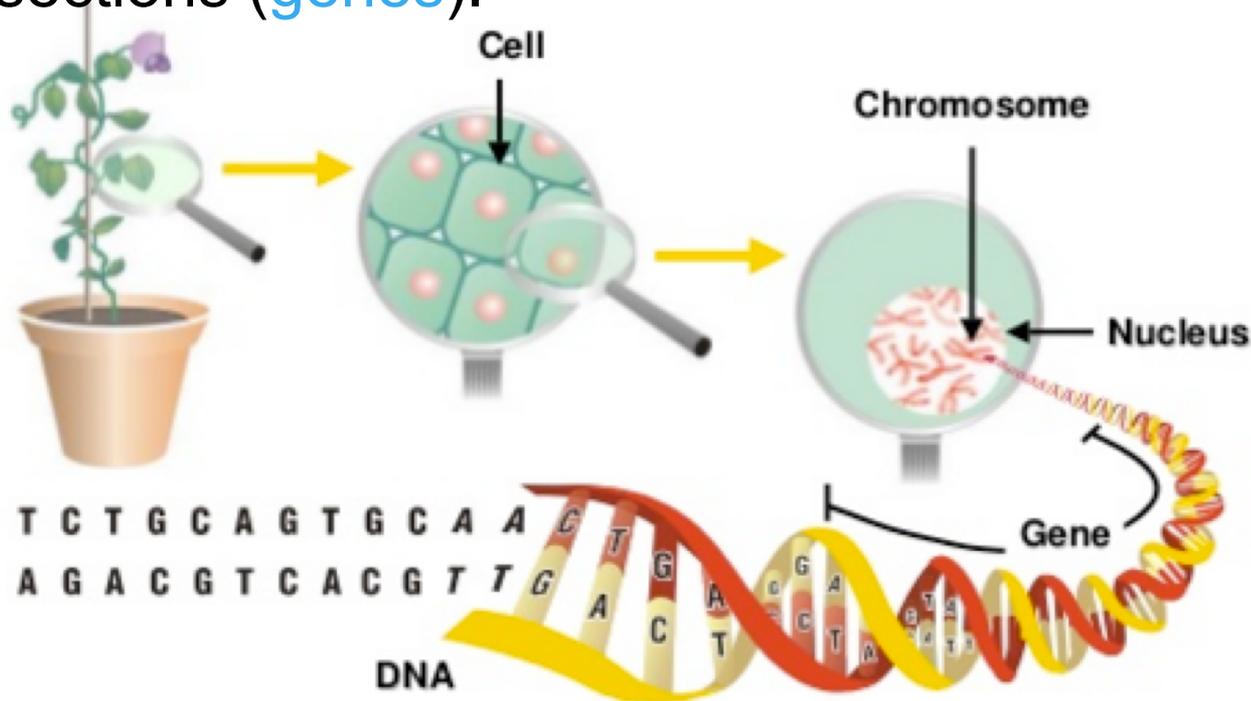


DNA day 1 notes

DNA = Deoxyribonucleic Acid. Is a long chain molecule that hold the recipes to make **proteins**, these proteins give you your traits.

DNA is stored in the **nucleus** of all living **cells**.

A **Chromosome** is a single long strand of DNA made up of recipe sections (**genes**).

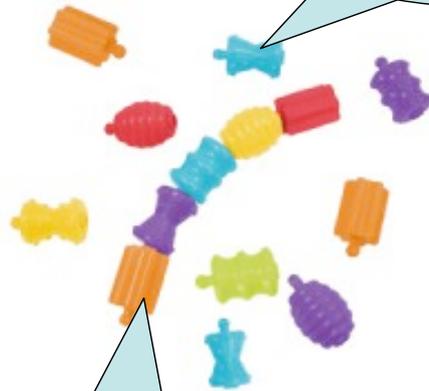


Biological molecules are all long chains
(**Polymers**) made of linked building block
molecules (**monomers**)

Poly –many (chain)

Mono –one (building block)

