

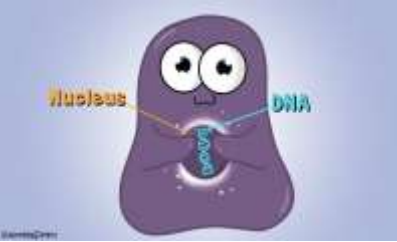


DNA: The Code of Life

DNA carries the full PLAN of the body

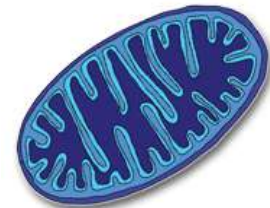
DNA also Makes RNA

That RNA makes Protein



LOCATIONS & FUNCTIONS of DNA

- In NUCLEUS – This DNA controls the cell's activities. It also carries the full genetic **plan** of your body. It **starts** protein synthesis (for hormones, enzymes).
- In CHLOROPLASTS – This DNA (in plants) **starts** making proteins (which are used in food-making).
- In MITOCHONDRIA – This DNA controls the **start** of protein synthesis in both plants and animals.



Exons = parts of DNA that code for protein synthesis.

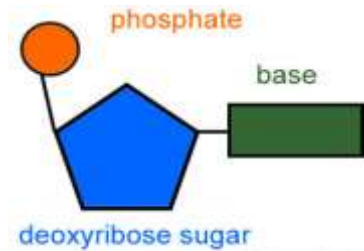
Introns = non-coding DNA (also called *junk DNA*).

STRUCTURE of DNA



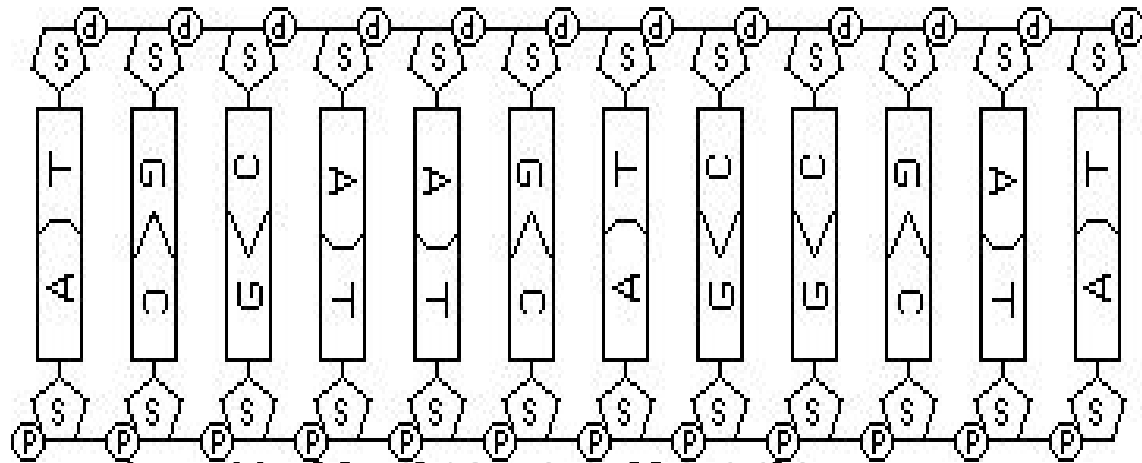
- DNA lengths (genes) are joined, and wrapped around histones (proteins), producing chromosomes.

