CONCEPT: DNA STRUCTURE

● **Deoxyribose nucleic acid (DNA)** has three main components

□ These _____ include:

- A phosphate

- A pentose sugar (deoxyribose has H at 2' carbon, ribose has OH at 2' carbon)

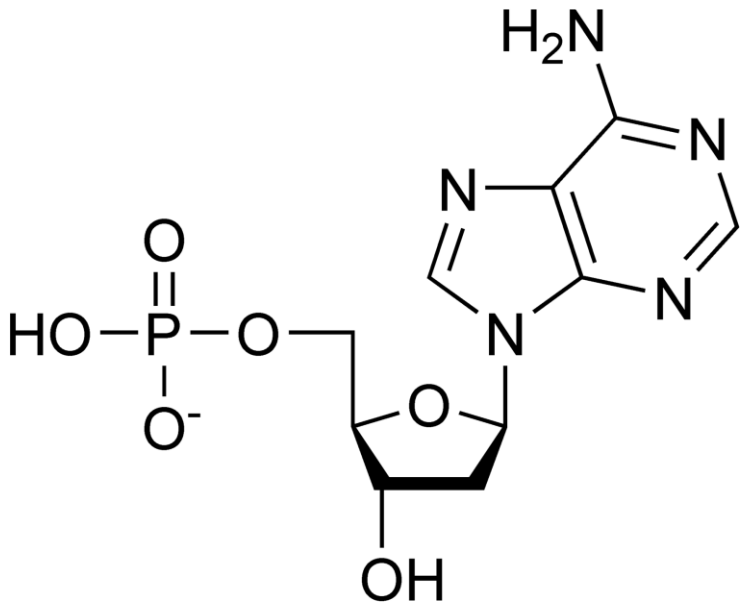
- A Nitrogenous base: **adenine (A), guanine (G), cytosine (C), thymine (T)**

□ There are two common names for combinations of these three components

- **Nucleosides** contain a nitrogenous base and pentose sugar

- **Nucleotides** contain a nitrogenous base, pentose sugar, and phosphate

EXAMPLE:



□ The nitrogenous bases fall into two _____

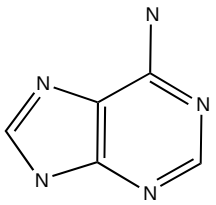
- **Purines** are bases with a double-ring structure: includes adenine and guanine

- **Pyrimidines** are bases with single ring structure: includes cytosine and thymine

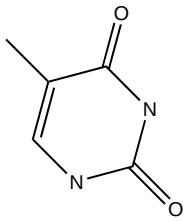
- Purines pair with Pyrimidines

□ **Chargoff's rules** state that A pairs with T and C pairs with G

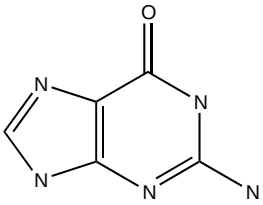
EXAMPLE:



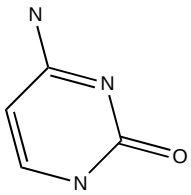
Adenine



Thymine



Guanine



Cytosine

Purine

Pyrimidines

□ Two types of _____ create DNA

- **Phosphodiester bonds** connect the nucleotides together in a single strand

- *Hydrogen bonds* connect the **complementary** strands together

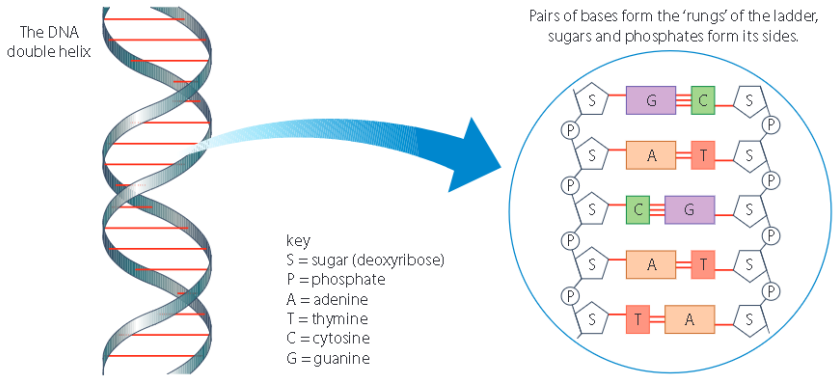
- G/C pairings make three hydrogen bonds. A/T pairings make two hydrogen bonds

□ The complementary strands are **antiparallel,** meaning that the nucleotides are inverted in sequence

□ The two DNA strands form a double helix

- The double helix has a large **major groove** and a small **minor groove**

EXAMPLE:



PRACTICE:

1. Which of the following is not a component of a nucleotide?
    a. Phosphate
    b. Pentose Sugar
    c. Starch sugar
    d. Nitrogenous base

2. Chargoff's rules states that which nucleotide pairings occurred?
    a. A and G, C and T
    b. T and U, C and G
    c. G and U, C and A
    d. A and T, C and G

3. Which of the following is NOT true regarding the structure of the DNA double helix?
    a. The two strands run parallel
    b. The two strands are complementary
    c. The nucleotides are held together via Phosphodiester bonds
    d. There is a major groove and minor groove