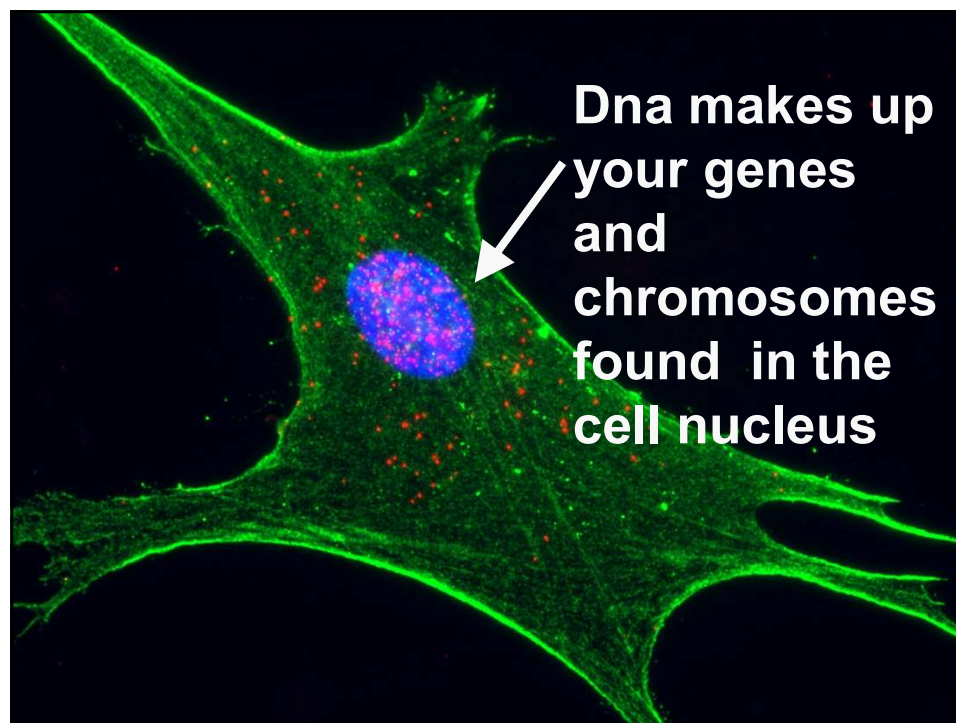
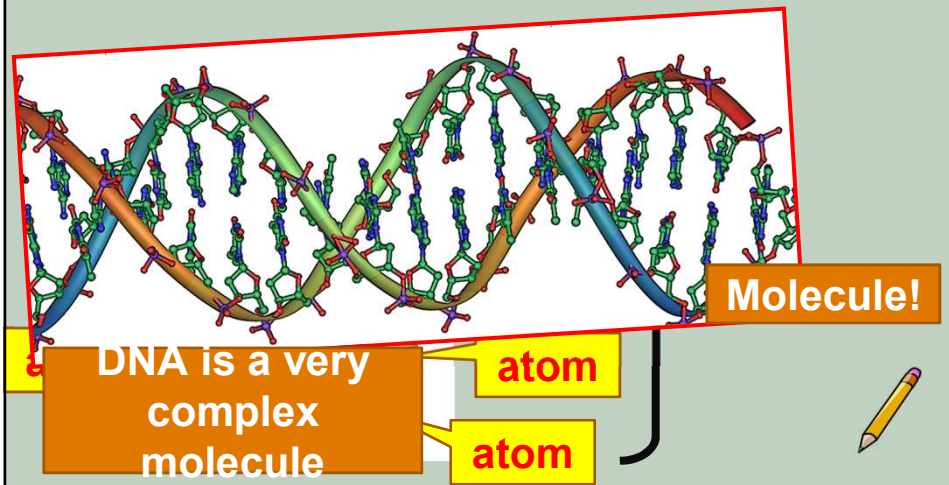
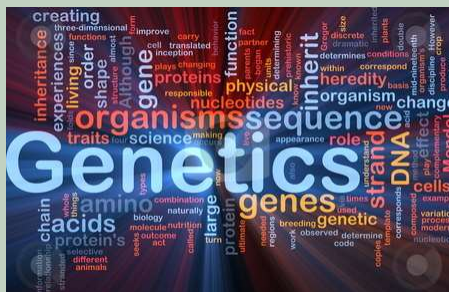


