Watson and Francis Crick interpreted the photo and discovered the double helix structure (They won the Nobel Prize)



- Genes: stretch of DNA that codes for a trait
  - The code is the order of the bases (letters)
  - Genes are hundreds or thousands of bases long



## Chargaff's Rule

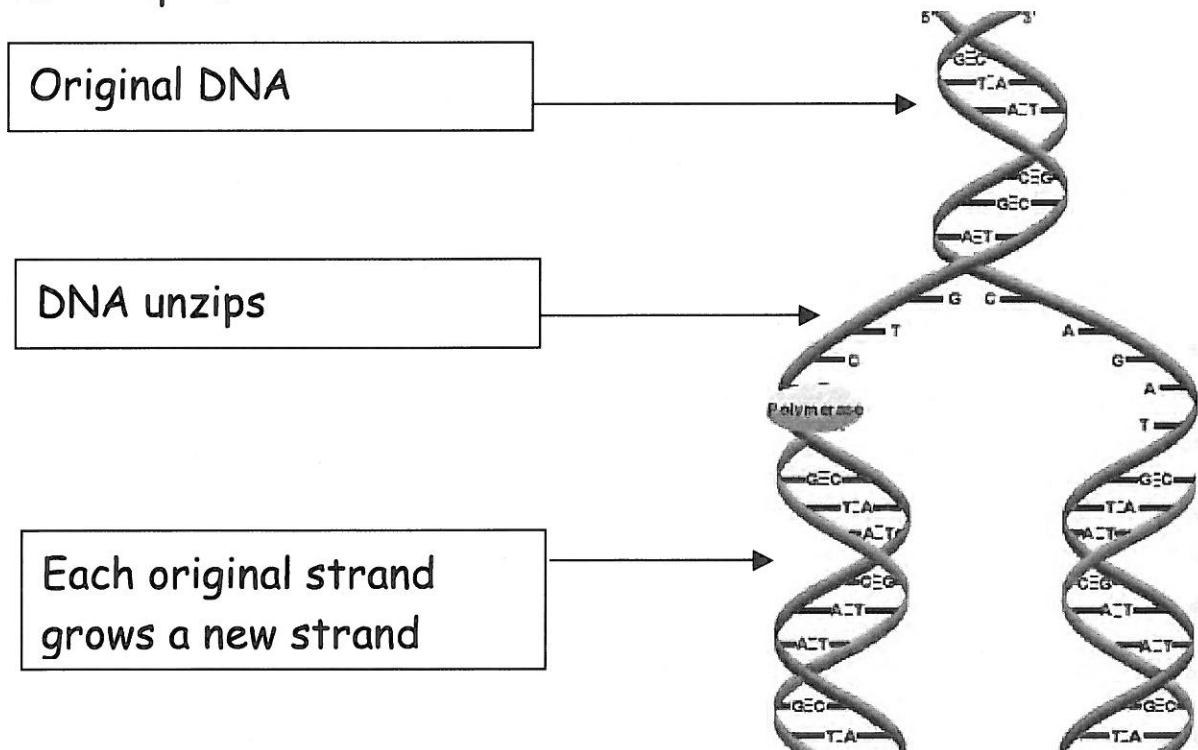
- In DNA, the amount of A = the amount of T  
the amount of C = the amount of G

## DNA is complementary

- Complementary: bases on one strand match up with the bases on the other strand (A-T and G-C)
- Example: Strand 1- ATG GGC CTA  
Strand 2- TAC CCG GAT

## Replication

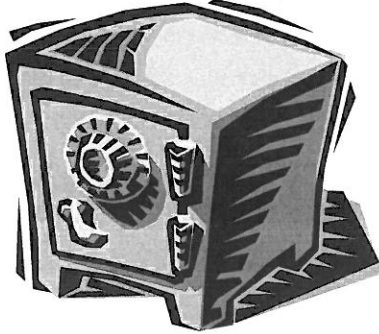
- Process by which DNA copies itself
- Happens when chromosomes copy themselves before mitosis and meiosis
- Semiconservative replication: Each new piece of DNA is made up of 1 old strand and 1 new strand



DNA never ever leaves the nucleus

- DNA is the master copy of the directions a cell needs to live so it needs to be protected

