

Warm-Up

Genetic Code



Lesson Question



Lesson Goals

Analyze the contributions of different scientists to the discovery of the genetic code.

Identify the components and structure of .

Relate DNA, genes, and .

Examine how cells make .



Words to Know

Fill in this table as you work through the lesson. You may also use the glossary to help you.

DNA	an abbreviation for “deoxyribonucleic acid,” which is the <input type="text"/> material passed from parent to offspring
helix	a shape that looks like a twisted ladder
offspring	the young of an organism
trait	a genetically determined characteristic that is passed from <input type="text"/> to offspring
chromatin	a complex of <input type="text"/> acids and proteins that make up chromosomes

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Words to Know

gene	a segment of DNA that <input type="text"/> for a trait and is transferred from parent to offspring
replication	the process by which DNA is copied
RNA	an abbreviation for “ribonucleic acid,” which is a type of nucleic acid that plays a role in making <input type="text"/>



Organic Compounds

- Carbohydrates are used for .
- are used for long-term energy storage.
- Proteins are used for growth and repair.
- Nucleic acids are used for and transmitting information.

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The Genetic Code and DNA

- The genetic code is found in a acid called **DNA**.
- DNA stands for .
- DNA is the genetic material that is passed from parent to and affects the of the offspring.

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The Discovery of the Genetic Code**FRIEDRICH MIESCHER**

Friedrich Miescher discovered in white blood .

The Discovery of the Genetic Code**MAURICE WILKINS**

- The chemical structure of “nuclein” was determined.
- It was named deoxyribonucleic acid.
- Scientists tried to figure out what looks like.
- Maurice Wilkins studied DNA using X-rays.

The Discovery of the Genetic Code**ROSALIND FRANKLIN**

Rosalind Franklin used to take a picture of DNA.

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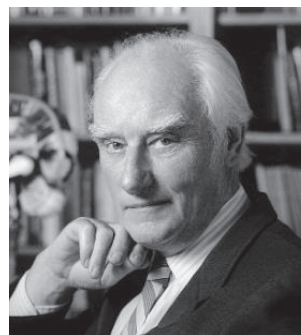
The Discovery of the Genetic Code

James Watson and Francis Crick confirmed that DNA is a

molecule.



James Watson



Francis Crick

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DNA Shape

The twisted ladder shape of DNA is called a double



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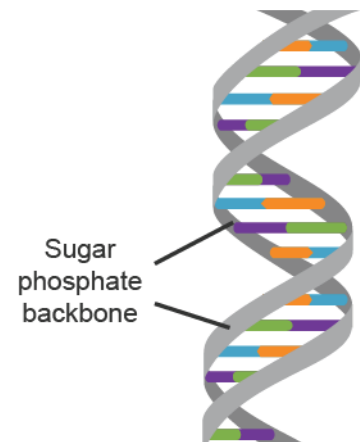
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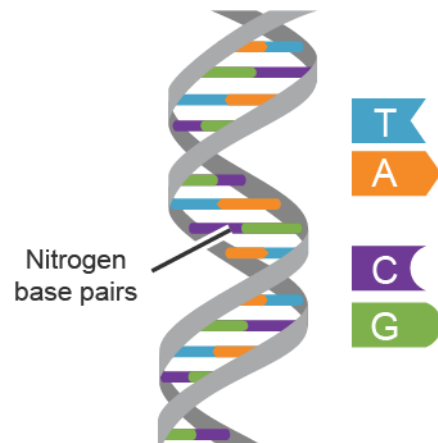
DNA Backbone

- The backbone of DNA is composed of:
 - molecules (deoxyribose).
 - molecules.

**DNA Rungs**

The “rungs” of DNA are composed of molecules called bases.

- There are four nitrogen bases.
- Thymine (T)
- (A)
- Cytosine (C)
- (G)



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Nitrogen Base Pairings

- Nitrogen bases have specific pairings.
 - (T) always pairs with adenine .
 - (C) always pairs with guanine (G).

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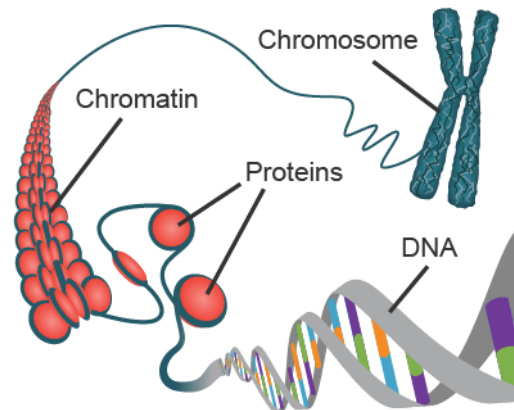
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Storage of the Genetic Code

- A chromosome is a structure in the of an eukaryotic cell that is made up of condensed .
- is a complex of nucleic acids and proteins that make up chromosomes.
- A gene is a segment of DNA that codes for a specific .