Monomer- a small
building block
molecule



Polymer- a long chain
made of repeatedly
linked subunit molecules



Nucleic Acids

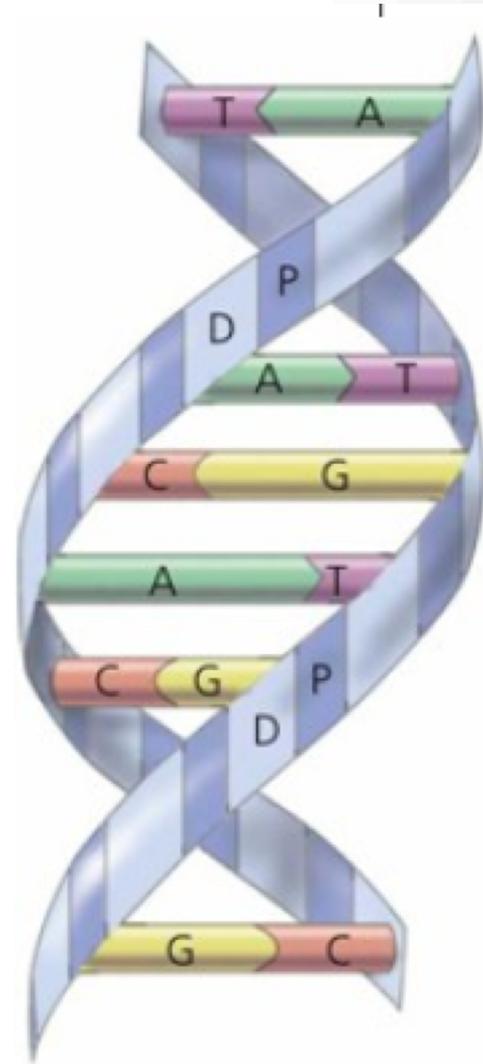
=are the group of long chain molecules that...

- Store genetic information
- Help cells build protein

Examples:

DNA= Deoxyribonucleic Acid

RNA= Ribonucleic Acid



Academy Artworks

DNA's shape

Double helix is the twisted ladder shape of DNA

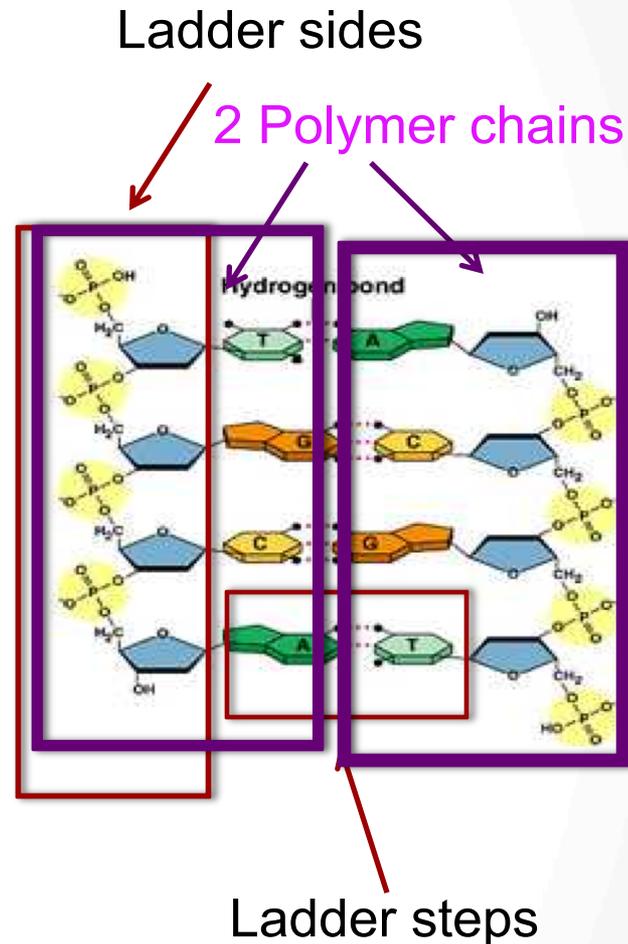
Made by **2** polymer chains in a **helix** (twist) linked in the middle with sticky attraction **hydrogen bonds**