**DNA** (Deoxyribonucleic Acid)  
the basis of your inherited traits

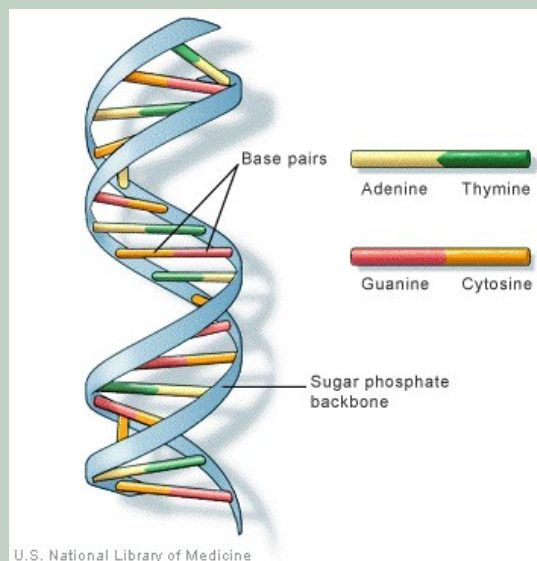


## Fun Fact

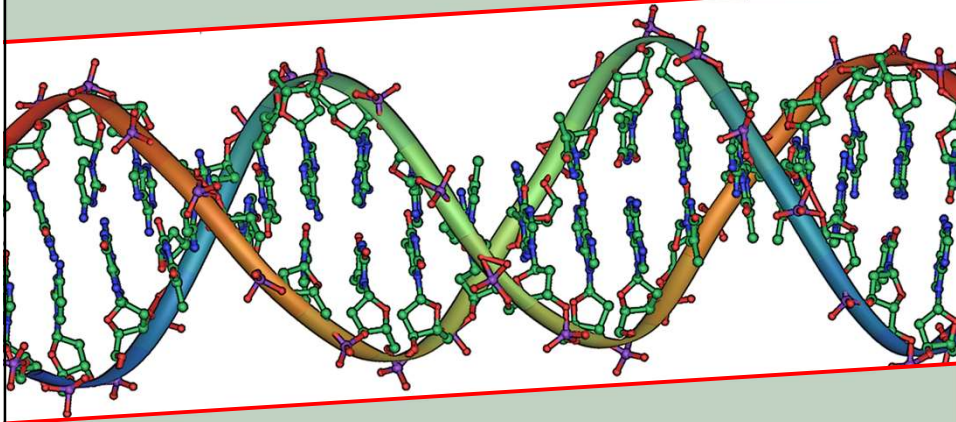
- 99.9% of your DNA is identical to everyone else's
- The remaining 0.1% influences our differences (hair color, eye color, height, etc.)