**The Human Genome Project**

- The human genetic code was from 1990 to 2003.
- In 2014, researchers estimated that human DNA contains about genes.
- The results of this project will help in the understanding of:
 - human .
 - the codes of other organisms.



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Functions of DNA

- DNA guides:
 - the formation of an organism's .
 - the processes that affect how an functions.

The Role of DNA in Growth and Reproduction

- need to divide for things to grow and reproduce.
- During this process, DNA must be copied through a process called .
- A chemical causes the bases that make up the rungs of the DNA ladder to separate, unzipping DNA.



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Genes, Proteins, and Traits

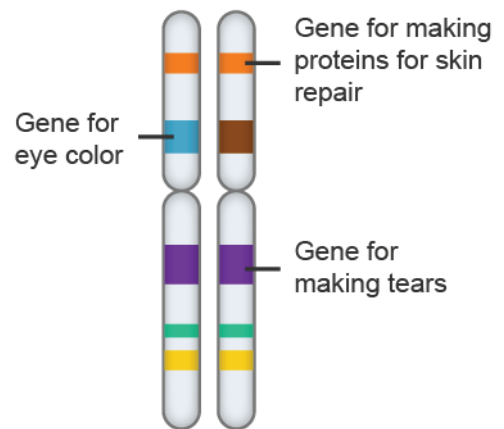
- Genes provide the set of

for producing

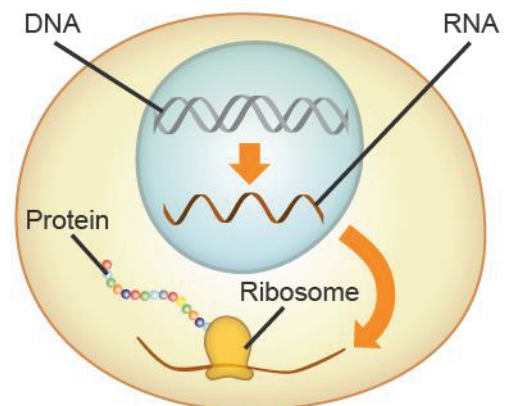
proteins with specific

and

- Proteins determine an organism's

**Protein Production**

- A strand of is formed in the nucleus.
 - RNA stands for acid.
 - The sugar in RNA is .
- The of RNA leaves the and moves to the ribosome.



- In the ribosome, the information that RNA copied from DNA is used to produce a protein with a specific function.

Summary

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**Lesson
Question**

What are the structures and functions of DNA?

**Answer**

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Review: Key Concepts

Scientist	Contribution
Friedrich Miescher	First discovered DNA; named DNA <input type="text"/>
Maurice Wilkins	Studied DNA using special <input type="text"/>
Rosalind Franklin	First photo of DNA, which helped confirm DNA's <input type="text"/>
James Watson	Confirmed the <input type="text"/> structure of DNA
Francis Crick	Confirmed the three-dimensional structure of DNA

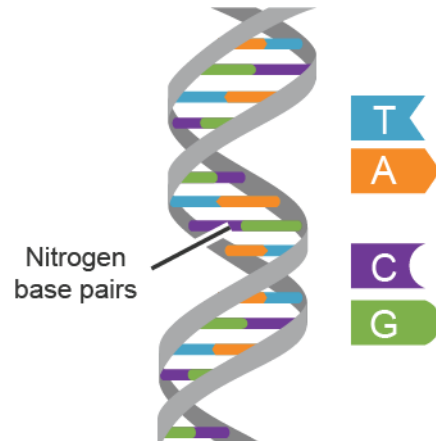
Summary | Genetic Code

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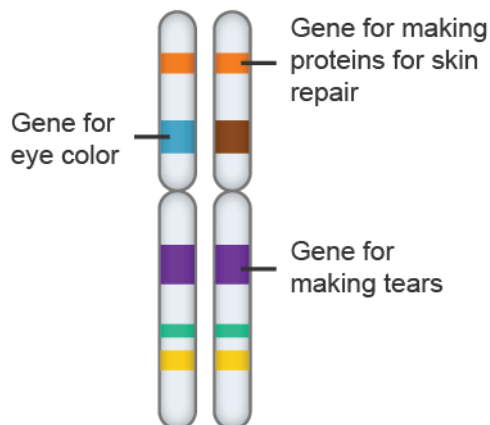
Review: Key Concepts

- DNA is a double made of a sugar-phosphate backbone and nitrogen bases.
- The bases have specific pairings: A and T, C and G.
- are structures in the nucleus that are made up of condensed DNA.



Review: Key Concepts

- DNA is made of segments called .
- Genes provide the set of instructions for producing .
- Proteins determine an organism's .



Summary

Genetic Code

Use this space to write any questions or thoughts about this lesson.