Ladder sides=

sugar & phosphates

Ladder steps=

nitrogen bases



Nucleotide Monomers

msu.edu

Nucleotide Parts

1. Sugar
2. Phosphate
3. Nitrogen base

5 Nitrogen bases possible

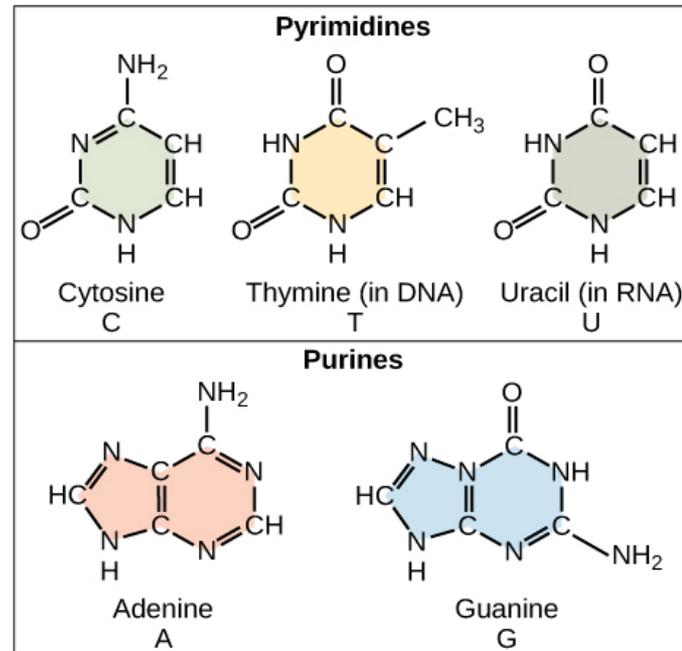
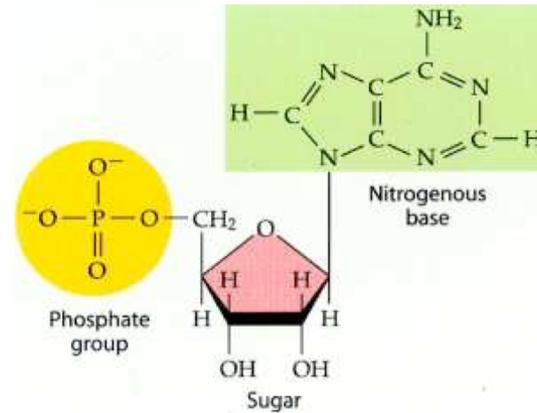
Adenine

Thymine

Guanine

Cytosine

Uracil (only in RNA)

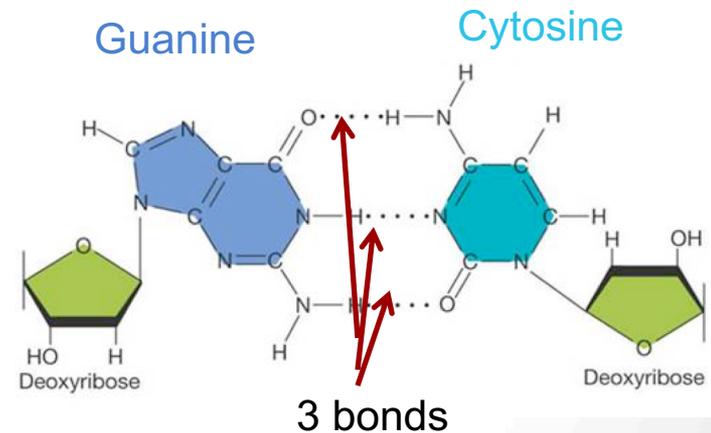
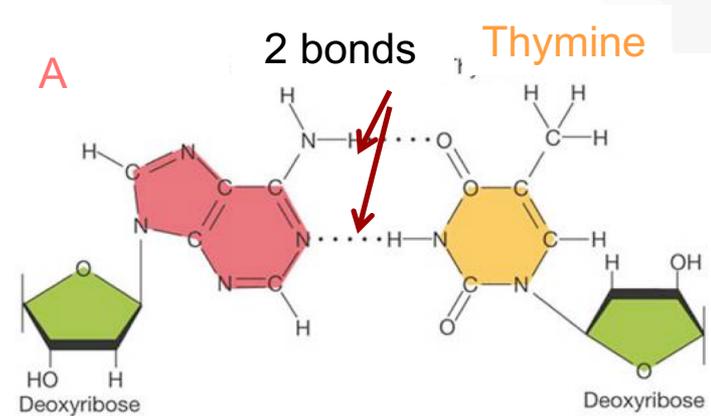


