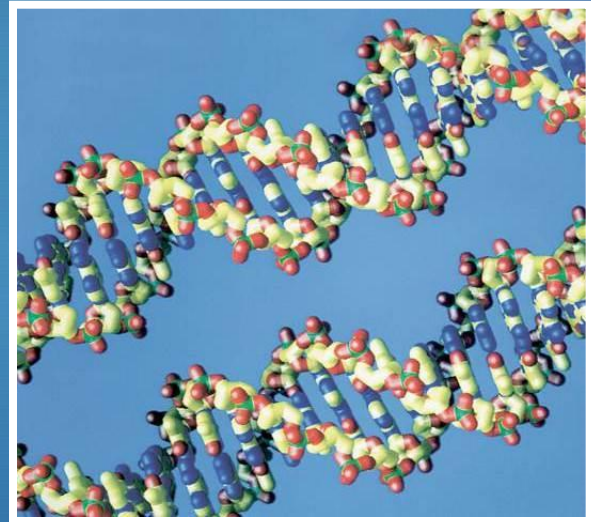


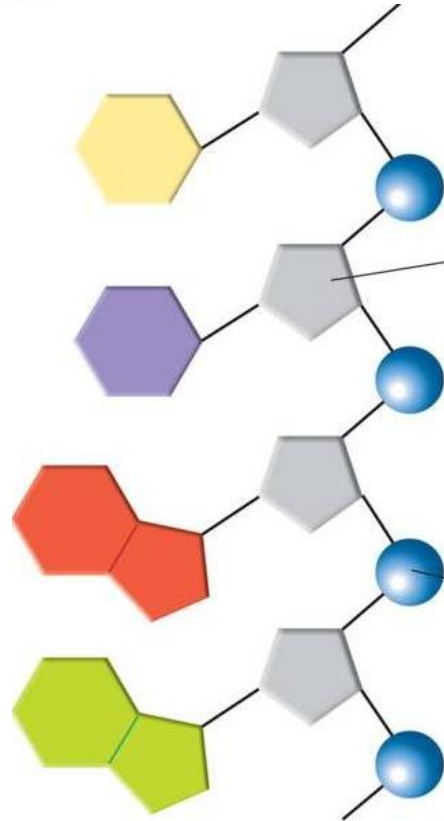
12-2 Chromosomes & DNA Replication

Making copies of DNA.



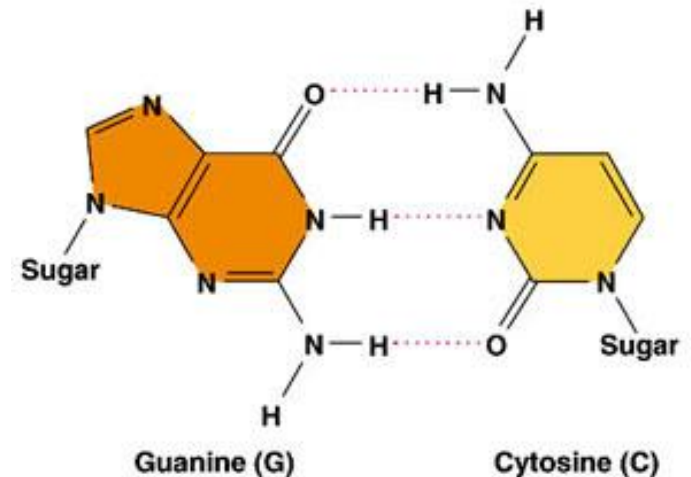
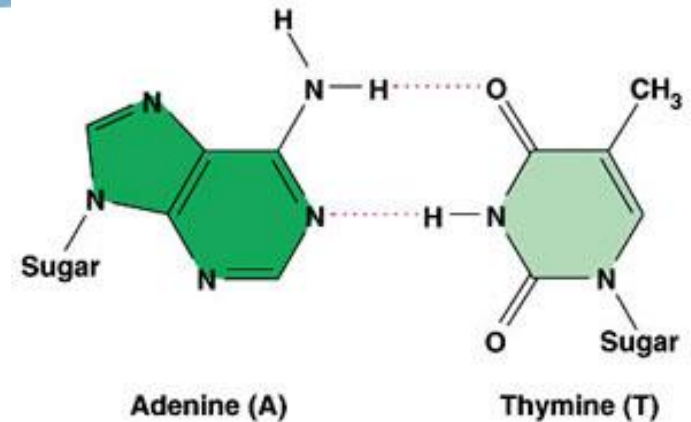
What forms the backbone of the DNA Chain?