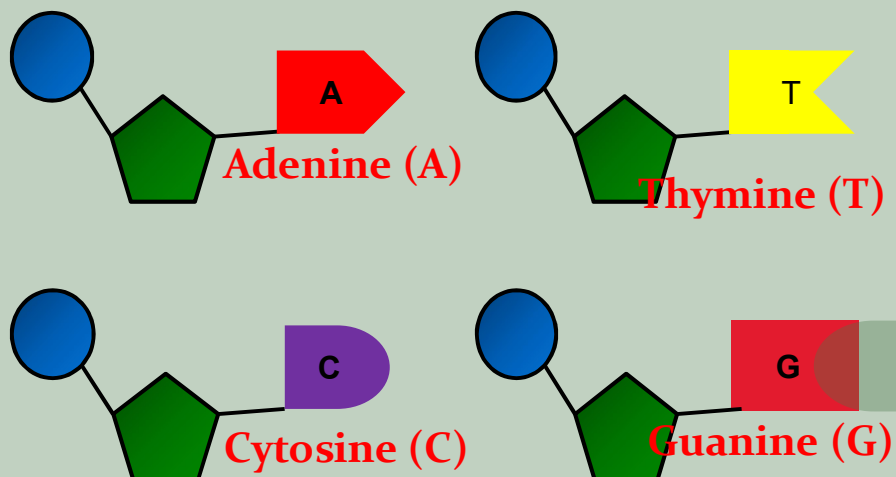
## Structure of DNA



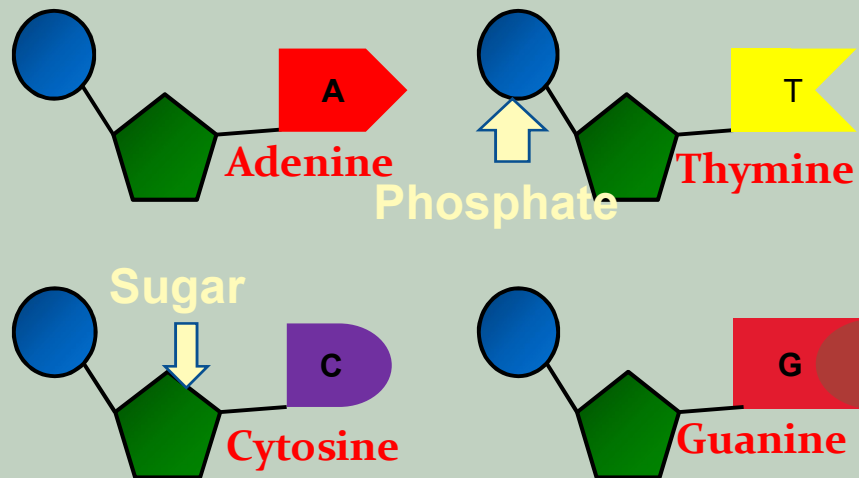
The DNA molecule is made of two strands **twisted** together in a **double helix** (a double coil)



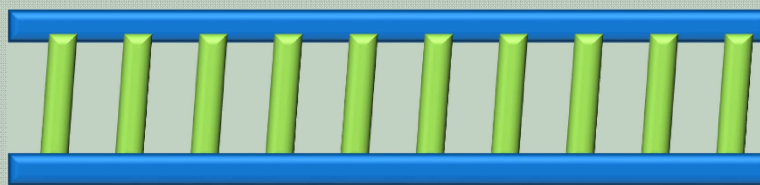
DNA is a little like a Lego building – it is made of 4 kinds of blocks called **nucleotides**



Each block (nucleotide) has a sugar, a phosphate and a base (ATCG)

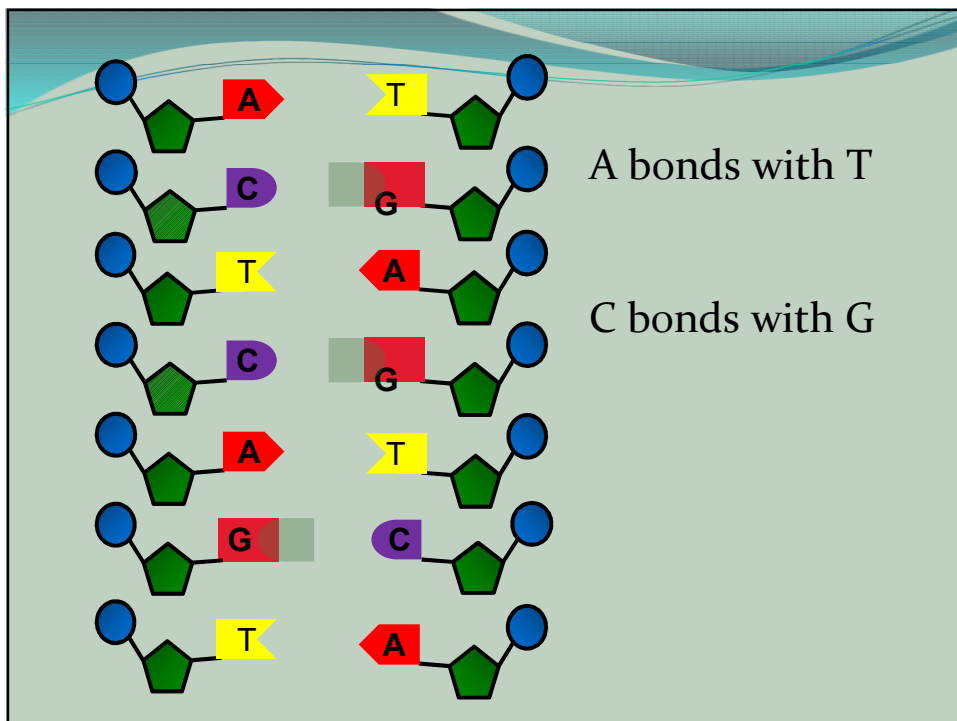
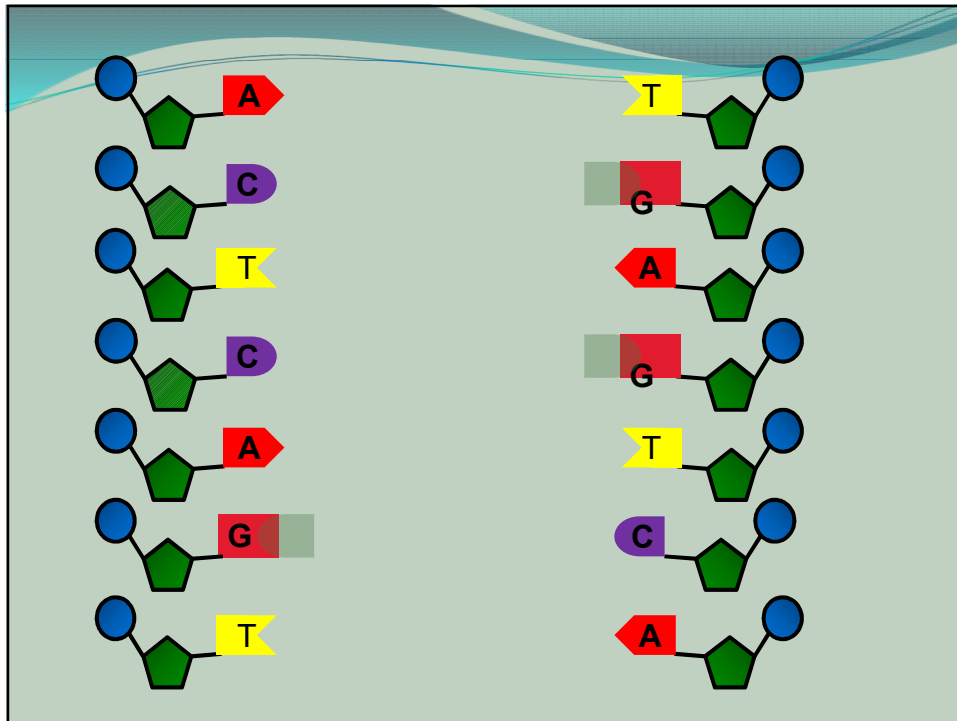