Nucleotide Monomers

Chargaff's Base Pair Rule

A = Adenine } bond w/
T = Thymine } 2 hydrogen bonds

G = Guanine } bond w/
C = Cytosine } 3 hydrogen bonds

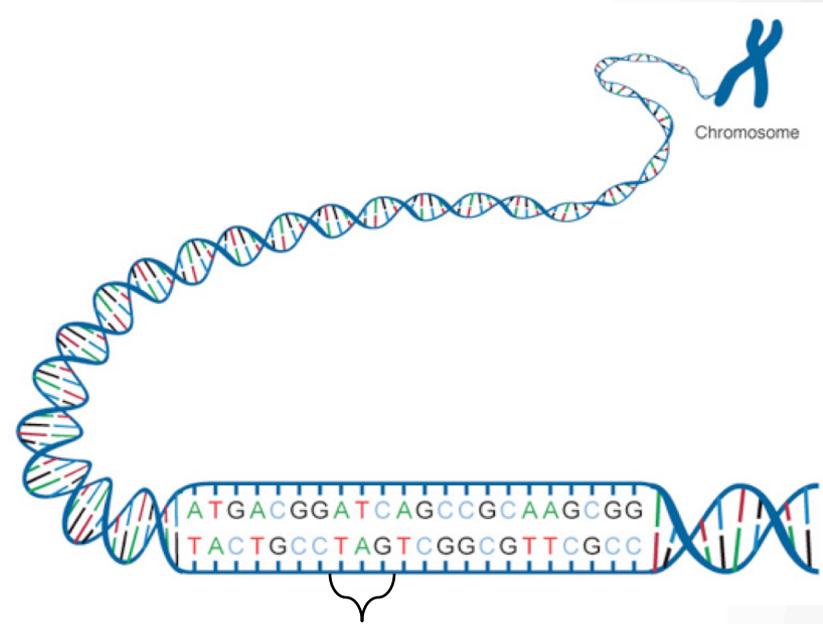


Genetic Code

DNA stores recipes to make **proteins**

Order of nucleotides stores info (change order, change info CAT vs TAC)

