

NAME \_\_\_\_\_

HR \_\_\_\_\_

### Modern Genetics Outline

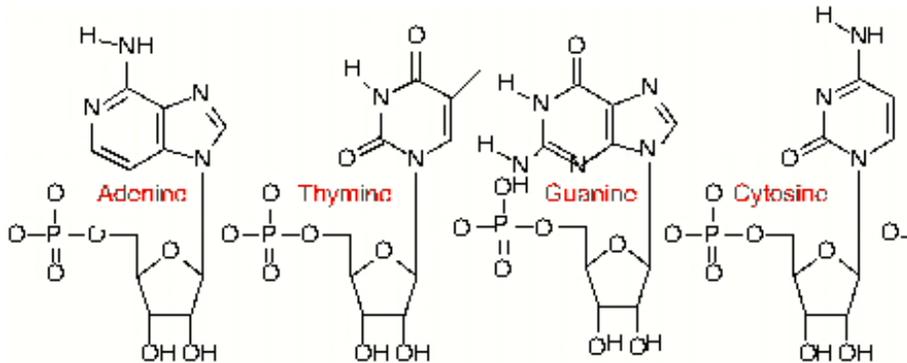
#### Chemical Basis for Genetics

- In the 1940's and 1950's experiments showed that \_\_\_\_\_ are made up of the chemical compound \_\_\_\_\_, or \_\_\_\_\_.
- \_\_\_\_\_ is a large complex molecule found in the \_\_\_\_\_ of the cell.
- \_\_\_\_\_ is responsible for passing \_\_\_\_\_ information from generation to generation.
- \_\_\_\_\_ also controls the manufacture of \_\_\_\_\_.
- \_\_\_\_\_ control cellular \_\_\_\_\_.

#### Nucleotides

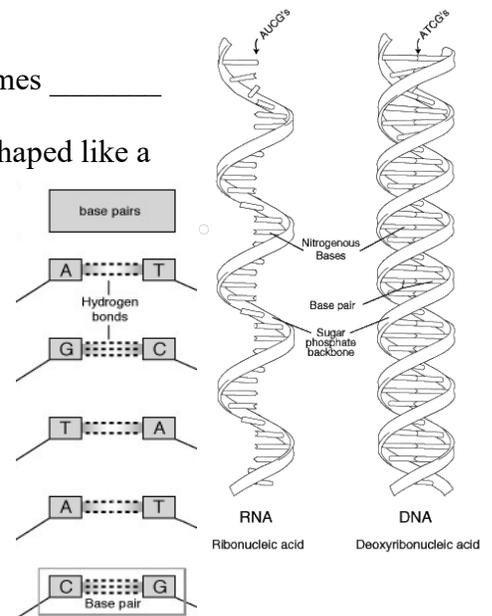
- The \_\_\_\_\_ molecule is made up of a long chain of repeating \_\_\_\_\_ units.
- Nucleotides contain \_\_\_\_\_ bases, a \_\_\_\_\_, and a \_\_\_\_\_ group.
- The four different bases in DNA nucleotides are
  - 
  - 
  - 
  -

#### Nitrogenous Bases of DNA



#### DNA Structure

- The structure of \_\_\_\_\_ was discovered in the 1950's by James \_\_\_\_\_ and Francis Crick.
- According to \_\_\_\_\_ and \_\_\_\_\_, \_\_\_\_\_ molecules are shaped like a twisted \_\_\_\_\_.
- The twisted ladder structure is called a \_\_\_\_\_.
- The \_\_\_\_\_ double helix has \_\_\_\_\_ strands or sides.
- The strands are connected at the rungs.
- The sides of the ladder consist of alternating \_\_\_\_\_ and \_\_\_\_\_ molecules.
- The rungs are pairs of \_\_\_\_\_ bases.
  - The nitrogen bases are attached to each other by \_\_\_\_\_ bonds.



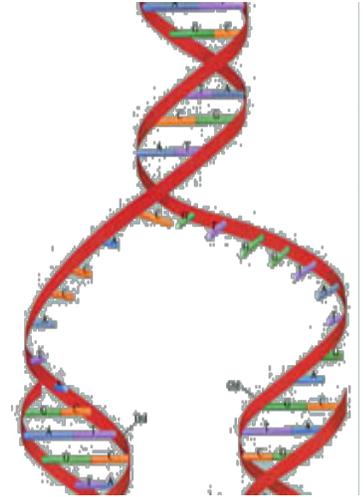
- The four nitrogenous bases in DNA \_\_\_\_\_  
(join) together in a certain way known as

\_\_\_\_\_ **pairing.**

- \_\_\_\_\_ (A) and \_\_\_\_\_ (T) bond together.
- \_\_\_\_\_ (G) and \_\_\_\_\_ (C) bond together.
- No other combinations are \_\_\_\_\_.

