

# **Canterbury High School**

Ottawa-Carleton District School Board

## **Science Department**

Semester I – 2010 / 11 – Course Outline

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**Course Title: Grade 12 Biology, university**

**Course Code: SBI4U**

**Prerequisite: SBI3U**

**Grade Level: 12**

**Credit Value: 1.0**

**Teacher:** Mr. Burgess, Mrs. Weir

**Course Overview:** 110 hours

This course provides students with the opportunity for in-depth study of the concepts and processes that occur in biological systems. Students will study theory and conduct investigations in the areas of biochemistry, metabolic processes, molecular genetics, homeostasis, and population dynamics. Emphasis will be placed on the achievement of detailed knowledge and the refinement of skills needed for further study in various branches of the life sciences and related fields.

### **Strands:**

Biochemistry

Metabolic Processes

Molecular Genetics

Homeostasis

Population Dynamics

### **Course Expectations**

#### **Biochemistry (Unit One):**

By the end of this course, students will:

- \* analyse technological applications of enzymes in some industrial processes, and evaluate technological advances in the field of cellular biology;
- \* investigate the chemical structures, functions, and chemical properties of biological molecules involved in some common cellular processes and biochemical reactions;
- \* demonstrate an understanding of the structures and functions of biological molecules, and the biochemical reactions required to maintain normal cellular function.

#### **Metabolic Processes (Unit Two):**

By the end of this course, students will:

- \* describe the structure and function of the macromolecules necessary for the normal metabolic functions of all living things, and the role of enzymes in maintaining normal metabolic functions;
- \* conduct laboratory investigations into the transformation of energy in the cell, including photosynthesis and cellular respiration, and into the chemical and physical properties of biological molecules;

\* explain ways in which knowledge of the metabolic processes of living systems can contribute to technological development and affect community processes and personal choices in everyday life.

### **Molecular Genetics (Unit Three):**

By the end of this course, students will:

- \* explain the concepts of gene and gene expression and the roles of DNA, RNA, and chromosomes in cellular metabolism, growth, and division, and demonstrate an awareness of the universality of the genetic code;
- \* explain, through laboratory activities and conceptual models, processes within the cell nucleus;
- \* describe some of the theoretical issues surrounding scientific research into genetic continuity; the general impact and philosophical implications of the knowledge gained; and some of the issues raised by related technological applications.

### **Homeostasis (Unit Four):**

By the end of this course, students will:

- \* describe and explain the physiological and biochemical mechanisms involved in the maintenance of homeostasis;
- \* analyse, through experiments and the use of models, the feedback mechanisms that maintain chemical and physical homeostasis in animal systems;
- \* analyse how environmental factors (physical, chemical, emotional, and microbial) and technological applications affect/contribute to the maintenance of homeostasis, and examine related societal issues.

### **Population Dynamics (Unit Five):**

By the end of this course, students will:

- \* analyse the components of population growth, and explain the factors that affect the growth of various populations of species;
- \* investigate, analyse, and evaluate populations, their interrelationships within ecosystems, and their effect on the sustainability of life on this planet;
- \* evaluate the carrying capacity of the Earth, and relate the carrying capacity to the growth of populations, their consumption of natural resources, and advances in technology.

### **Units of Study**

In biology, each strand covered will be a unit of study. The units of study are:

- Biochemistry
- Metabolic Processes
- Molecular Genetics
- Homeostasis
- Population Dynamics

See above section for more details.

## **Teaching Strategies**

teacher demonstrations  
laboratory experiments  
multimedia  
investigative research

small group work  
student-teacher conferencing  
written assignments  
hands-on activities

## **Assessment and Evaluation Strategies**

written tests  
lab reports  
observation (formal and informal)  
homework checks and quizzes  
summative assignment

rubrics  
group presentations  
discussion  
research projects  
exam

## **Evaluation Summary**

Knowledge and Understanding	30 %
Thinking, Inquiry & Problem Solving	10 %
Communication	10%
Making Connections	20 %
Summative Evaluation	10 %
Final Examination	20 %

Please refer to the achievement chart for science in the ministry curriculum documents for more information.

## **References**

[www.edu.gov.on.ca/eng/curriculum/secondary/science1112curr.pdf](http://www.edu.gov.on.ca/eng/curriculum/secondary/science1112curr.pdf)

## **Student Resources / Texts**

Biology 12, Nelson, replacement cost \$95 + tax and shipping.