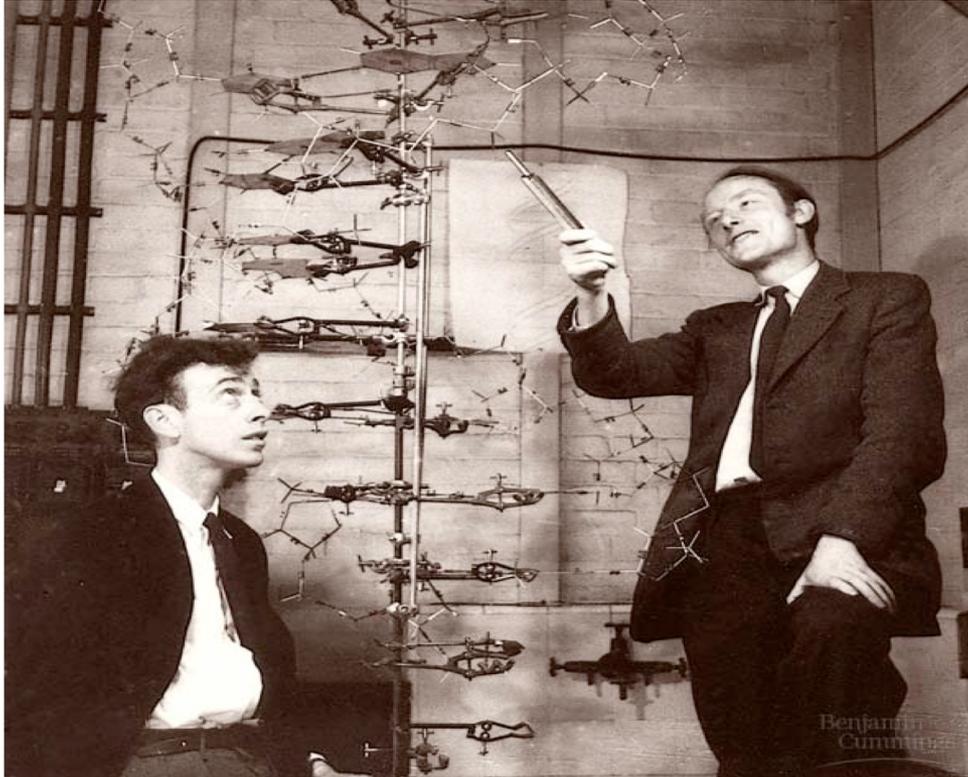
Recipe changed (mutated), = protein coded for may be shaped differently and may or may not work.



TAG can get mutated to TAC

James Watson and Francis Crick discovered the DNA structure with the evidence from Rosalind Franklin in 1953. Nobel Prize

