



Genes and DNA
Life Science Ch. 6

1. What Does DNA Look Like?

The Pieces of the Puzzle

Scientists knew that genes must be able to do two things:

- 1) give instructions for building and maintaining cells.
- 2) be able to be copied each time a cell divides so each cell must contain identical genes

2. Nucleotides: The Subunits of DNA

- 1) DNA is made of subunits called nucleotides, which consist of a sugar, a phosphate, and a nitrogen base.
- 2) There are 4 different bases. Adenine, Thymine, Guanine, & Cytosine. Each base has a different shape.
- 3) Adenine connects to Thymine; Guanine connects to Cytosine.

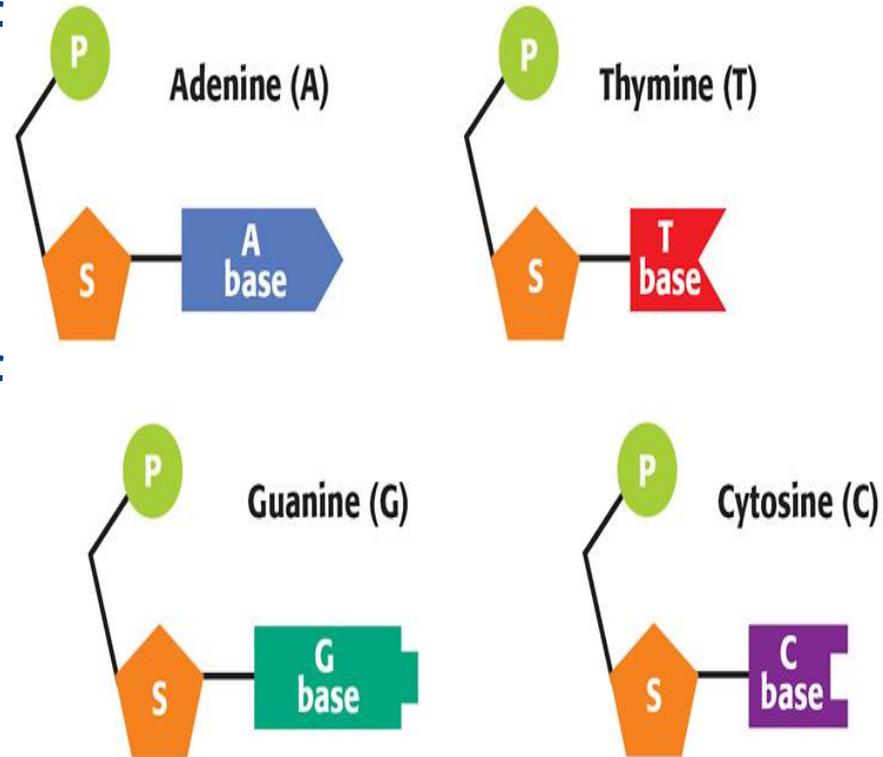
3. Chargaff's Rule

Rule

The amount of adenine always equals the amount of thymine;

The amount of Guanine always equals the amount of Cytosine.

This later helped scientists to understand DNA



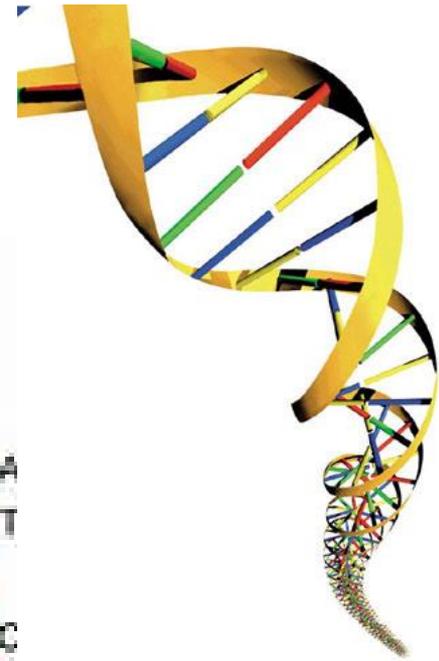
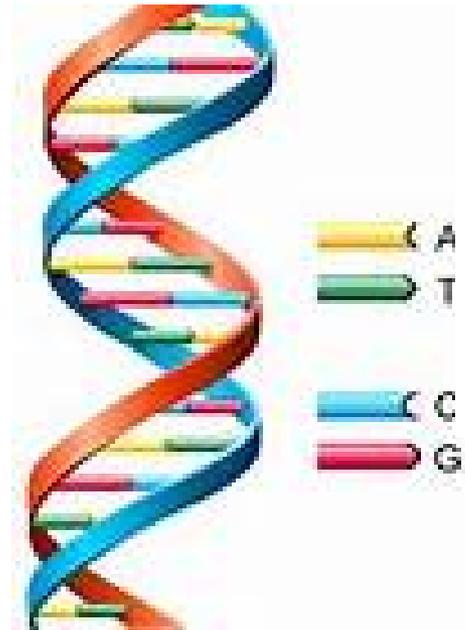
4. Rosalind Franklin's Discovery

Rosalind Franklin used X-ray diffraction to make images of DNA molecules. X rays are aimed at the DNA molecule. When an X ray hits a part of the molecule the ray bounces off & leaves a pattern. She saw that the DNA was spiral shaped.