- The phosphate and sugar form the backbone of the DNA molecule, whereas the bases form the “rungs”.

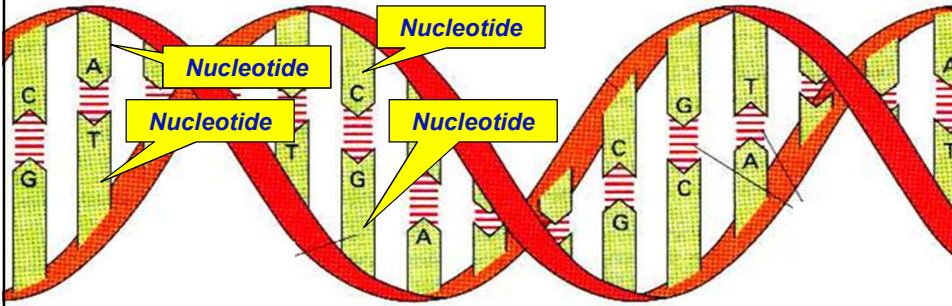


- The four bases are .....

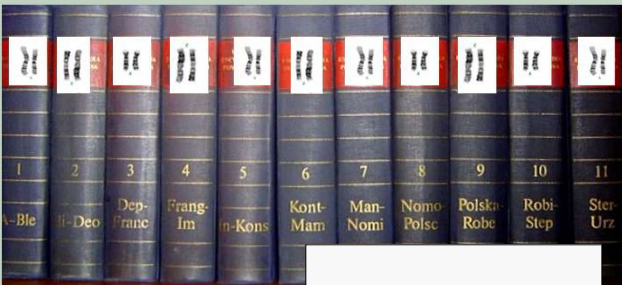
ATCG



a segment of DNA (called a **GENE**)



- **The genetic code** – comes from the order the blocks (nucleotides) are in.
- Each gene has the code (instructions) for putting together one protein