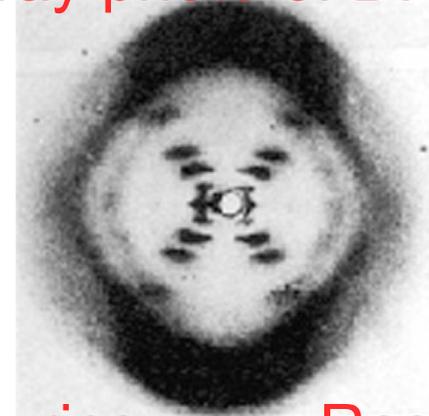
x-ray photo of DNA



jonahprobell.com/famous_photos

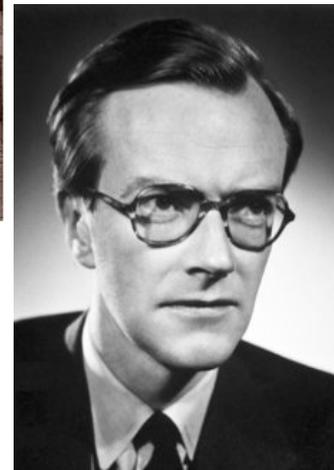
James Watson
USA

Francis Crick
Britain



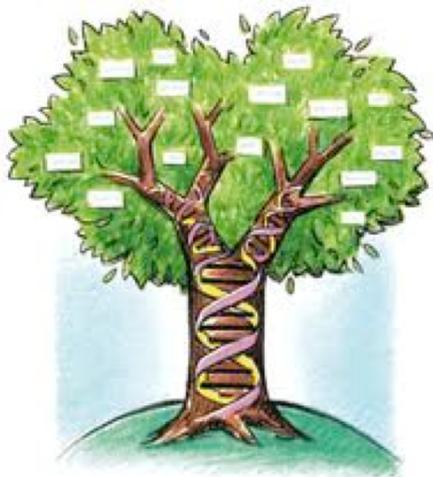
Maurice Wilkins
New Zealand

Rosalind Franklin
Britain

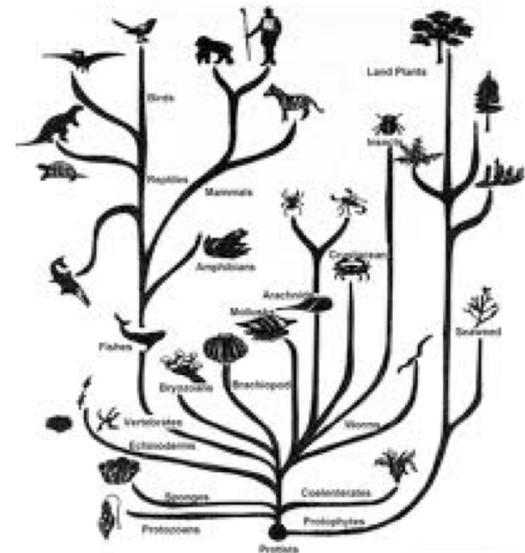


Evolutionary Importance

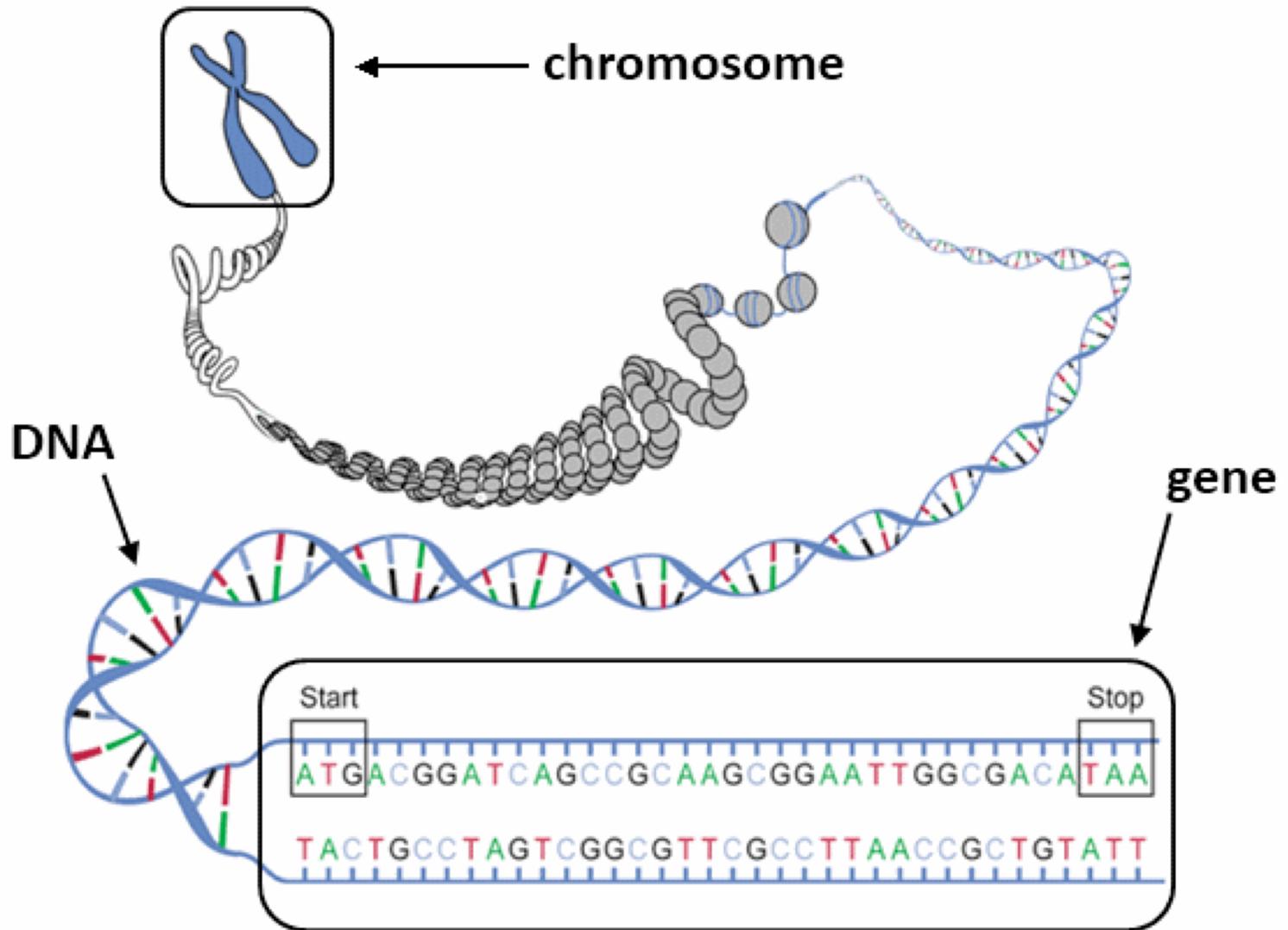
- DNA has the same structural parts in all species (ATGC)
- DNA code is translated into protein in the same process in all species
- DNA is used to pass down genetic traits in all species (you get your genes from your ancestors)
- **Therefore all species must be related with a common ancestor (evolution).**



