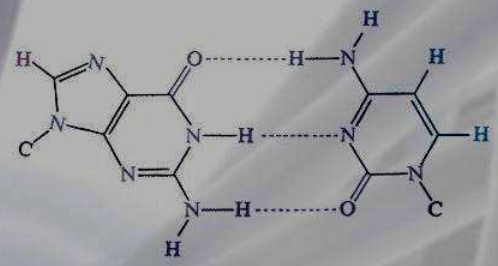
DNA Structure & Function to Replication

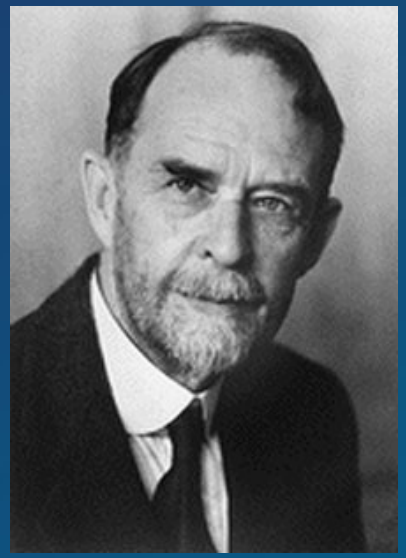


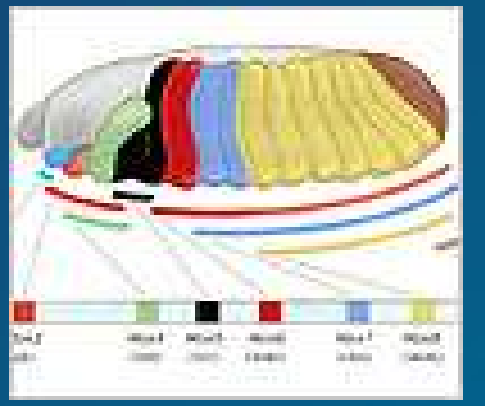
deoxyribonucleic acid

WJ

Important Scientists Aiding the Discovery of DNA

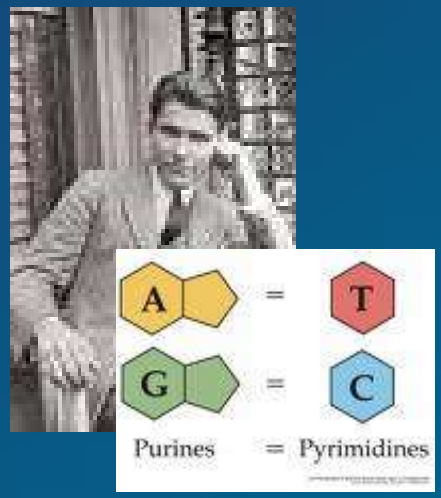
- 1865 Gregor Mendel – Shows characteristics of pea plants are passed from generation to generation.
- 1903 Walter Sutton – the U.S. geneticist who provided the first conclusive evidence that chromosomes carry the units of inheritance and occur in distinct pairs.
- 1911 Thomas Hunt Morgan – finds that genes are arranged in linear fashion on chromosomes of fruit fly





