CHAPTER 12 DNA

* 1. **The Role of DNA in Heredity**

- \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ needed for traits and cell processes

- \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ information needed for new cells

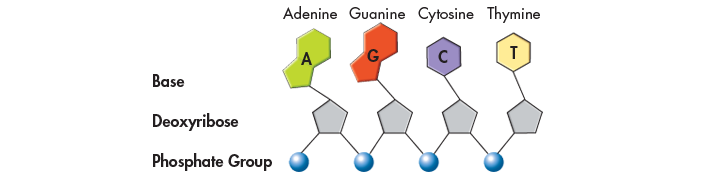
- \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ information from generation to generation

**12.2 The structure of DNA**

-The DNA molecule must give directions to make proteins which are needed to regulate the various functions of each cell

- What kind of structure could serve this purpose without varying from cell to cell?

- Understanding the structure of DNA has been the key to understanding how genes work.

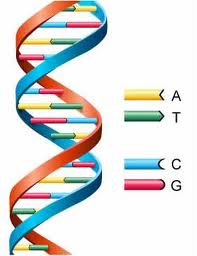


**Components of DNA**

* Made of **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** (\_\_\_parts)
  + \_\_\_\_\_\_\_\_\_\_\_\_\_ (deoxyribose)
  + \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ group
  + \_\_\_\_\_\_\_\_\_\_ (nitrogenous base)
    - \_\_\_\_ (adenine)
    - \_\_\_\_ (thymine)
    - \_\_\_\_ (cytosine)
    - \_\_\_\_ (guanine)
* The nucleotides in a strand of DNA are joined by \_\_\_\_\_\_\_\_\_\_\_\_\_ formed between the \_\_\_\_\_\_\_\_\_\_\_ and \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ groups.
* The bases stick out \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ from the nucleotide chain.
* The nucleotides can be joined together \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, any sequence of bases is possible

**Solving the structure of DNA**

* Chargaff discovered that the percent of \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ and \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ in DNA were the same.
* The percent of guanine and cytosine are also equal.
* The observation that [A] = [T] and [G] = [C] became known as one of “\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.”
* Rosalind Franklin (1950) – used\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_(aimed X-rays at DNA and looked at the scatter pattern) to find clues about the structure

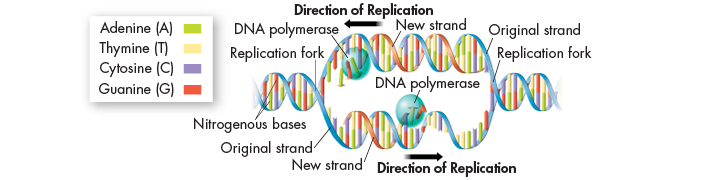


* + Showed DNA has \_\_\_\_\_\_ strands
  + The DNA strands are twisted around each other like a spring (helix shaped)
  + The bases are in the center
* \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ – built models of DNA
  + Discovered the **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** structure (2 strands twist around each other like staircases)
  + Explained Franklin’s and Chargaff’s earlier discoveries
  + Discovered that \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ bonds hold the DNA strands together
  + Weak forces that enable the DNA to \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
* Base pairing
  + **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** pairs with **thymine** and **\_\_\_\_\_\_\_\_\_\_\_\_\_** pairs with **cytosine**

**12.3 DNA replication**

**DNA replication**

* Before a cell divides, it duplicates its DNA in a copying process called **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**
* This process ensures that each resulting cell has the same complete set of DNA molecules
* How does the double helix structure of DNA make replication (copying) possible??????
* Each strand of the double helix has all the information needed to reconstruct the other half by the mechanism of base pairing.
* Because each strand can be used to make the other strand, the strands are said to be **\_\_\_\_\_\_\_\_\_\_\_\_\_**
* The process of DNA Replication
* The DNA molecule \_\_\_\_\_\_\_\_\_\_\_\_\_\_ into two strands and then produces two new \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ strands following the rules of \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.
* Each strand of the double helix of DNA serves as a \_\_\_\_\_\_\_\_\_\_\_\_\_, or model, for the new strand.
* The two strands of the double helix \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, or “unzip,” allowing two replication forks.
* New \_\_\_\_\_\_ are \_\_\_\_\_\_ following the rules of base pairing (A-T and C-G) to the newly forming strand.
* Results of DNA Replication
* Each DNA molecule has **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** and **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** (semi-conservative).
* The result of replication is two DNA molecules \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ and to the \_\_\_\_\_\_\_\_\_ molecule.



**DNA Replication and enzymes**

* DNA replication is carried out by enzymes. They first “unzip” a molecule of DNA by breaking the hydrogen bonds between base pairs and unwinding the two strands of the molecule
* **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** = enzyme that \_\_\_\_\_\_\_ individual \_\_\_\_\_\_\_\_\_\_\_\_\_\_ to produce a new strand of DNA and \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ the new strand

**Telomeres**

* The tips of chromosomes are known as **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**
* Telomeres are \_\_\_\_\_\_\_\_\_\_\_\_\_\_. DNA may be \_\_\_\_\_\_\_\_\_ from telomeres each time a chromosome is replicated.
* An enzyme (\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_) adds short, repeated DNA sequences to telomeres, \_\_\_\_\_\_\_\_\_\_\_\_\_ the chromosomes and making it less likely important gene sequences will be lost during replication.