maddoxdna.com

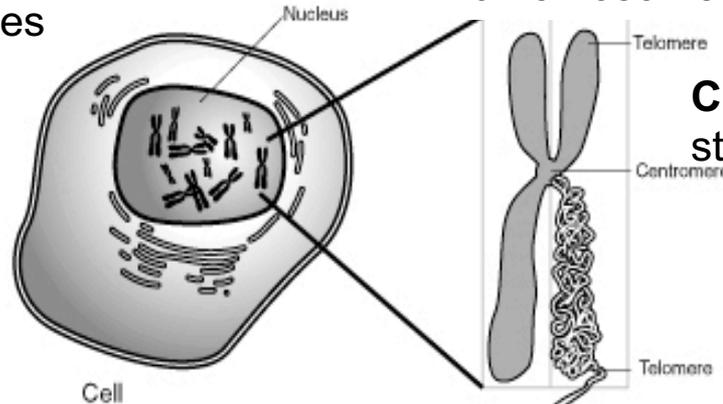


boards.ign.com



Genome-
full set of 46 chromosomes
(Library)

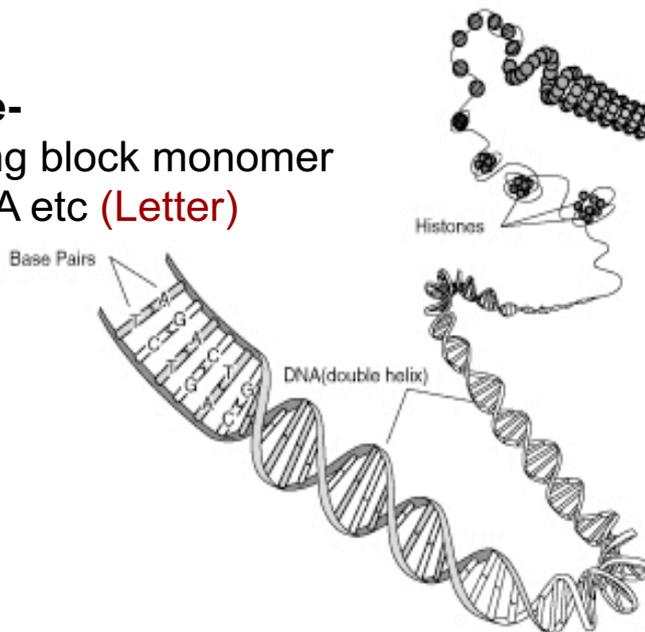
Sister chromatids-
Two identical copies of the same
chromosome (2 copies of same book)



Chromosome- one long
strand of DNA (1 book)