- Nucleotide = Phosphate, Sugar, Nitrogen



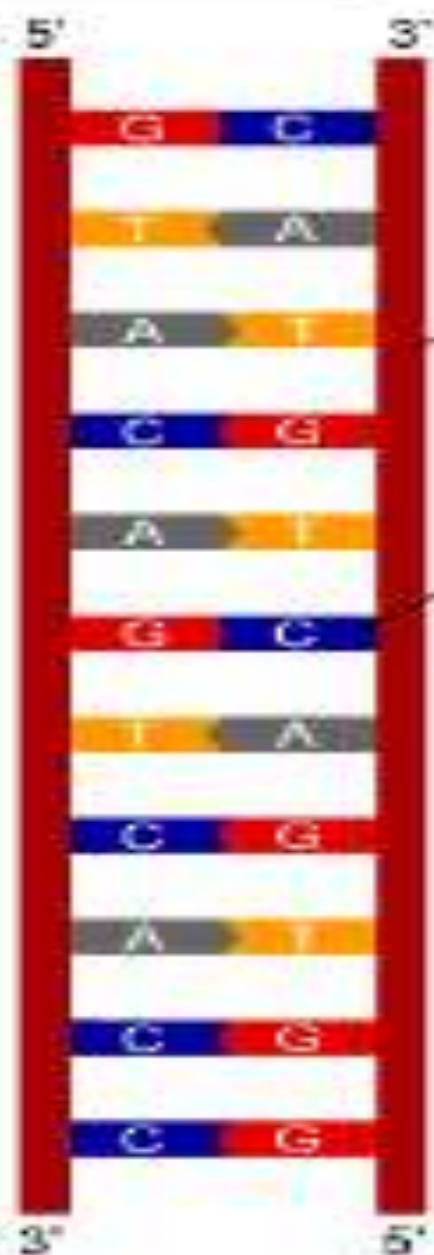
Base (Adenine=Thymine, Cytosine≡Guanine).

- Nucleotides join:
- With Nitrogen Bases:
- Other N-Bases attach:
- With their chain:



- Result: Two strands, joined with **Hydrogen Bonds**.