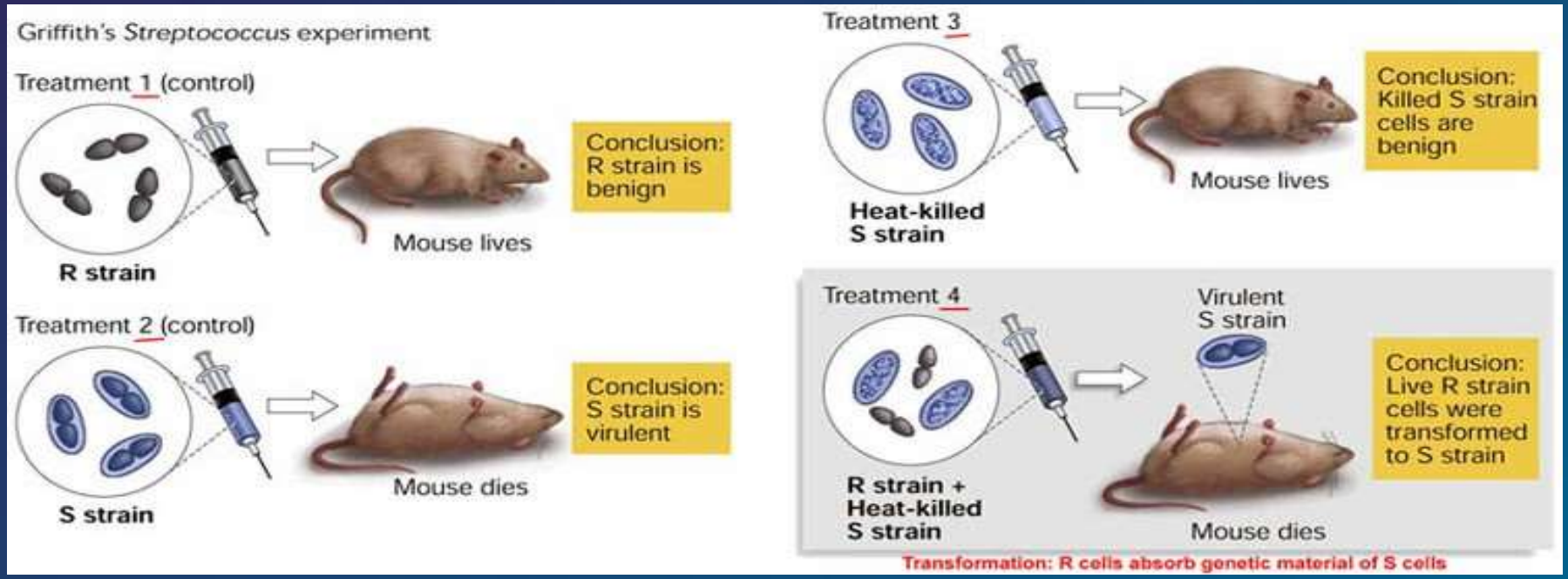
Important Scientists Aiding the Discovery of DNA

- 1928 Frederick Griffth – discovered that bacteria contain a molecule that can transfer information from cell to cell
- 1944 Oswald Avery, Colin MacLeod, Maclyn McCarty – showed that the substance that Griffith discovered was DNA.
- 1950 Erwin Chargraff – analyzes the nitrogenous base compositions of DNA. Discovers that the amounts of Adenine, Thymine, are in equal parts and Cytosine and Guanine are in equal proportions.



History of DNA

- Scientists originally thought that Proteins were the genetic material passed on through generations *not* DNA.
- Griffith injected mice with bacteria causing pneumonia and death, and pneumonia bacteria that didn't cause death. Found that Transformation happened seen in treatment #4 when he combined both strains together.



