

# **PETERS TOWNSHIP SCHOOL DISTRICT**

## **CORE BODY OF KNOWLEDGE (CBK)**

### **BIOLOGY HONORS**

#### **GRADES 9 & 10**

For each of the sections that follow, students may be required to understand, apply, analyze, evaluate or create the particular concepts being taught.

#### **COURSE DESCRIPTION**

Biology Honors is offered as a first year course in biology at Peters Township High School. It is targeted at students who are entering the Honors track. These students typically take Biology Honors in 9th grade. Students in this course typically will take one or more Advanced Placement science courses as they proceed through high school.

The aim of the course is to engage students in the wonders of the living world. The lives of all students will be touched by biology every day and understanding the concepts of biology and their connections to our lives is more important than ever. The goal of Biology Honors is two-fold. First, the course gives students the framework of key biological concepts into which they can integrate the many new things that they learn and encounter throughout their lives. Second, the course should familiarize students with the scientific process. This course incorporates hands-on activities and labs when appropriate and is taught in a combination lecture-lab room, which is well equipped with instructional technology and lab equipment. This curriculum is aligned with both the Pennsylvania State Standards as well as the assessment anchors posted for the Keystone Exams.

#### **STUDY SKILLS**

- Thoroughly complete structured study guides while reading the text for each section.
- Daily review of class notes in preparation for class.
- Participate in class discussions; ask and answer questions relating to content.
- Application of content in the laboratory setting when appropriate.
- Complete online text activities and review in preparation for assessments.

#### **MAJOR UNIT THEMES:**

##### **1. BASIC BIOLOGICAL PRINCIPLES**

- Scientific method
- Major themes that link all forms of life
- Characteristics of living things
- Laboratory techniques

## **2. CHEMICAL BASIS OF LIFE**

- Structure of an atom
- Types of chemical bonds
- Functional groups
- Properties of water
- pH scale
- Macromolecules: carbohydrates, lipids, proteins, nucleic acids
- Enzymes
- Biochemical reactions

## **3. CELLULAR STRUCTURE AND FUNCTION**

- Cell theory
- Prokaryotic and eukaryotic cells
- Cell membranes and transport mechanisms
- Cell organelles: Structure and function
- Cell cycle and its regulation
- Mitosis in plants and animals

## **4. BIOENERGETICS (CELLULAR RESPIRATION AND PHOTOSYNTHESIS)**

- Overview of aerobic and anaerobic respiration
- Structure and function of ATP
- Mitochondrion structure and function
- Molecules and reaction involved in cellular respiration
- Chloroplast structure and function
- Light dependent and light independent reaction(Calvin cycle)
- C<sub>3</sub> , C<sub>4</sub>, and CAM plants
- Chemiosmosis in mitochondria and chloroplasts

## **5. HEREDITY**

- Meiosis and gametogenesis
- Eukaryotic chromosomes
- Mendel's experiments and Punnett squares
- Inheritance patterns
- Human genetics

## **6. MOLECULAR GENETICS**

- RNA and DNA structure and function
- DNA replication
- Protein synthesis
- Mutations
- Viral structure and replication
- Nucleic acid technology and applications
- Genetic engineering

## **7. EVOLUTIONARY BIOLOGY**

- Evolutionary scientists and their theories
- Natural selection
- Evolution of populations
- Evidence for evolution
- Mechanisms of evolution
- Early evolution of life
- Speciation

## **8. ORGANSIMS AND POPULATIONS**

- Diversity of Organisms
- Evolutionary patterns
- Survey of the diversity of life
- Phylogenetic classification
- Evolutionary relationships

## **9. ECOLOGY**

- Levels of organization
- Energy flow through an ecosystem
- Abiotic/biotic factors
- Cycling of matter
- Biodiversity
- Biomes
- Population dynamics
- Communities and ecosystems
- Global issues

## **MATERIALS** (and Supplemental materials used in course):

- Biology Concepts and Connections, 6th ed. by Campbell, Reece, Taylor, Simon, Dickey; Benjamin/Cummings Publishing, 2009.
- [www.mybiology.com](http://www.mybiology.com) (a subscription website with interactive units and science updates.)

Revised September 2014