DNA Structure

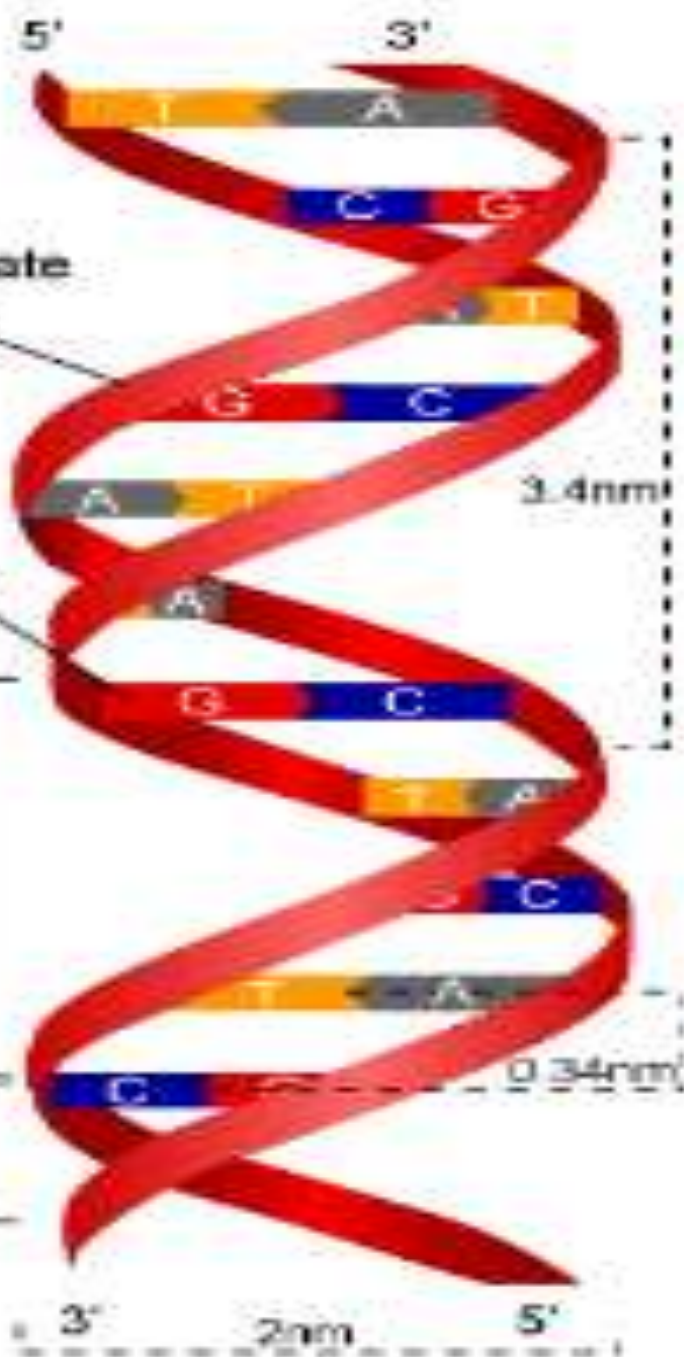


Sugar Phosphate Backbone

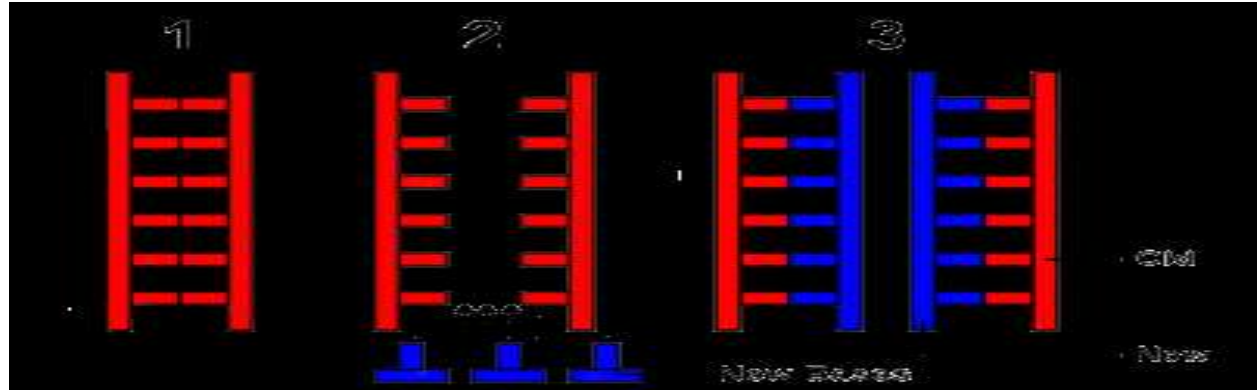
Nitrogenous Bases

Major Groove

Minor Groove



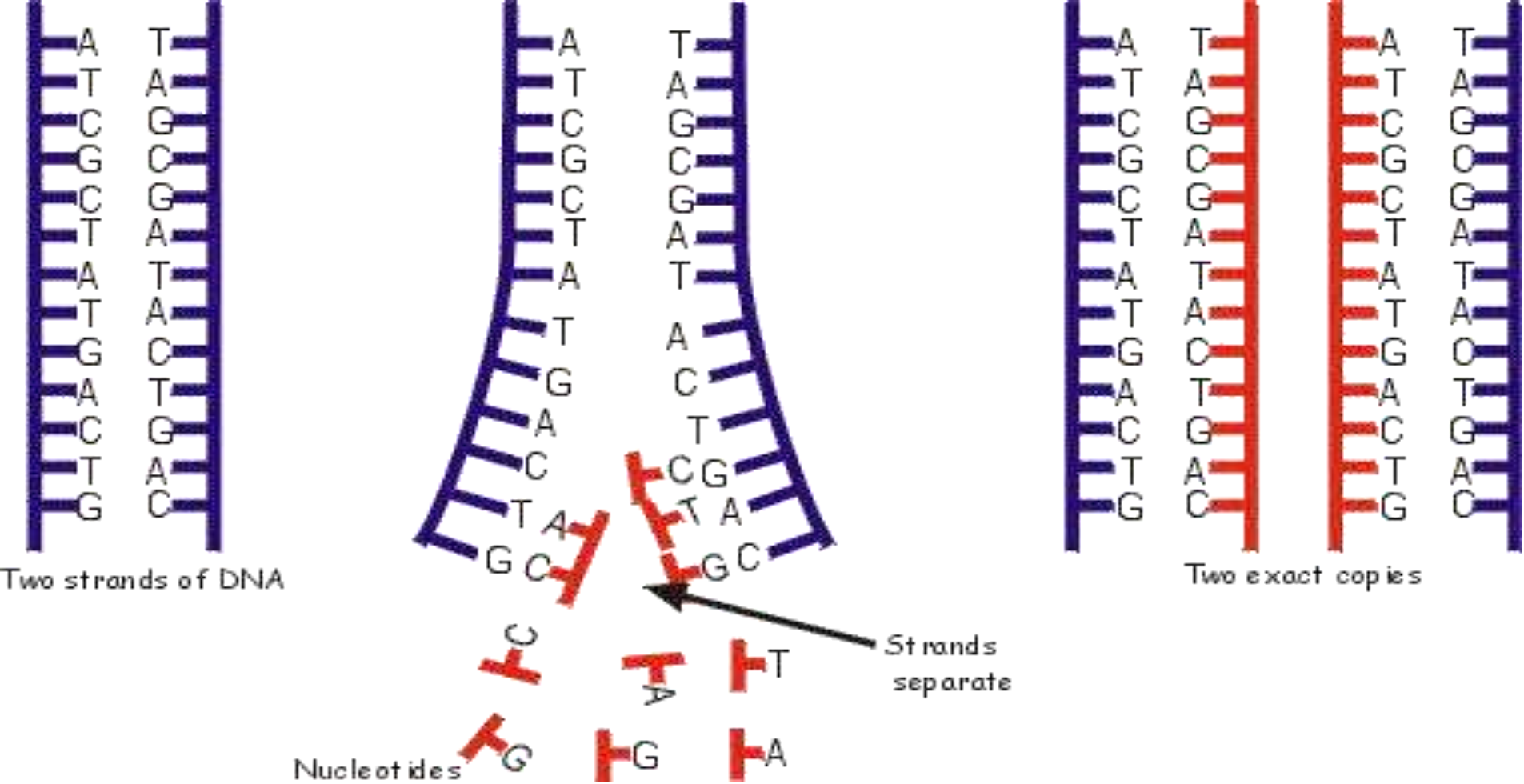
REPLICATING that DNA



DNA Replication = making an ***exact copy*** of that DNA plan, as follows:

- The Hydrogen bonds break.
- The two strands move apart from each other.
- A **new** strand forms on **each** of the original strands (A and T can only join with each other; C and G can only join with each other).
- **End result**: two full **DNA** double strands, each the same as each other, and each the same as the original one. ***Exact copies = Replication.***





DNA REPLICATION

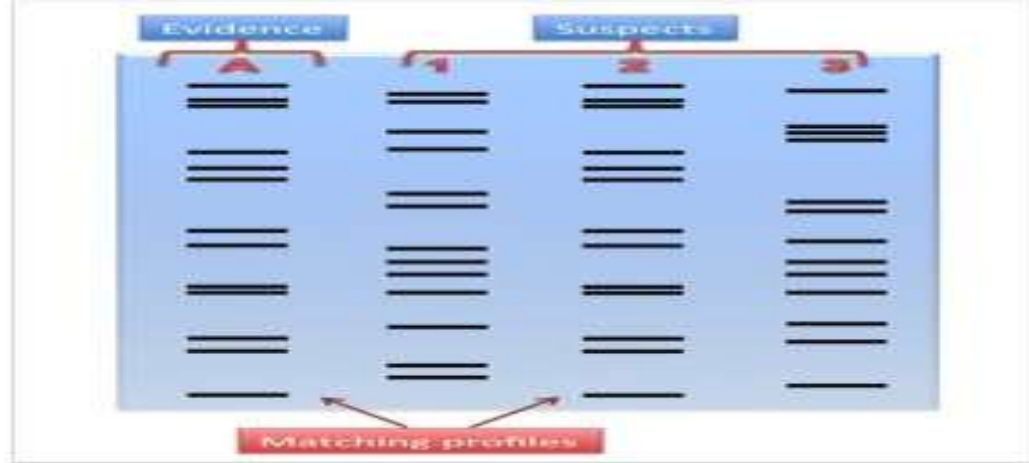
YOU START WITH A NORMAL DOUBLE STRAND.

THIS STRAND SPLITS, AND FREE NUCLEOTIDES JOIN THEM.

YOU NOW HAVE TWO DOUBLE STRANDS THAT ARE EXACT COPIES.

DNA

PROFILING



Instruction: **Do not** call it “DNA-FingerPrinting”.

- Your DNA plan is unique to **you** – **nobody** else.
- **Every** cell inside you has that **full, unique** plan.
- When treated in a lab, **your DNA plan** draws a **unique** pattern/**profile** - *like a price bar-code*.
- **ADVANTAGES**: catch criminals (DNA left at crime scene); find long lost relatives; body pieces identified after bomb blast; who is the real father.
- **DISADVANTAGES**: identical twins have identical plans; evidence could be planted; there is no international routine system; you can never be 100% sure.



Victim



Crime Scene



Suspect 1



Suspect 2



Suspect 3



USING DNA PROFILING

THE VICTIM WAS STABBED.

BLOOD OF THE ATTACKER WAS FOUND UNDER HER NAILS.

MATCH THE DNA PROFILE OF THIS BLOOD WITH THOSE OF THE SUSPECTS.