DNA in the nucleus is safe



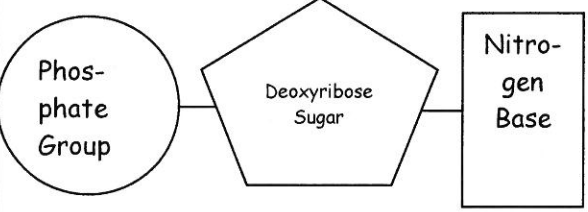
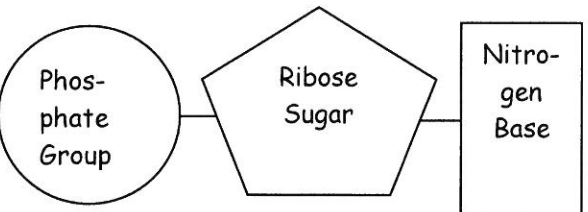


But DNA in the cytoplasm can be destroyed



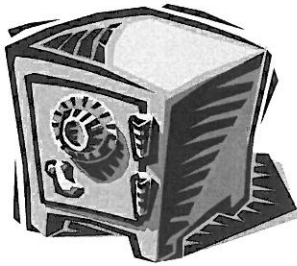
RNA is a copy of DNA that goes out into the cytoplasm to tell the cell what to do in order to stay alive

- RNA: ribonucleic acid
- You can always make more RNA so it's ok if it gets destroyed (You can't make more DNA!!!)

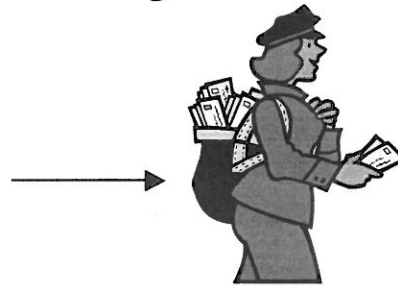
	DNA	RNA				
<i>How many strands?</i>	2 	1 				
<i>Nucleotide subunit</i>	 Deoxyribose sugar	 Ribose sugar				
<i>Bases</i>	Thymine (T) Adenine (A) Guanine (G) Cytosine (C) <table border="1" data-bbox="690 1638 852 1837"> <tr><td>T - A</td></tr> <tr><td>G - C</td></tr> </table>	T - A	G - C	Uracil (U) Adenine (A) Guanine (G) Cytosine (C) <table border="1" data-bbox="1291 1638 1453 1837"> <tr><td>U - A</td></tr> <tr><td>G - C</td></tr> </table>	U - A	G - C
T - A						
G - C						
U - A						
G - C						

## Transcription

- Definition: RNA is made from 1 gene in DNA
- The type of RNA made is called mRNA (messenger RNA) because it sends a message from DNA to the cytoplasm