- ◆ Phosphates.
- ◆ Deoxyribose sugars (5-carbon sugars).



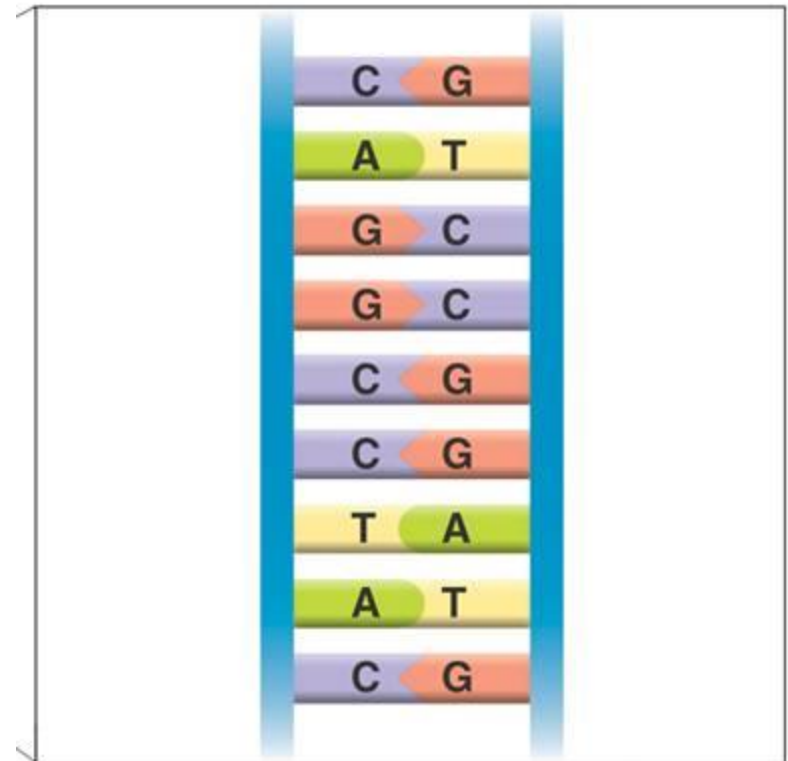
What is Chargaff's Rule?

- He found an Equal amount of Adenines and Thymines, and an equal amount of Cytosines and Guanines.



How does your model explain Chagraff's Rule?