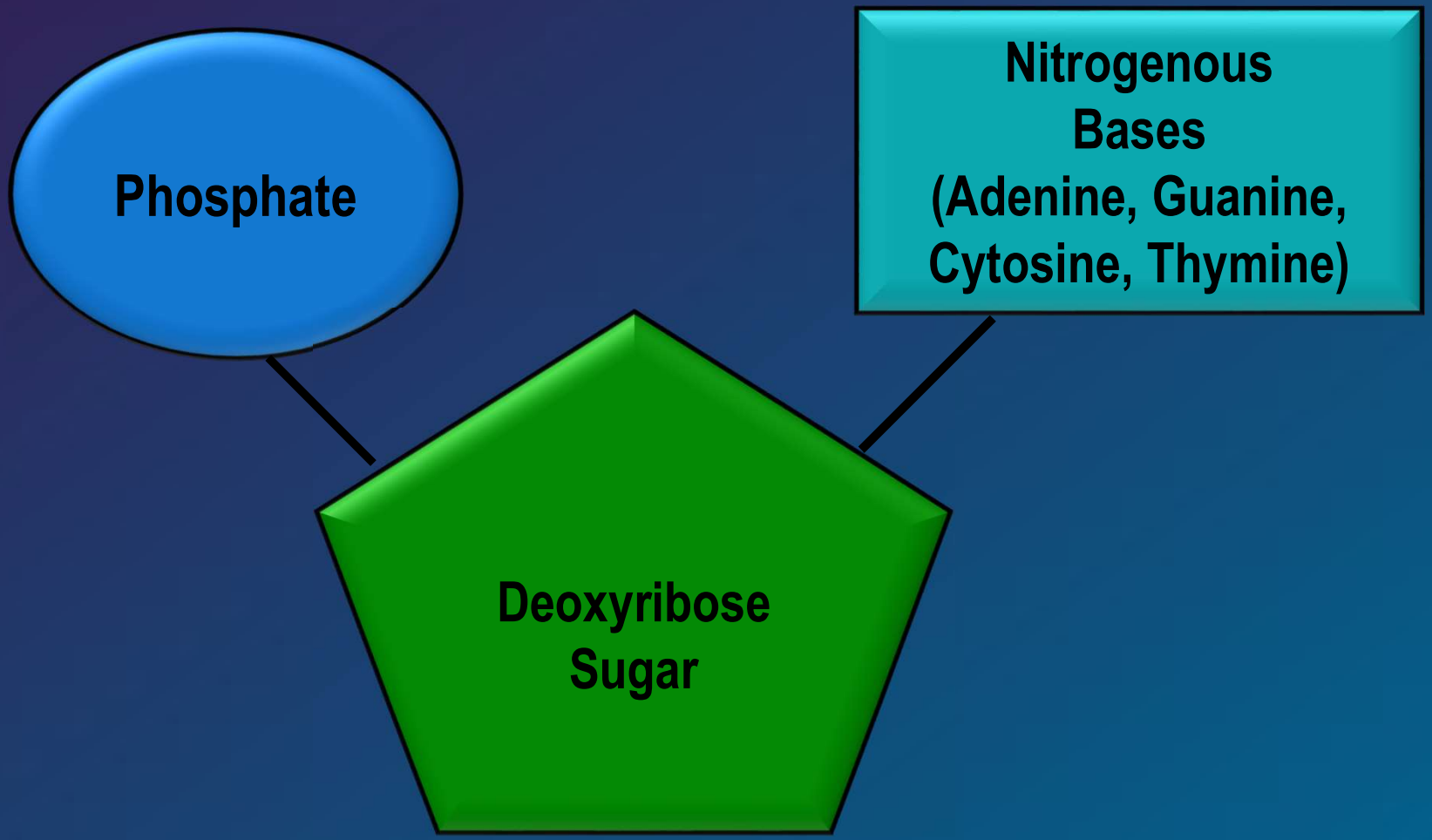
DNA Structure

- DNA = stand for deoxyribonucleic acid
- DNA consists of molecules that are arranged into a ladder-like structure called a Double Helix.

- A molecule of DNA is made up of millions of tiny subunits called Nucleotides.

- Each nucleotide consists of:
  1. Phosphate group
  2. Deoxyribose sugar
  3. Nitrogenous base

Nucleotides

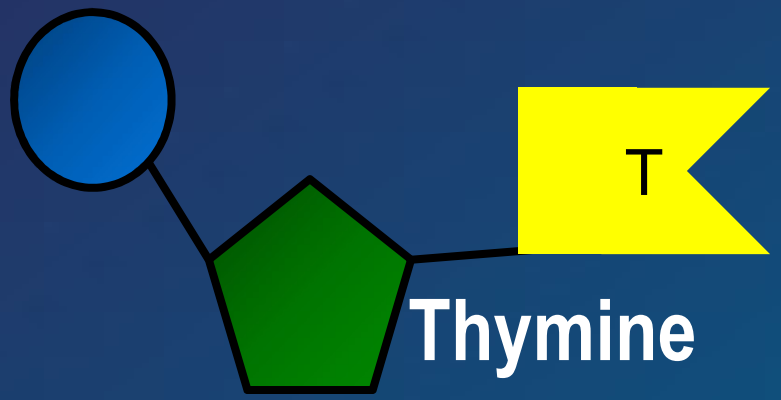


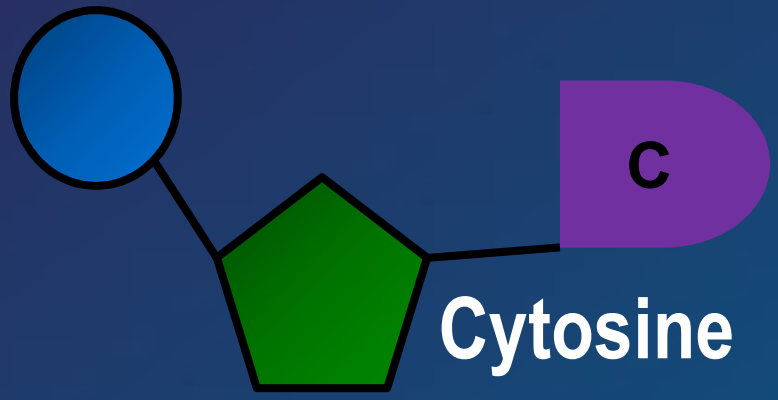
Nucleotides

- The phosphate and sugar-deoxyribose form the backbone of the DNA molecule, whereas the bases form the “rungs”.