DNA safe in the nucleus



Uses mRNA



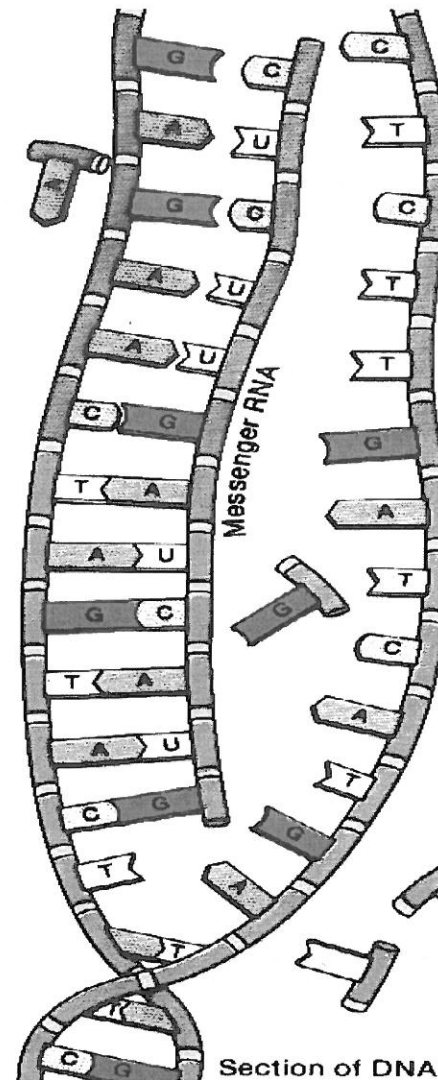
To send a message to the cytoplasm

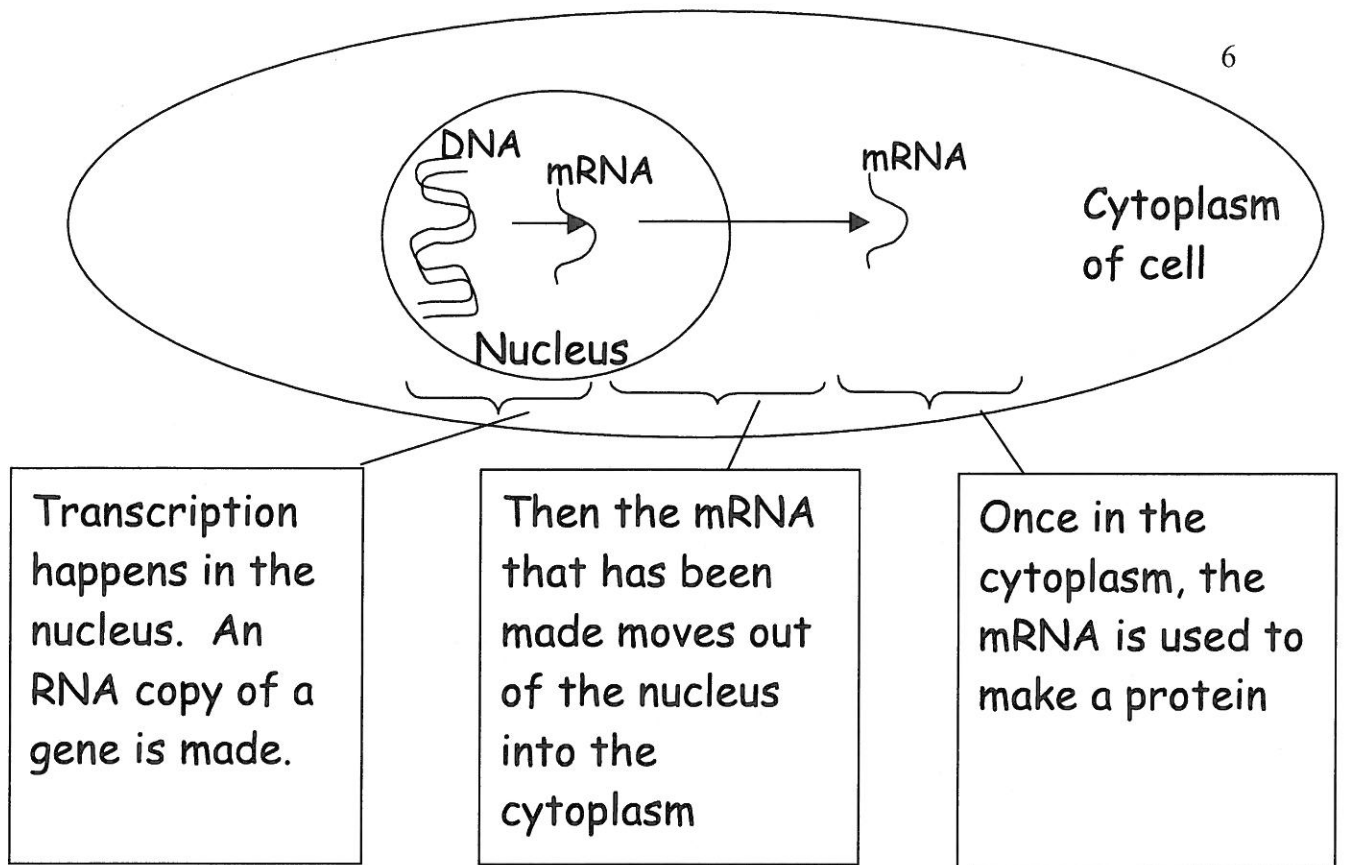
- Transcription
  - Unzip one gene in DNA
  - Match up bases to one side of a gene in DNA
  - mRNA detaches from the DNA
  - mRNA moves out of the nucleus and into the cytoplasm

DNA: GAG AAC TAG TAC  
RNA: CUC UUG AUC AUG

For figuring out RNA:

A binds U  
C binds G





How does mRNA tell the cell what to do?

- mRNA is a message that codes for a protein
- Proteins are made in the cytoplasm and then work to keep the cell alive
- Translation (protein synthesis): Process of making a protein
- Proteins are made up of amino acids (small building blocks)
- There are 20 different types of amino acids