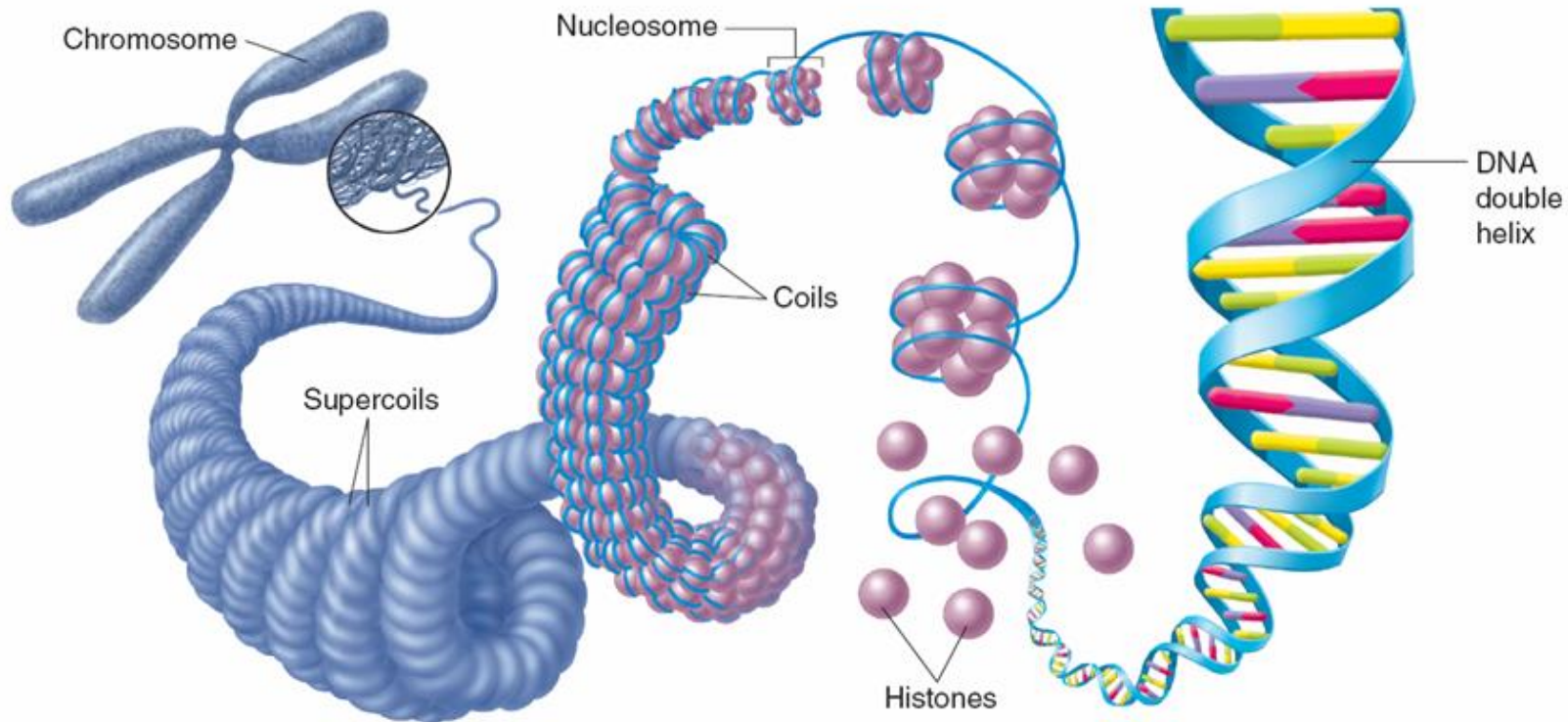
- I made a model of two strands of DNA. The bases of each strand matched up according to Chagraffs Rule.



Bases on the
Chromosome

What could you do to your model so that the DNA would be more tightly packed?

- It would have to be twisted.



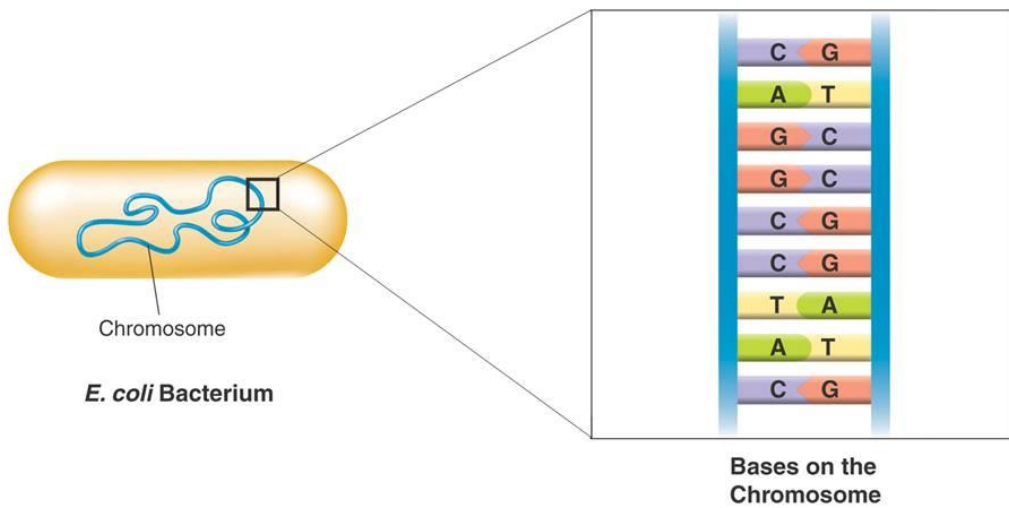
Why is it called DNA?