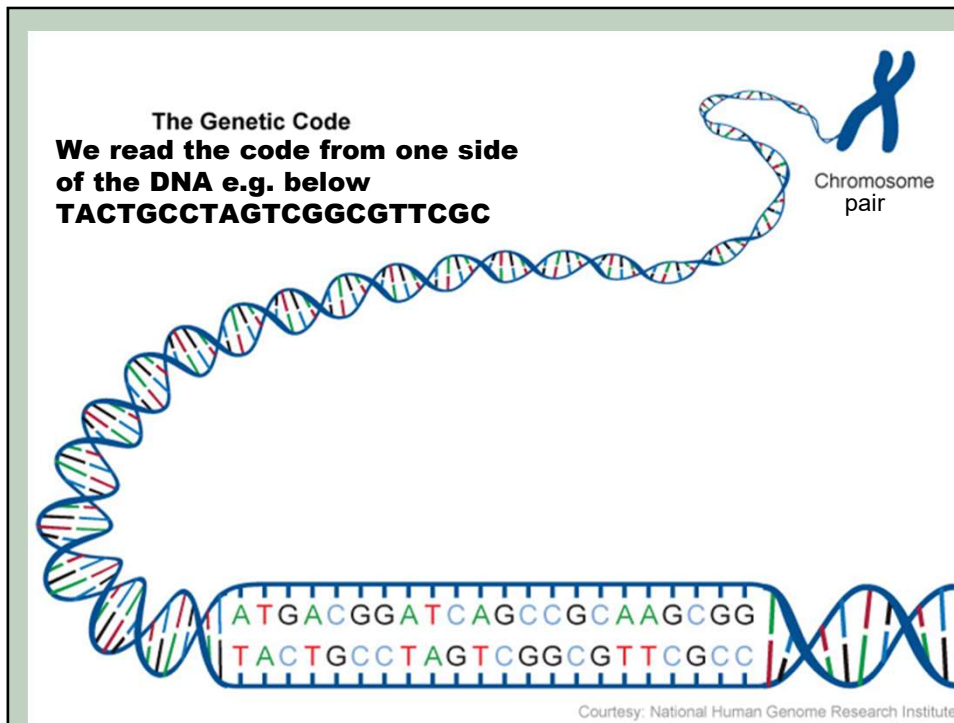
**Table of Contents**

1. **Eye color**
  - Blue
  - Brown
  - Green
2. **Earlobe Shape**
  - Attached
  - Hanging
3. **Hair Color**
  - Blonde
  - Black
  - Brown
  - Red

The words and letters in the books are like letters (nucleotides) in the **DNA**.  
(the code or language of genes)

Chromosomes are like **books**  
(Humans have 46 chromosomes)

Genes are like the **chapters** in the books  
(Humans have About 20,000 genes)