- There are four types of nitrogenous bases.

Nucleotides





Nucleotides

- Each base will only bond with one other specific base.

- Adenine (A)
- Thymine (T)

} Form a base pair.

- Cytosine (C)
- Guanine (G)

} Form a base pair.

Nitrogen Bases

There are similarities between the nitrogenous bases

- Cytosine (C)
- Thymine (T)

Are called Pyrimidines

Pyrimidines have only a six-membered nitrogen-containing ring

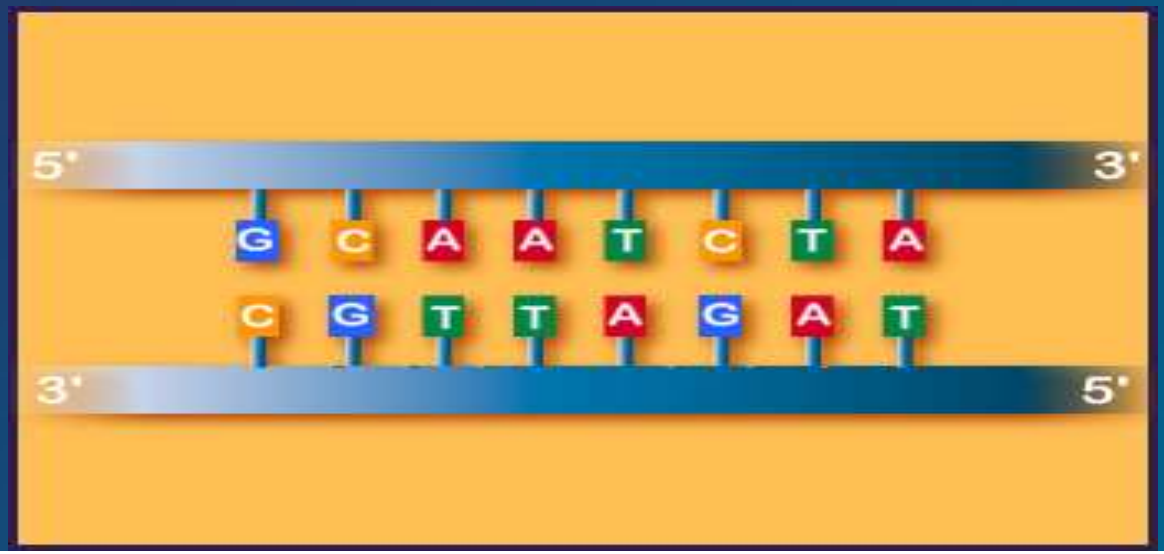
- Guanine (G)
- Adenine (A)

