



# Southmoreland School District

## Advanced Biology

### Curriculum Overview

#### **Advanced Biology Overview:**

Advanced Biology (Pre-AP) focuses deeply on the concepts and skills that have maximum value for college and career. This course concentrates on the core areas of ecological systems, cellular systems, evolution and genetics. Rather than understanding content topics in isolation, students will make meaningful connections between the structures, processes and interactions that exist across biological systems—from cells to ecological communities.

#### **Module Titles:**

**Module 1:** Introduction to Biology

**Module 2:** Biochemistry

**Module 3:** Cells and Cell Processes

**Module 4:** Heredity

**Module 5:** Molecular Genetics and Technology

**Module 6:** Evolution

**Module 7:** Ecology

#### **Module Overviews:**

##### **Module 1: Introduction to Biology**

Students will use scientific thinking, processes, tools, and technology to study biology determining relationships between structure and function of all living organisms.

##### **Module 2: Biochemistry**

Students will explain the chemical basis of life by describing the properties of water, formation of polymers by enzyme regulated reactions to create carbohydrates, lipids, proteins, and nucleic acids.

##### **Module 3: Cells and Cell Processes**

Students will explain the characteristics of all prokaryotic and eukaryotic cells by examining organelle structure and function including membrane transport, bioenergetics (photosynthesis and cellular respiration), and cell life cycles to maintain homeostasis.

##### **Module 4: Heredity**

Students will explain the hereditary process by examining the cell cycles of mitosis and meiosis to determine the relationship between DNA, genes, alleles and chromosomes in order to observe patterns of inheritance.



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#### **Module 5: Molecular Genetics and Technology**

Students will explain the process, and manipulation of the process, of turning a gene into a physical trait by examining transcription and translation, mutations, and genetic engineering techniques.

#### **Module 6: Evolution**

Students will explain how species change over time by examining evidence of genotypic and phenotypic modification resulting in speciation observed on present day earth.

#### **Module 7: Ecology**

Students will describe how nature is organized by determining biotic factors, abiotic factors, species interactions, energy flow and nutrients(matter) cycles to evaluate human impacts on natural systems.