- 🔹 DNA stands for deoxyribonucleic acid.
- 🔹 Nucleic acids are **macromolecules**
 - 🔹 made from many individual nucleotides.
- 🔹 Each nucleotide contains the sugar deoxyribose.



DNA Length

- 🟢 DNA molecules are very long.
- 🟢 It is usually folded into a space only one-thousandth of its length.



Comparing DNA

DNA	In Prokaryotes	In Eukaryotes
<u>Where</u> is it located?		
<u>How much</u> DNA is there?		
<u>How many</u> chromosomes are there?		

Comparing DNA

PROKARYOTES

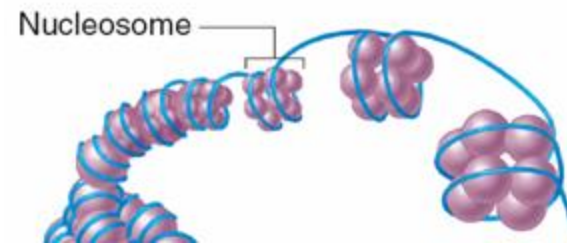
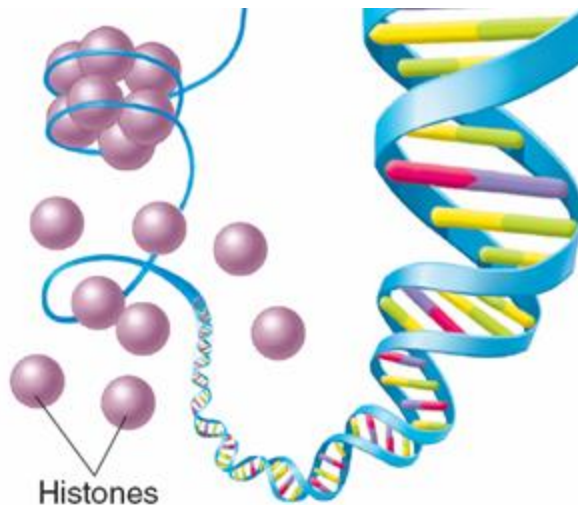
- ◆ Location: the cytoplasm.
- ◆ A single DNA molecule (circular)
- ◆ Chromosomes: All DNA stored on one chromosome