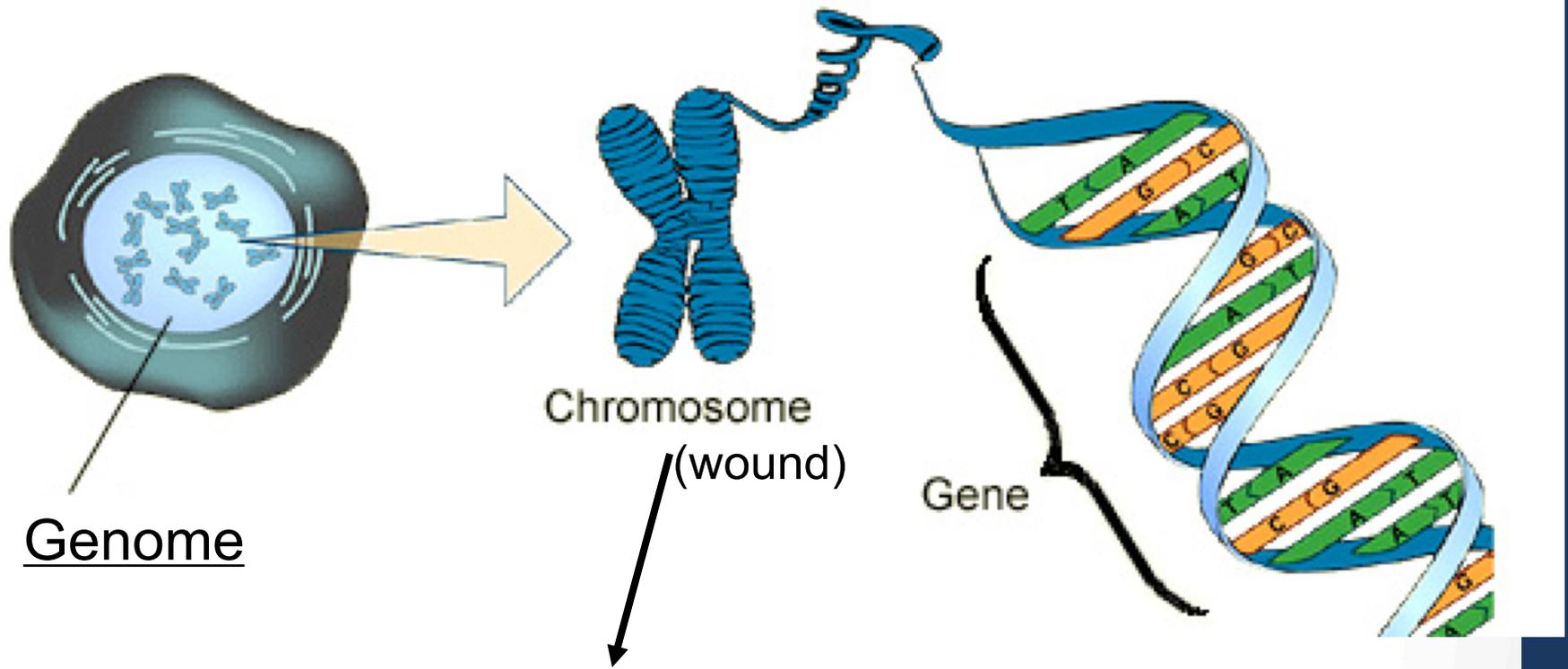
Nucleotide-
One building block monomer
of DNA; T, A etc (Letter)

Gene-
A section of a chromosome
that codes for one protein
(Recipe/Story)



Codon-
3 nucleotides that code for one amino acid
building block of a protein (TAC or TTA)
(Word)

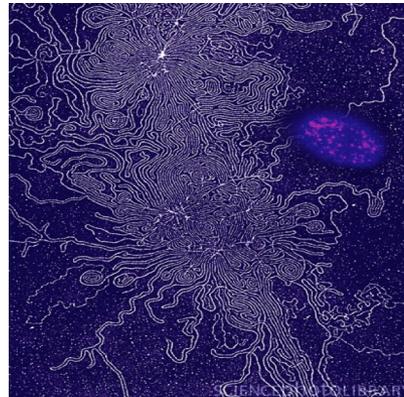
DNA Forms



Genome

Chromosome
(wound)

Gene



Chromatin (unwound)

DNA Forms Definitions

Analogy

- **Genome** = full set of chromosomes in cell nucleus (46 for humans; 23 from each parent) → Library
- **Chromosome** = One strand of DNA that coils into an X during cell division. Each contains many genes. → One book
- **Gene** = A section of a chromosome that codes for one protein; includes start & stop instructions → recipe
- **Codon** = Set of 3 monomers that code for an amino acid. → word
- **Nucleotide Monomer** = Building block of DNA made of a sugar, phosphate and nitrogen base (4 kinds) → One letter