### DNA Replication

- During reproduction, \_\_\_\_\_ makes exact \_\_\_\_\_ of itself (\_\_\_\_\_).
- The process begins with an \_\_\_\_\_ of the \_\_\_\_\_ helix.
- The two strands “\_\_\_\_\_” leaving two strands of \_\_\_\_\_.
- Each strand is a \_\_\_\_\_ for the new nucleotide strand.
- Free nucleotides present in the cytoplasm pair with the free nitrogenous bases of both strands.
- Two identical \_\_\_\_\_ molecules that are identical to the original are \_\_\_\_\_.



### RNA - Ribonucleic Acid

- RNA also controls cellular \_\_\_\_\_.
- RNA contains the sugar “\_\_\_\_\_.”
- RNA is \_\_\_\_\_ stranded.
- RNA also has \_\_\_ nitrogen bases:
  - \_\_\_\_\_
  - \_\_\_\_\_
  - \_\_\_\_\_
  - \_\_\_\_\_ instead of Thymine.
- RNA has different functions than DNA:
  - \_\_\_\_\_ **RNA - mRNA** – is a single, uncoiled strand that carries the genetic code information of DNA from the \_\_\_\_\_ to the \_\_\_\_\_ in the \_\_\_\_\_.
  - \_\_\_\_\_ **RNA - tRNA** – is a single folded strand that \_\_\_\_\_ the message for protein formation carried by mRNA. tRNA then transfers amino acids to form amino acids.
  - \_\_\_\_\_ **RNA - rRNA** – is a form of RNA that makes up most of the \_\_\_\_\_ in a cell.

### Mutations

- A mutation is any \_\_\_\_\_ or \_\_\_\_\_ in the \_\_\_\_\_ or \_\_\_\_\_ of an organism that can be inherited.
- These changes usually produce \_\_\_\_\_ characteristics.
- To be \_\_\_\_\_, these changes must occur in the \_\_\_\_\_ or \_\_\_\_\_ cell.
- As a result of \_\_\_\_\_, the changed gene or chromosome in the sex cell is \_\_\_\_\_ on to the new organism.
- If they occur in other cells, they can be passed on only to other \_\_\_\_\_ cells.
- Mutations occur as \_\_\_\_\_ chance events and may occur \_\_\_\_\_ within the cell or be caused by forces outside the cell called \_\_\_\_\_.

- X rays, ultraviolet light, radioactive substances, cosmic rays, and chemicals such as formaldehyde and benzene, are \_\_\_\_\_ agents.
- Asbestos fibers and drugs, such as LSD, marijuana, cigarettes and alcohol, are also known to cause changes in \_\_\_\_\_ and \_\_\_\_\_.
- Unborn children can be injured when their pregnant mothers are exposed to \_\_\_\_\_ agents.

### Human Genetic Diseases

- Most genetic diseases in humans are \_\_\_\_\_ as \_\_\_\_\_ genes and involve \_\_\_\_\_ in enzyme formation.
- When there is a mistake in \_\_\_\_\_ formation, the person's metabolism is \_\_\_\_\_.
- The presence of many genetic disorders can be detected either before or after birth.
  - \_\_\_\_\_ (chemical analysis of body \_\_\_\_\_),
  - \_\_\_\_\_ (detecting chromosome abnormalities by matching homologous chromosomes) and
  - \_\_\_\_\_ (removing a small amount of amniotic fluid from around the fetus) are tests used to detect (identify) genetic diseases.

### Genetic Engineering

- Today, scientist can deliberately remove \_\_\_\_\_ from one organism and add them to the \_\_\_\_\_ material of another organism.
- **Genetic Engineering** will \_\_\_\_\_ (change) the \_\_\_\_\_ of a cell.
- The changed \_\_\_\_\_ is called \_\_\_\_\_.
- The \_\_\_\_\_ that received the recombinant \_\_\_\_\_ receives new \_\_\_\_\_, such as, the ability to prevent a certain disease.

### How to Clone a Sheep