EUKARYOTES

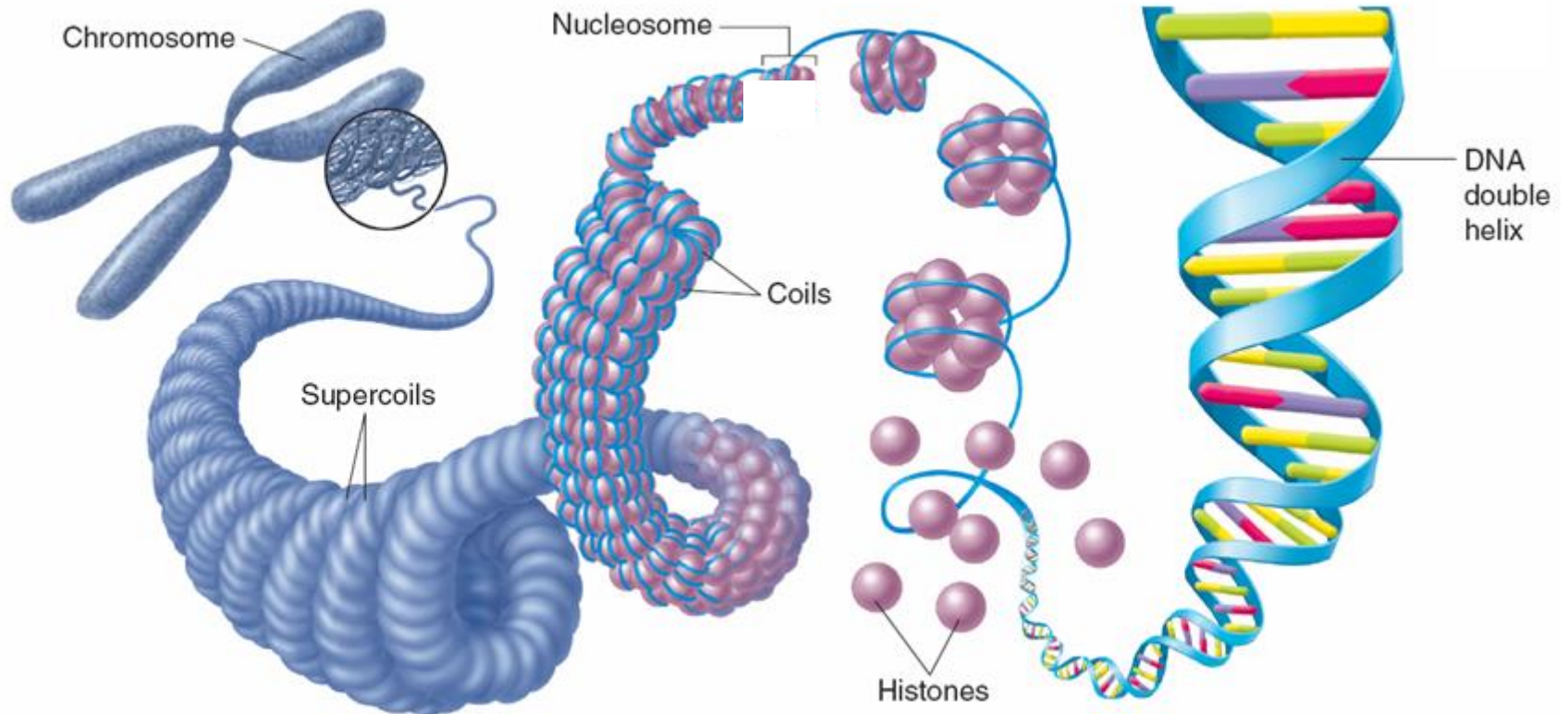
- ◆ Location: in the cell nucleus inside chromosomes.
- ◆ They have 1000 times the amount of DNA as prokaryotes.
- ◆ A varying number of chromosomes depending on the species.

DNA and Chromosomes

- ▶ DNA is tightly wrapped around proteins called histones.
- ▶ DNA and histone molecules make **nucleosomes**
- ▶ **Nucleosomes** pack together to form a thick fiber.