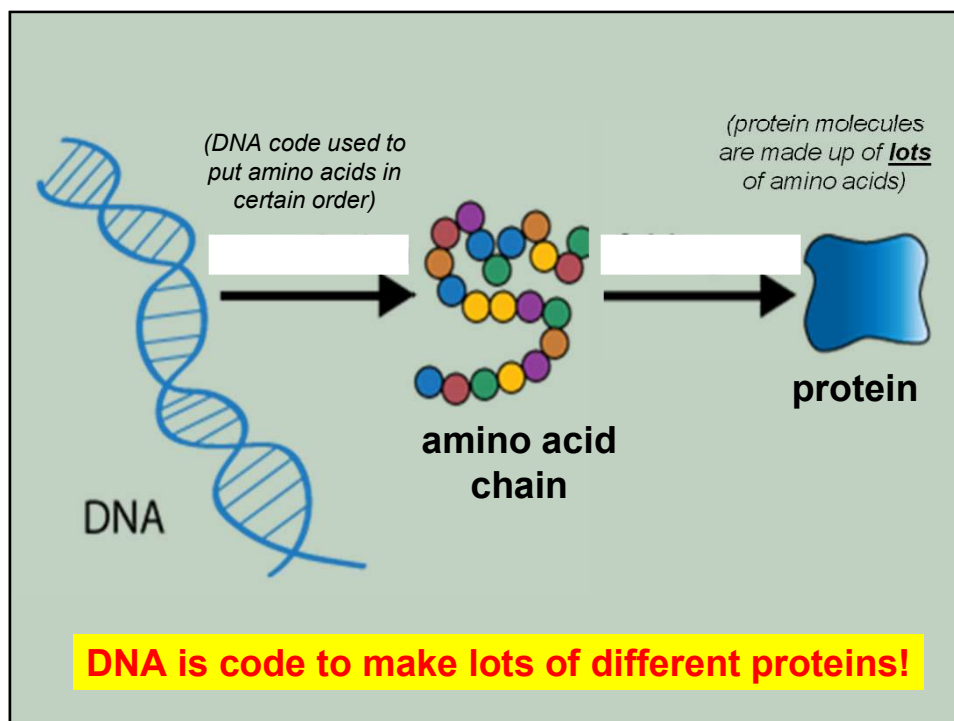
### DNA → amino acid code

		Second Letter				
		T	C	A	G	
First Letter	T	TTT } Phe TTC } TTA } Leu TTG }	TCT } Ser TCC } TCA } TCG }	TAT } Tyr TAC } TAA } Stop TAG } Stop	TGT } Cys TGC } TGA } Stop TGG } Trp	T C A G
	C	CTT } Leu CTC } CTA } CTG }	CCT } Pro CCC } CCA } CCG }	CAT } His CAC } CAA } Gln CAG }	CGT } Arg CGC } CGA } CGG }	T C A G
	A	ATT } Ile ATC } ATA } Met ATG }	ACT } Thr ACC } ACA } ACG }	AAT } Asn AAC } AAA } Lys AAG }	AGT } Ser AGC } AGA } Arg AGG }	T C A G
	G	GTT } Val GTC } GTA } GTG }	GCT } Ala GCC } GCA } GCG }	GAT } Asp GAC } GAA } Glu GAG }	GGT } Gly GGC } GGA } GGG }	T C A G

## Common Amino Acids

Abbreviations for amino acids

<i>Amino acid</i>	<i>Three-letter abbreviation</i>	<i>One-letter symbol</i>
Alanine	Ala	A
Arginine	Arg	R
Asparagine	Asn	N
Aspartic acid	Asp	D
Asparagine or aspartic acid	Asx	B
Cysteine	Cys	C
Glutamine	Gln	Q
Glutamic acid	Glu	E
Glutamine or glutamic acid	Glx	Z
Glycine	Gly	G
Histidine	His	H
Isoleucine	Ile	I
Leucine	Leu	L
Lysine	Lys	K
Methionine	Met	M
Phenylalanine	Phe	F
Proline	Pro	P
Serine	Ser	S
Threonine	Thr	T
Tryptophan	Trp	W
Tyrosine	Tyr	Y
Valine	Val	V







- Why do Genes contain the code for making PROTEINS?
- Because you are made of proteins!
- Your hormones/ enzymes/ muscles/bones/skin/ hair etc. all are proteins



Example – What does the DNA strip above code for? (use your DNA Chart)

• **TAC TGC CTA GTC GGC GTT CGC**

Codes for:

Tyr – Cys – Leu – Val – Gly – Arg

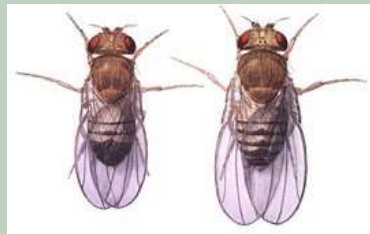
Thyrosine – Cysteine- Leucine – Valine –

Glycine- Arginine

## Fun Fact

- Humans share between 40 -50% of their genes with fruit flies

[http://www.nature.com/nature/journal/v4 ... 241.html](http://www.nature.com/nature/journal/v4...241.html).



## Fun Fact



8FACT

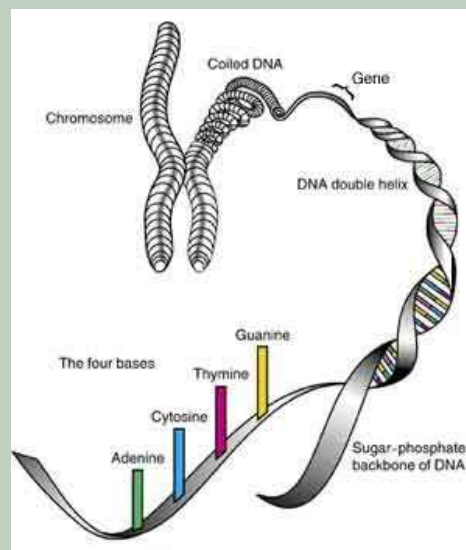
**If your DNA was  
to be stretched out,  
it would go from  
the earth to the moon  
and back 6,000 times.**

