# Unit 1: DNA Structure & Cellular Replication

Content Area: **Science**
Course(s): **Modern Genetics**
Time Period: **Semester 1**
Length: **5 Weeks**
Status: **Published**

## Standards

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|---|---|
| HS-LS1-1 | Construct an explanation based on evidence for how the structure of DNA determines the structure of proteins which carry out the essential functions of life through systems of specialized cells. |
| | Constructing Explanations and Designing Solutions |
| LS1.A | Structure and Function |
| HS-LS1-4 | Use a model to illustrate the role of cellular division (mitosis) and differentiation in producing and maintaining complex organisms. |
| | Developing and Using Models |
| LS1.B | Growth and Development of Organisms |
| | Systems and System Models |
| LS3.B | Variation of Traits |

## Enduring Understandings

1. DNA is the genetic material contained in all cells

2. Genetic material in the form of DNA is replicated and passed on to new cells when they grow and divide, allowing an organism to grow and replace damaged tissue.

3. Chromosomes are condensed forms of DNA.

4. All cells in an organism contain the same genetic library, but only certain cells will express various genes, allowing for cell differentiation

5. Sexually reproducing organisms complete a form of cell division known as meiosis. This process allows for genetic variation and recombination in these organisms.

## Essential Questions

1. How does the structure of DNA relate to the formation of genes and ultimately proteins?

2. How do organisms pass on genetic material, in the form of DNA from one cell to another?

3. How do organisms pass on genetic material, in the form of DNA from parent to offspring?

4. How does the formation of chromosomes relate to the passing on of genetic material from parent to offspring?

5. How does genetic variation occur in a population?

6. How does genetic recombination affect the offspring of sexually reproducing organisms?

7. How does the process of mitosis differ from the process of meiosis.

8. How do the processes of cellular reproduction in asexual versus sexually reproducing organisms affect the genetic diversity found in populations of these organisms?

9. How might errors that occur during chromosome separation affect an organism?

## Knowledge and Skills

Knowledge:

1. DNA is the genetic material contained in all cells

2. Genetic material in the form of DNA is replicated and passed on to new cells when they grow and divide, allowing an organism to grow and replace damaged tissue.

3. Chromosomes are condensed forms of DNA.

4. All cells in an organism contain the same genetic library, but only certain cells will express various genes, allowing for cell differentiation

5. Sexually reproducing organisms complete a form of cell division known as meiosis. This process allows for genetic variation and recombination in these organisms.

Skills:

1. Develop and use models to display understanding and convey ideas.

2. Identify problems by asking questions and work on designing solutions to these problems

3. Conduct and investigation based on a given problem.

4. Construct an explanations based on evidence gathered from a scientific investigation.

## Assessments

https://docs.google.com/document/d/1wR7bQF-8AQoRrt0g4C3hKja0yjwDjC9_BiAmONWbTcI/edit?usp=sharing

## Modifications

https://docs.google.com/document/d/1ODqaPP69YkcFiyG72fIT8XsUIe3K1VSG7nxuc4CpCec/edit