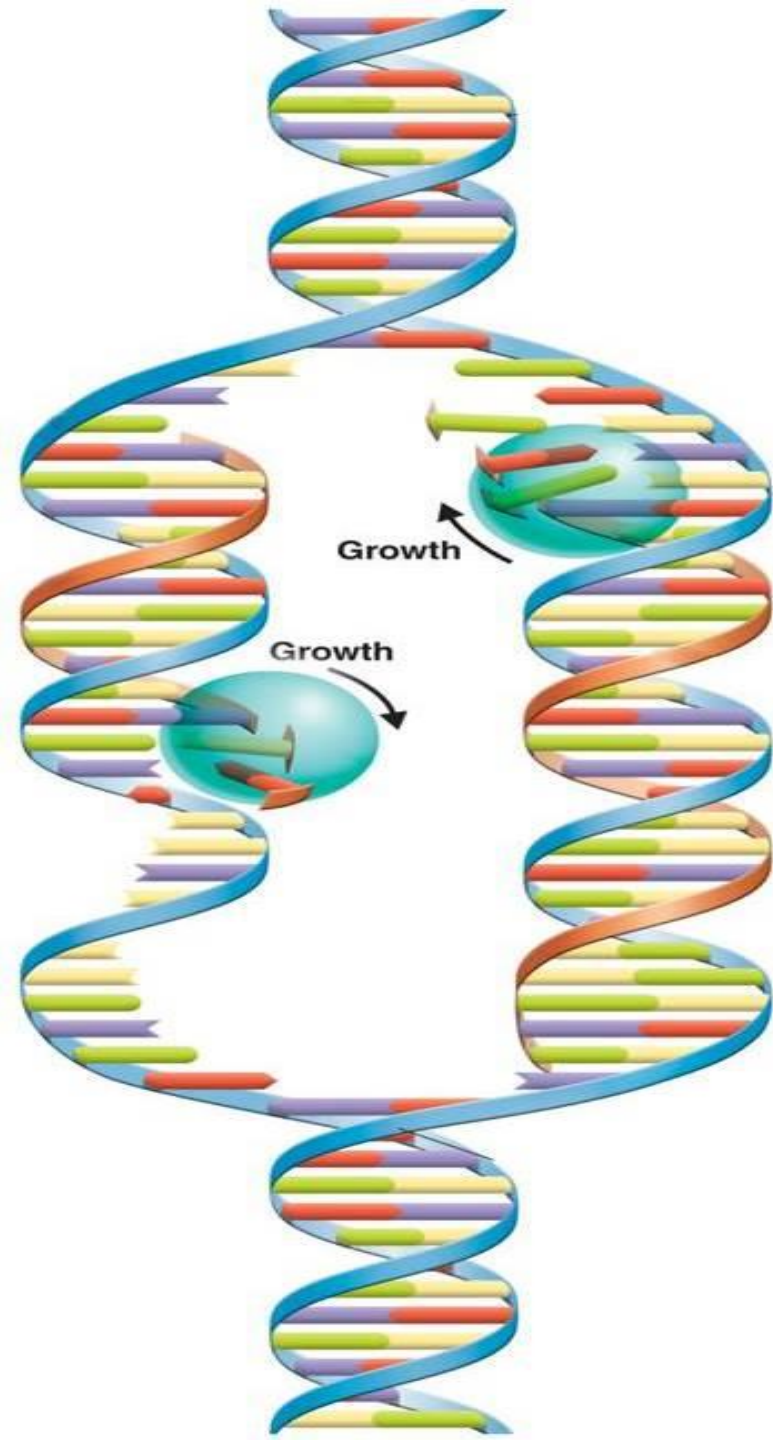


DNA and Chromosomes



DNA Replication

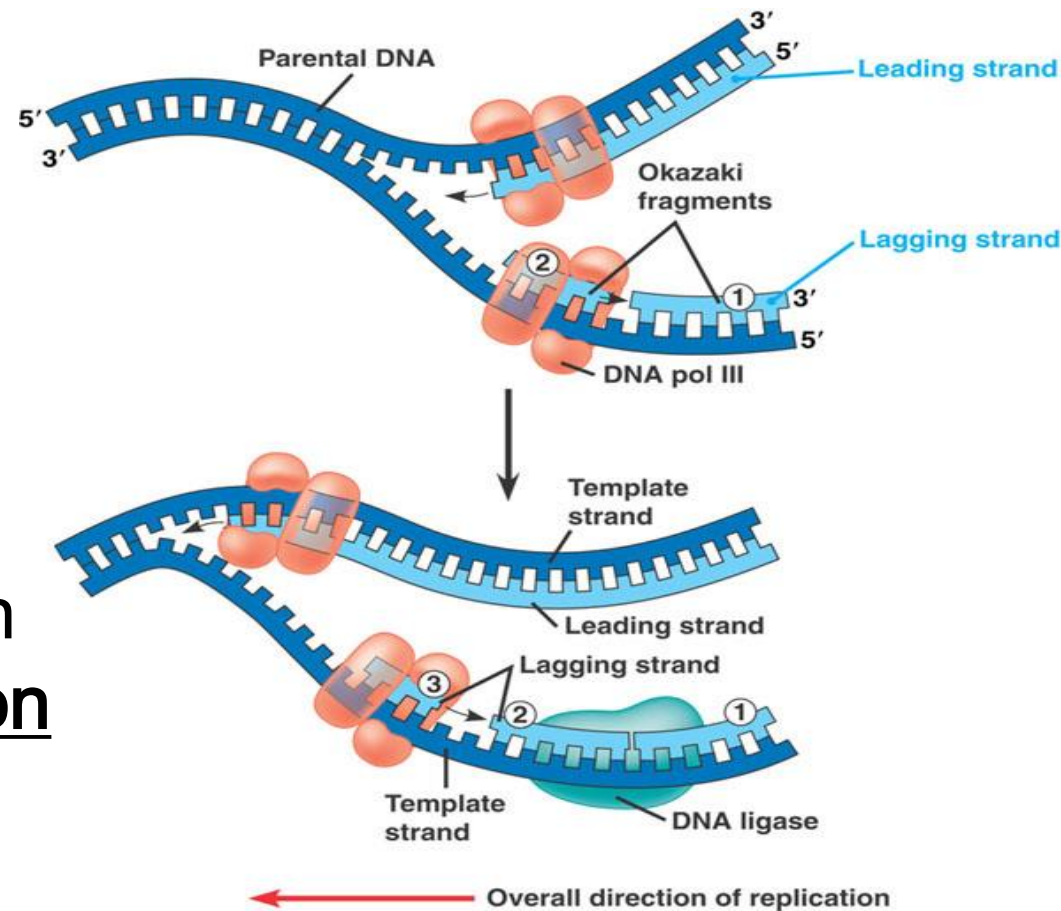
- Each strand of the DNA double helix has all the information needed to make the other half by base pairing.
- In most **prokaryotes**, DNA replication begins at a single point and continues in two directions.



DNA Replication

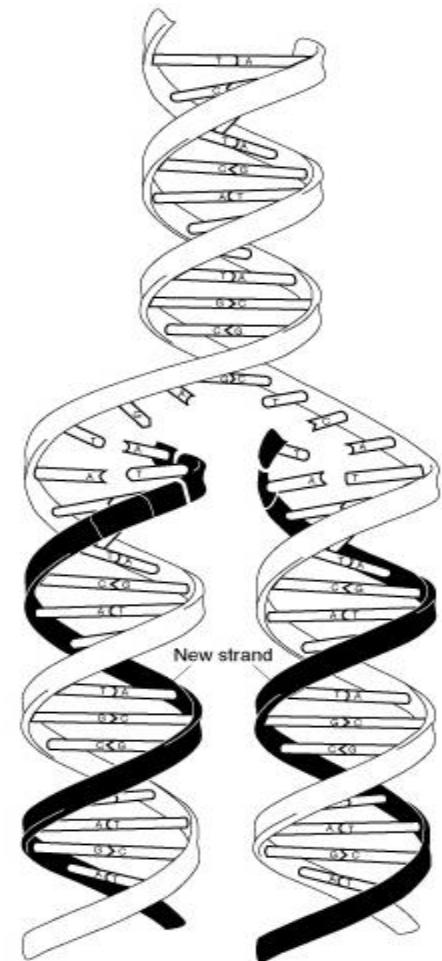
💧 In eukaryotic chromosomes, DNA replication occurs at hundreds of places.

💧 The sites where separation and replication occur are called replication forks.



How Replication Occurs

1. Enzymes “unzip” a molecule of DNA. (DNA Helicase)
 - 💧 Hydrogen bonds between base pairs are broken and the two strands of DNA unwind.
2. The enzyme DNA polymerase walks along the DNA strand and adds matching bases to it. It then “proofreads” each new DNA strand.



DNA Replication