8FACT.COM

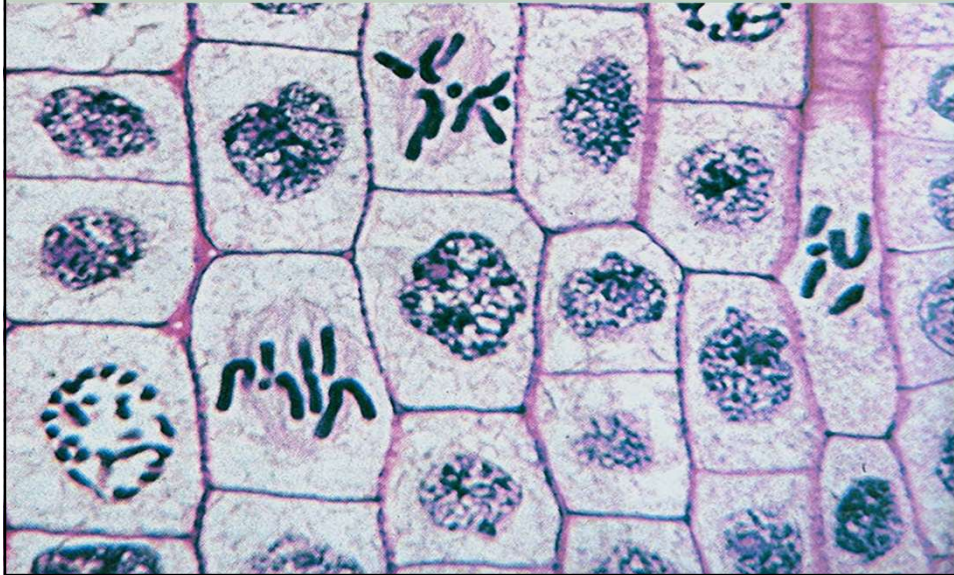
## Now solve the mystery!

- Each group should send one person up to get their mystery DNA package.
- In this activity you are going to:
  - Build both sides of a 'gene'
  - Figure out what amino acids the 'gene' codes for
  - Figure out the mystery word your strip of DNA codes for and put it on the board
  - Decode a DNA message

