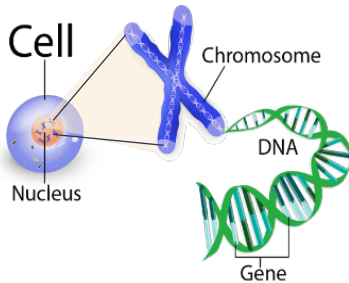


# DNA Replication

## Vocabulary

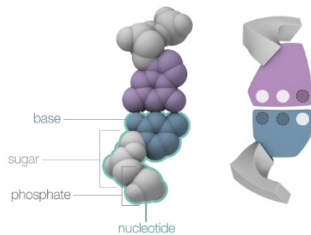


### Nucleic Acids –

the cells information storage and handling system; composed of smaller units called nucleotides

### Nucleotides–

the strands that make up DNA and RNA; each nucleotide is made up of a sugar unit, a phosphate group, and a nitrogen-containing base



SEE:

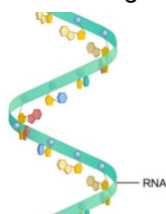
<https://learn.genetics.utah.edu/content/basics/builddna/>

### Deoxyribonucleic Acid–

DNA's FUNCTION is to store the genetic information needed for a cell to function and reproduce; it consists of two strands of nucleotides which form a double helix structure

### Ribonucleic Acid–

RNA shares a similar base structure as DNA; RNA consists of a single strand of nucleotides; RNA's FUNCTION is protein synthesis



## REVIEW

Each blank is a letter. Fill in the missing term.

**Chromosomes** are made up of \_\_\_\_\_ and found in the nucleus of eukaryotic cells. Chromosomes carry the \_\_\_\_\_ code.

**Deoxyribonucleic acid** makes up chromosomes and is the \_\_\_\_\_ information of an organism. DNA has a \_\_\_\_\_ helix shape.

**Genes** are the basic units of the \_\_\_\_\_ code found on specific regions of \_\_\_\_\_. Genes are inherited from the offspring's \_\_\_\_\_.

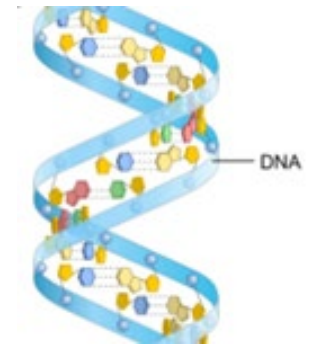
## Nitrogen-Containing Bases – Just 4 of them!

Remember, DNA and RNA are made up of nucleotides. Nucleotides contain a sugar unit, a phosphate group and a nitrogen-containing base (see image at left). There are only four (4) nitrogen-containing bases in DNA and RNA. They are:

- Guanine (G)
- Cytosine (C)
- Adenine (A)
- Thymine (T)

These bases are combined in a specific sequence or order. They are always paired together as follows:

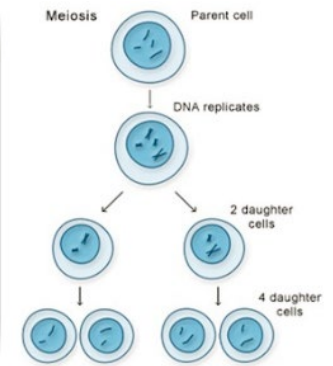
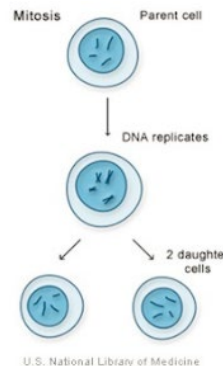
- Guanine (G) and Cytosine (C) or G-C; or Cytosine and Guanine or C-G
- Adenine (A) and Thymine (T) or A-T; or Thymine and Adenine or T-A



## Review Mitosis

### Remember, Mitosis?

- **Mitosis** – cell division that creates two **diploid** body cells
  - makes two identical nuclei making two \_\_\_\_\_ cells with a full set of the chromosomes



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## Vocabulary

### Diploid –

having two of each type of chromosome; a parent cell with a full set of chromosomes

### Haploid –

containing one chromosome of each type; a sex cell with only half a set of chromosomes

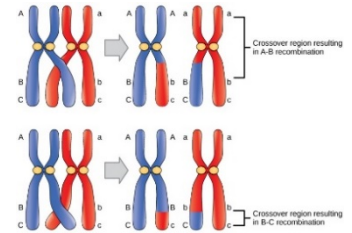
## Review Meiosis

### Remember, Meiosis?

- **Meiosis** – cell division that creates four **haploid** sex cells
  - makes four        cells with half the chromosomes in each cell
    - **Sex Cells or Gametes** – eggs and sperm; have HALF the chromosomes of the organism
      - **Eggs** –        sex cell
      - **Sperm** –        sex cell
  - **Zygote** – formed as a result of **fertilization**; when the gametes (egg and sperm) join to complete the full set of chromosomes and start the creation of the new organism

### **NEW INFORMATION:**

During Meiosis, these bases come apart for replication and have to come back together to reform the chromosomes.



Sometimes in Meiosis, the chromosomes cross over each other and exchange the ends of the chromosomes. This changes the genetic information carried on those chromosomes!

### Complete this Mitosis vs. Meiosis Comparison Table

Characteristic of Cell Division	Mitosis	Meiosis
Type of cell that uses this process		
Number of divisions		
Number of daughter cells		
Daughter cells: Diploid or Haploid		
To the parent cell, genetically: Identical or Different		
Purpose of the process		



## DNA Replication

DNA's structure allows a cell to make exact copies of the DNA using simple pairing rules (T-A, C-G). Replication of DNA is the making of a second structure that is the same as the original (see image at left).

1. A DNA enzyme initiates the replication process.
  2. The DNA forms a *complimentary strand* of the pairing bases.
  3. When a double strand of DNA separates (to replicate itself), each part directs the making of its own complement, resulting in two copies of the original double strand.
    - This is also how DNA makes strands of RNA to carry the message of its code to the cytoplasm to create a protein.
      - RNA nucleotides can also pair up with the DNA nucleotides to form RNA molecules with complementary bases.
  4. Proteins follow behind the DNA enzyme and cut out any base pairing mistakes.
- Remember, DNA is the storehouse of key genetic information for a cell.
    - Reliable transmission of that information is critical when a cell divides and when an organism reproduces.
  - If there is any error in the copying of the bases, the DNA is changed.

**PREDICTION:** This is called a       

### Codominance –

the alleles do not blend, both are seen in the offspring; Example: Cow Coat Color – red, white, roan (RR, WW, or RW)