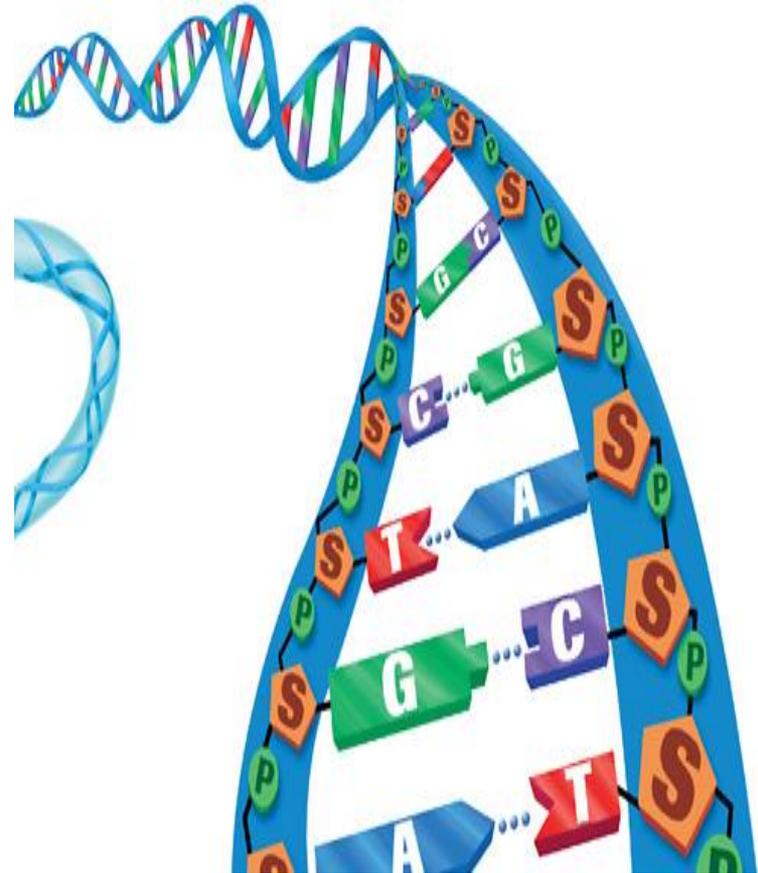
5. Watson and Crick's Model

After seeing Franklin's images, the scientists decided that DNA must look like a long, twisted ladder. They built a model of DNA which explained how it functions in the cell.



6. DNA's Double Structure

Known as a double helix; the legs of the ladder alternate between sugars and phosphates; the rungs of the ladder are made of sugar, and phosphates also known as a base pair.

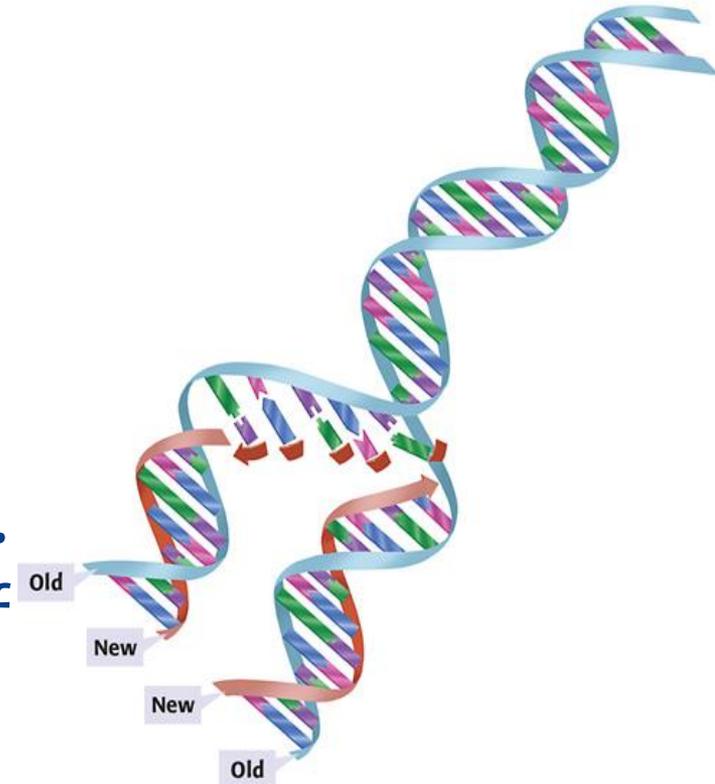


7. Making Copies of DNA

DNA-pairing of the bases allows a cell to replicate (copy). Each base bonds with only one other base.

8. How Copies of DNA are made

1. DNA splits down the middle where the bases meet
2. bases on each side of the molecule are used as a pattern for a new strand
3. as bases are exposed; complimentary nucleotides are added to each leg of the ladder.
4. DNA molecules are formed. half of each molecule is old and half is new



9. When Copies Are Made

1. DNA is copied every time a cell divides
2. Each new cell gets a complete set of DNA
3. Unwinding, copying, and rewinding is done by proteins

PRACTICE

1. What does DNA stand for?

2. If I gave you the Gene sequence TAACG, what would be the complementary side of the double helix? How about GCTAAGGC?

PRACTICE

3. Why do the pairings for # 2 appear as they do? (what's the rule?)

4. What are the parts of a nucleotide? (4)