## More details of DNA, Chromosomes and Genes

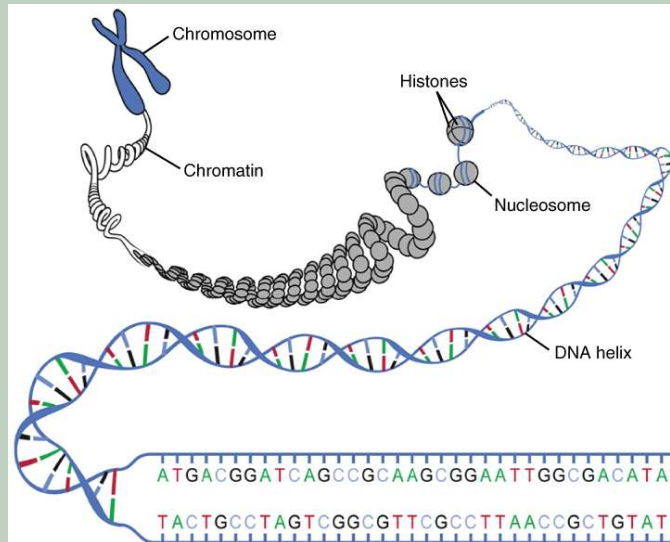


**You find your chromosomes (which are made of DNA and proteins (histones)) in the nucleus of the cell.**



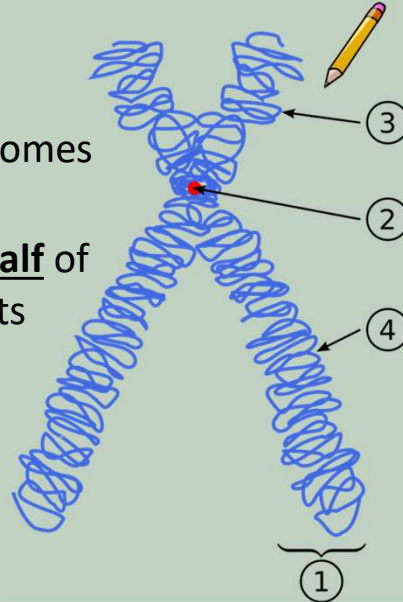
## Up close look at a chromosome

**A chromosome  
is made up of  
DNA coiled-  
around  
proteins  
(histones.)  
This reduces  
tangling**




## Chromosomes

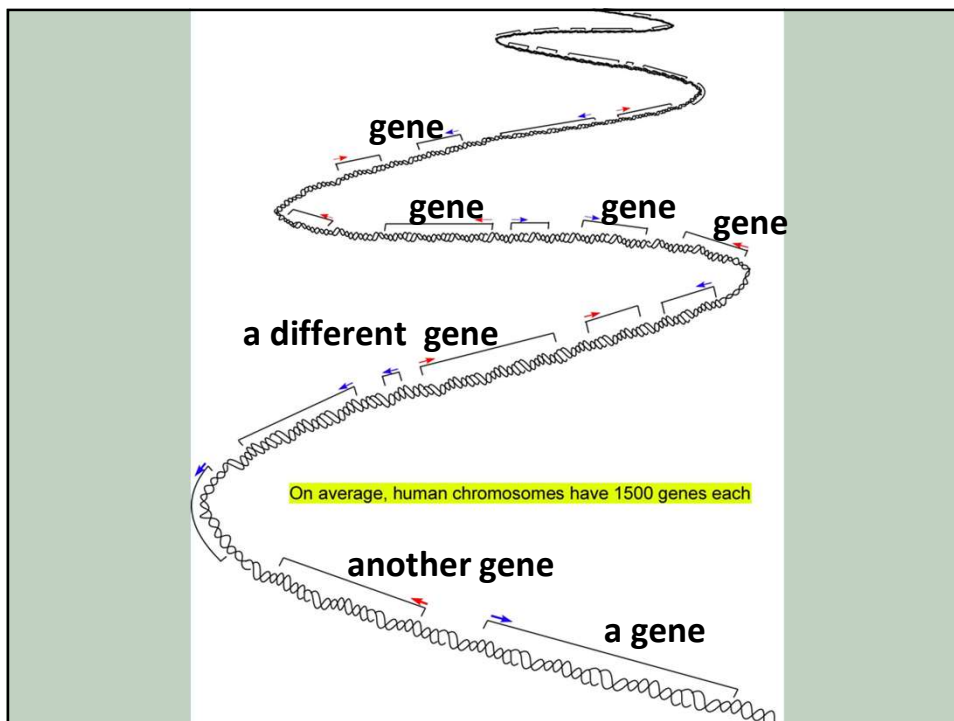
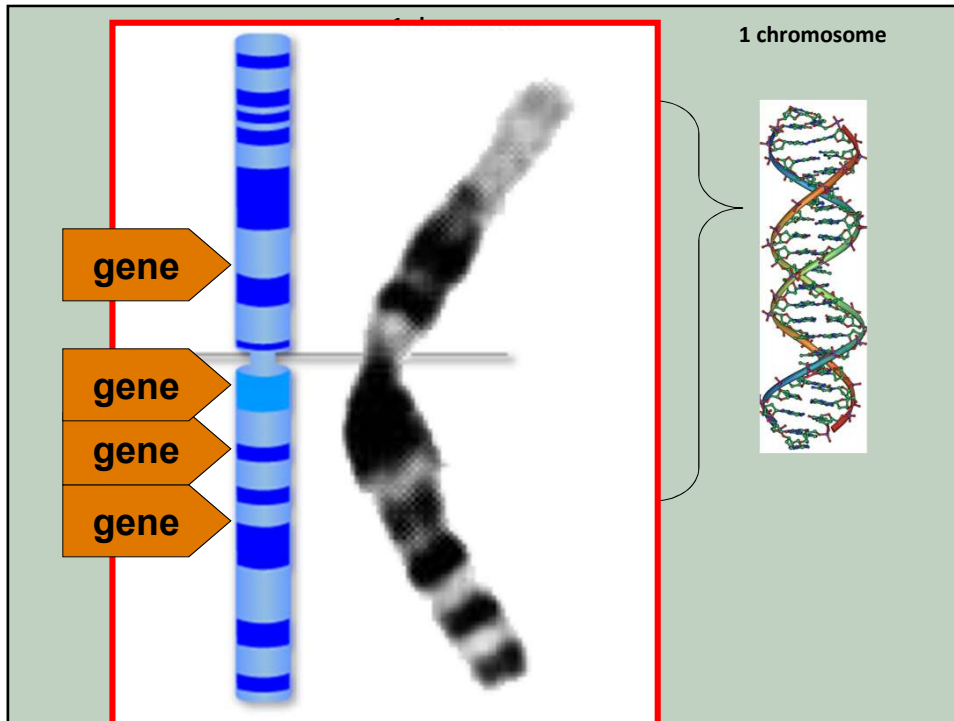
- Humans have **46** chromosomes in our **body** cells
- **Each** parent contributes **half** of his/her chromosomes to its **offspring**



## What are genes?

- Genes are short segments of **DNA** which contain the instructions for a trait in an organism 
- Each chromosome has on average nearly 1000 **genes for a total of approximately 20,000 genes**

**DeoxyriboNucleic Acid**



## **FUN FACT**

**In the next  
60 seconds  
your body  
will produce  
enough new  
DNA that  
if it was  
linked  
together,  
it would  
stretch  
100,000 km**