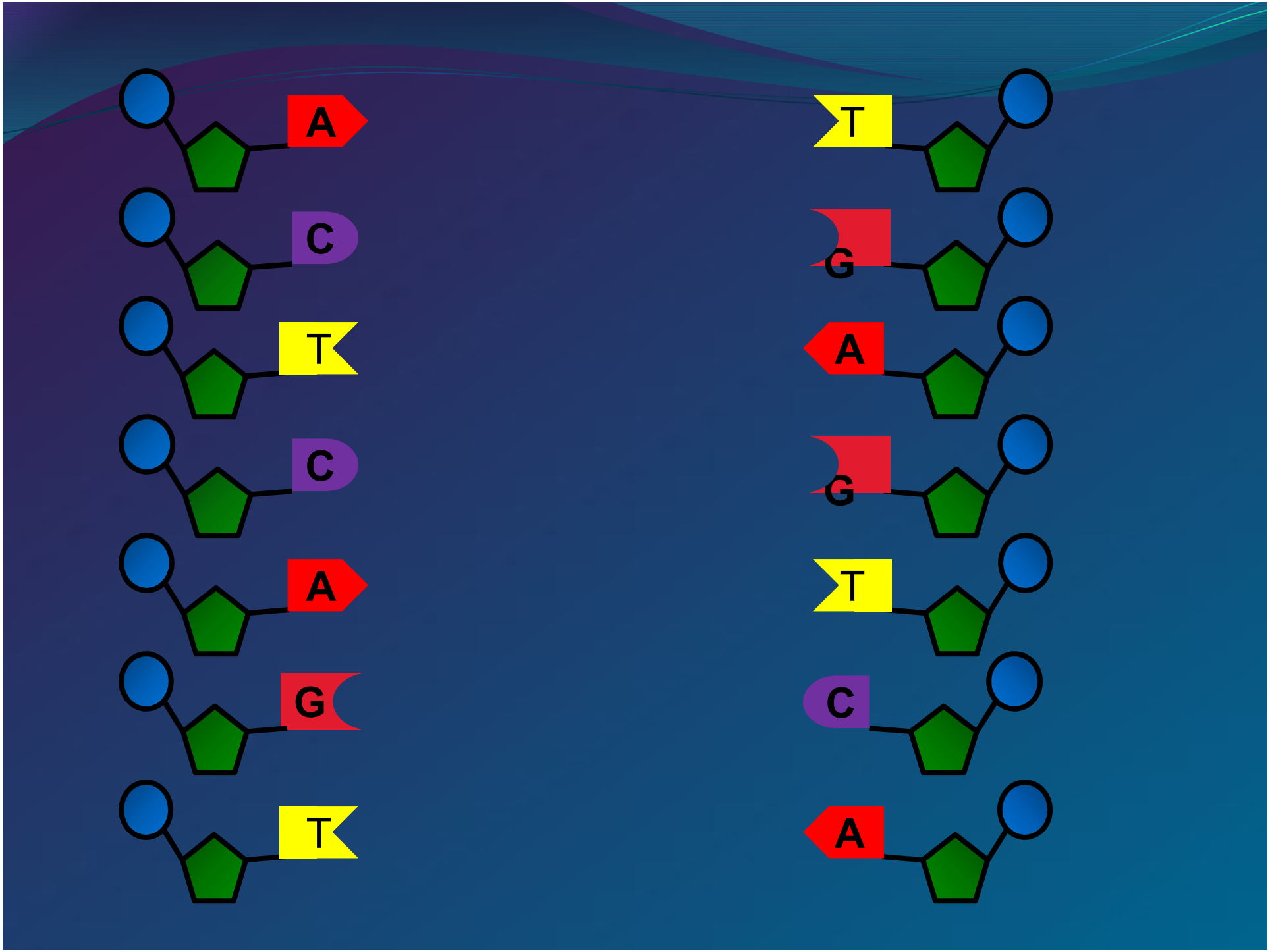
Are called Purines

Purines consist of a six-membered and a five-membered nitrogen-containing ring, fused together.

DNA Structure

- Because of this complementary base pairing, the order of the bases in one strand determines the order of the bases in the other strand and they run antiparallel to each other. The complementary strand is oriented in the opposite direction from the original strand.




A
C
T
C
A
G
T
T
G
A
G
T
C
A

DNA Structure

- To crack the genetic code found in DNA we need to look at the sequence of bases.

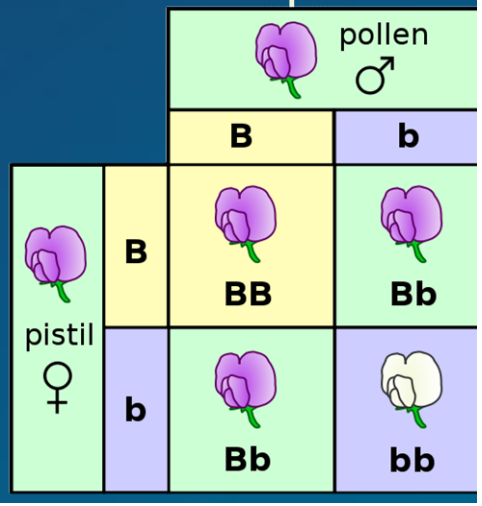
- The bases are arranged in triplets called codons.

A G G - C T C - A A G - T C C - T A G

T C C - G A G - T T C - A G G - A T C

DNA Structure- The bigger Picture

- A gene is a section of DNA that codes for a protein.
- Each unique gene has a unique sequence of bases.
- This unique sequence of bases will code for the production of a unique protein.
- It is these proteins and combination of proteins that give us a unique phenotype, or physical appearance.
- Genotype is your genetic make-up.
  For example the punnett square shows genotypes B and b (dominate and recessive)



DNA to Trait

DNA

Protein

Gene

Trait