Curriculum Map: Honors Biology

Course: BIOLOGY Sub-topic: Biology

Grade(s): 10

Course

**Description:** Biology is designed to teach students the unifying principles that consume the study of life.

The subject matter focuses on common life processes. The course traces biological

organization from the cellular level to the entire organism. The course gives students a solid understanding of the common themes associated with the many fields within the biological sciences. Students will use a variety of resources including laboratory investigations, computer applications, and research projects to enhance their understanding biology. All nine benchmark topics will be covered and reviewed in preparation for the Biology Keystone, which will occur at

the end of the semester.

Course Requirement: Credit earned in Earth & Environment or Honors Earth & Environment

Unit: Unit 1- Biological Principles Characteristics of Life

STANDARDS: **STANDARDS** 

STATE: Pennsylvania SAS Keystone Anchors (2010-2014)

BIO.A.1 (Advanced) Basic Biological Principles BIO.A.1.1 Explain the characteristics common to all organisms.

(Advanced)

BIO.A.1.2 Describe relationships between structure and function at 

biological levels of organization. (Advanced)

Topic: What is Life?

Minutes for Topic: 86

**Topic: Scientific Method Review** 

Minutes for Topic: 86

Topic: Scientific Method and Tools of Science

Minutes for Topic: 129

**Topic: Review for Quest** 

Minutes for Topic: 86

Topic: Quest on Characteristics of Life and Scientific Method

Minutes for Topic: 86

Unit: Unit 2-pH and Living STANDARDS: **STANDARDS** 

STATE: Pennsylvania SAS Keystone Anchors (2010-2014)

BIO.A.2 (Advanced) The Chemical Basis for Life BIO.A.2.1 Describe how the unique properties of water support life on 

(Advanced) Farth.

Describe the unique properties of water and how these BIO.A.2.1.1 (Advanced)

properties support life on Earth (e.g., freezing point, high

specific heat, cohesion).

**Topic: Properties of Water** 

Minutes for Topic: 86

**Topic: Acids and Bases** 

Minutes for Topic: 172

Topic: Quest Review Minutes for Topic: 86

Topic: Quest-pH and Living

Minutes for Topic: 86

**Unit: Unit 3-Biochemistry** 

STANDARDS: STANDARDS

STATE: Pennsylvania SAS Keystone Anchors (2010-2014)

BIO.A.2 (Advanced) The Chemical Basis for Life 
BIO.A.2.2.1 Explain how carbon is uniquely suited to form biological

(Advanced) macromolecules. BIO.A.2.2.2

BIO.A.2.2.2 (Advanced) Describe how biological macromolecules form from monomers.

BIO.A.2.2.3 Compare the structure and function of carbohydrates, lipids,

(Advanced) proteins, and nucleic acids in organisms.

BIO.A.2.3 Explain how enzymes regulate biochemical reactions within a

(Advanced) cell.

BIO.A.2.3.1 Describe the role of an enzyme as a catalyst in regulating a

(Advanced) specific biochemical reaction.

BIO.A.2.3.2 Explain how factors such as pH, temperature, and

(Advanced) concentration levels can affect enzyme function.

**Topic: Carbohydrates** 

Minutes for Topic: 172

**Topic: Lipids** 

Minutes for Topic: 86

**Topic: Proteins and Enzymes** 

Minutes for Topic: 86

**Topic: Nucleic Acids** 

Minutes for Topic: 86

**Topic: Enzymes** 

Minutes for Topic: 172

**Topic: Quest Review-Biochem** 

**Topic: Quest** 

Unit: Unit 4-Cells Timeline: 1 Weeks

STANDARDS: STANDARDS

STATE: Pennsylvania SAS Keystone Anchors (2010-2014)

BIO.A.1.2.2 Describe and interpret relationships between structure and

(Advanced) function at various levels of biological organization (i.e.,

organelles, cells, tissues, organs, organ systems, and

multicellular organisms).

BIO.A.3.1.1 Describe the fundamental roles of plastids (e.g., chloroplasts)

(Advanced) and mitochondria in energy transformations.

**Topic: Cell Structure and Function** 

Topic: Cell Organelles

Minutes for Topic: 86

Topic: Cell Microscopy

Minutes for Topic: 86

Topic: Cell Organelle Practice

Minutes for Topic: 86

**Topic: Cell Quest Review** 

**Topic: Quest-Cells** 

Unit: Unit 5-Cell Transport STANDARDS: STANDARDS

STATE: Pennsylvania SAS Keystone Anchors (2010-2014)

BIO.A.4 (Advanced) Homeostasis and Transport & BIO.A.4.1 Identify and describe the cell structures involved in transport

(Advanced) of materials into, out of, and throughout a cell.

BIO.A.4.1.1 Describe how the structure of the plasma membrane allows it

(Advanced) to function a

to function as a regulatory structure and/or protective barrier for a cell.

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Topic: Cell Transport-Passive Transport

Minutes for Topic: 86

Topic: Cell-Transport Lab Investigation

Minutes for Topic: 172

**Topic: Cell Transport-Active Transport** 

**STANDARDS** 

Minutes for Topic: 86

Topic: Quest Review

STANDARDS:

Minutes for Topic: 86

Topic: Quest on Cell Transport

Unit: Unit 6-Bioenergetics

STATE: Pennsylvania SAS Keystone Anchors (2010-2014)

BIO.A.3 (Advanced) Bioenergetics 
BIO.A.3.1 Identify and describe the cell structures involved in processing

(Advanced) energy.

BIO.A.3.1.1 Describe the fundamental roles of plastids (e.g., chloroplasts)

(Advanced) and mitochondria in energy transformations.

BIO.A.3.2 Identify and describe how organisms obtain and transform

(Advanced) energy for their life processes.

BIO.A.3.2.1 Compare the basic transformation of energy during

(Advanced) photosynthesis and cellular respiration.

**Topic: Photosynthesis**Minutes for Topic: 172

**Topic: Respiration** 

Minutes for Topic: 86

Topic: Photosynthesis and Cellular Respiration Script and Review

Minutes for Topic: 172

**Topic: Quest Review-Photosynthesis** 

Minutes for Topic: 86

Topic: Quest-Photosynthesis and Cellular Respiration

Minutes for Topic: 86

Unit: Unit 7-Mitosis Meiosis STANDARDS: STANDARDS

STATE: Pennsylvania SAS Keystone Anchors (2010-2014)

BIO.B.1 (Advanced) Cell Growth and Reproduction 
BIO.B.1.1 Describe the three stages of the cell cycle: interphase, nuclear

(Advanced) division, cytokinesis.

BIO.B.1.1.1 Describe the events that occur during the cell cycle:

(Advanced) interphase, nuclear division (i.e., mitosis or meiosis),

cytokinesis.

BIO.B.1.1.2 Compare the processes and outcomes of mitotic and meiotic

(Advanced) nuclear divisions.

**Topic: Mitosis** 

Minutes for Topic: 258

**Topic: Meiosis** 

Minutes for Topic: 258

**Topic: Mitosis Meiosis Review**Minutes for Topic: 86

**Topic: Meiosis Mitosis Quest** Minutes for Topic: 86

## **Unit: Unit 8-DNA Replication and Protein Synthesis**

STANDARDS: STANDARDS

STATE: Pennsylvania SAS Keystone Anchors (2010-2014)

BIO.B.1.2 (Advanced)

BIO.B.1.2.1 Describe how the process of DNA replication results in the transmission and/or conservation of genetic information.

BIO.B.1.2.2 Explain the functional relationships between DNA, genes, (Advanced) alleles, and chromosomes and their roles in inheritance.

This Curriculum Map Unit has no Topics to display

## **Unit: Unit 9- Mendelian Genetics**

STANDARDS: STANDARDS

STATE: Pennsylvania SAS Keystone Anchors (2010-2014)

BIO.B.1.2 Explain how genetic information is inherited. (Advanced) BIO.B.2 (Advanced) Genetics Compare Mendelian and non-Mendelian patterns of BIO.B.2.1 (Advanced) \inheritance. BIO.B.2.1.1 Describe and/or predict observed patterns of inheritance (i.e., dominant, recessive, co-dominance, incomplete dominance, (Advanced) sex-linked, polygenic, and multiple alleles). BIO.B.2.3 Explain how genetic information is expressed. (Advanced)

**Topic: Monohybrid Crosses**Minutes for Topic: 172

**Topic: Practice Crosses**Minutes for Topic: 172

## Unit: Unit 10-Applied Genetics STANDARDS: STANDARDS

STATE: Pennsylvania SAS Keystone Anchors (2010-2014)

BIO.B.1.2 Explain how genetic information is inherited. (Advanced) BIO.B.2.1 Compare Mendelian and non-Mendelian patterns of (Advanced) \inheritance. BIO.B.2.1.1 Describe and/or predict observed patterns of inheritance (i.e., (Advanced) dominant, recessive, co-dominance, incomplete dominance, sex-linked, polygenic, and multiple alleles). BIO.B.3.1.3 Explain how genetic mutations may result in genotypic and phenotypic variations within a population. (Advanced)

**Topic: Mendel Exceptions**Minutes for Topic: 258

**Topic: Genetics Review**Minutes for Topic: 86

**Topic: Genetics Quest**Minutes for Topic: 86

Unit: Unit 11-Biotechnology

**Topic: genetic engineering**Minutes for Topic: 172

**Topic: gel electrophoresis** 

Minutes for Topic: 172

Unit: Unit 12-Keystone review  $\rightarrow$  Cell Energy, Parts of a Cell, Ecology

**Topic: Keystone Review-Ecology** 

Minutes for Topic: 172

Unit: Unit 13-Keystone review  $\rightarrow$  Evolution

**Topic: Evolution Review** Minutes for Topic: 172

**Unit: Unit 14- Classification and Animals** 

Timeline: 1 Weeks

**Topic: Classification** 

Minutes for Topic: 172

**Topic: Animals-Amphibian Anatomy and Life Cycles**Minutes for Topic: 258

## **Unit:**

This Curriculum Map Unit has no Topics to display