

Biology 11 / Advanced Biology 11

General Curriculum Outcomes

STSE

1. Students will develop an understanding of the nature of science and technology, of the relationships between science and technology, and of the social and environmental contexts of science and technology.

Skills

2. Students will develop the skills required for scientific and technological inquiry, for solving problems, for communicating scientific ideas and results, for working collaboratively, and for making informed decisions.

Knowledge

3. Students will construct knowledge and understandings of concepts in life science, physical science, and Earth and space science, and apply these understandings to interpret, integrate, and extend their knowledge.

Attitudes

4. Students will be encouraged to develop attitudes that support the responsible acquisition and application of scientific and technological knowledge to the mutual benefit of self, society, and the environment.

Specific Curriculum Outcomes

Students in Advanced Biology 11 will be expected to achieve the outcomes for Biology 11 as well as those for Advanced Biology 11.

Students will be expected to

Matter and Energy for Life (30%) (Advanced, 25%)

THE CELL

- explain how cell theory has developed over time, referencing evidence, theories, and paradigms (114-2, 314-5, 114-1)
- perform experiments using specimens and microscopes and record the data collected (213-3, 214-3)

INTERACTION OF CELL STRUCTURES

- using appropriate equipment, observe and describe cell organelles (314-6, 213-8)
- compare and contrast different types of prokaryotic and eukaryotic cells (314-7)
- describe how organelles manage various cell processes (314-8)
- do investigations of cell size and display collected data, including variables and conclusions (212-7, 213-2, 213-5)

PHOTOSYNTHESIS AND RESPIRATION

- design, perform, and report on experiments that investigate the basic and critical processes of photosynthesis and respiration (214-11, 114-5)
- compare and contrast matter and energy transformations associated with the processes of photosynthesis and aerobic respiration (314-9)

Biodiversity (25%) (Advanced, 20%)**CLASSIFYING LIVING THINGS**

- describe and apply classification systems and nomenclatures used in the biological science (214-1)
- use organisms found in local or regional ecosystems to demonstrate an understanding of the fundamental principles of taxonomy (316-5)
- analyze and describe examples where scientific knowledge evolved, was enhanced, or revised as a result of new laws, theories, and/or technologies (115-7, 116-2)

DIVERSITY AMONG LIVING THINGS

- construct arguments to support a decision or judgment, using examples and evidence, recognizing various perspectives (118-6)
- describe the anatomy and physiology of a representative organism from each kingdom, including a representative virus (316-6)
- analyze and explain the life cycle of a representative organism from each kingdom, including a representative virus (313-1)

Maintaining Dynamic Equilibrium I (35%) (Advanced, 30%)**HOMEOSTASIS**

- explain the importance of nutrition and fitness to the maintenance of homeostasis, debating the merits of funding specific scientific or technological endeavours and not others (117-4, 317-3)
- explain, with specific examples, how behaviours such as tropisms, instinct, and learned, help to maintain homeostasis and identify multiple perspectives that influence a decision/issue (215-4, 317-8)

BODY SYSTEMS

Biology 11 requires that a minimum of two (2) of the following five body systems be investigated in detail—circulatory, respiratory, digestive, excretory, and immune systems.

- design and perform experiments, identifying specific variables, to investigate how body systems work based on scientific understandings (212-6, 116-4)
- analyze and report how natural and technological systems have developed and improved over time, including organ transplants (115-5, 116-7)
- explain how different plant and animal systems maintain homeostasis (317-1)
- identify and describe the role of chemicals, including elements, compounds, biochemicals, and water on the structure and function of various body systems (314-1, 314-2, 314-3)
- identify and predict the impact of viruses, diseases, and environmental factors on the homeostasis of an organism and propose alternate solutions (317-4, 317-6, 214-15)

Interactions among Living Things (10%) (Advanced, 5%)

BIOMES

- compare and interpret patterns of North America's biomes with another continent in terms of climate, vegetation, physical geography, and location (214-5, 318-7)

POPULATION DYNAMICS

- synthesize information from multiple sources to describe and explain factors that influence population growth and interactions within and between populations (215-3, 318-8, 319-9)
- propose courses of action on social, economic, and cultural issues related to Earth's carrying capacity and demands on natural resources, referencing the energy pyramid (116-7, 118-10, 318-10, 318-11)

Advanced Biology 11 Outcomes (Draft)

IN-DEPTH TREATMENT: CELLULAR BIOLOGY (COMPLETED WITHIN UNITS)

- identify chemical elements and compounds that are commonly found in living systems (314-1)
- identify and describe the structure and function of the important biochemical compounds, carbohydrates, proteins, and lipids (314-3)
- use library and electronic research tools to collect and synthesize relevant information on the features of the Canadian biome (213-6)
- work co-operatively with team members to develop and carry out a plan, and troubleshoot problems as they arise (215-6)
- carry out procedures controlling the major variables and adapting or extending procedures where required (213-2)
- compile and organize data, using appropriate formats and data treatments to facilitate interpretation of the data (213-5)
- describe how organelles manage various cell processes such as ingestion, digestion, transportation, and excretion (314-8)

IN-DEPTH TREATMENT: LITERATURE SEARCH AND REPORT ON MENTAL HEALTH (5%)

- collect information on how the brain functions with respect to the biology of mental health and mental illness compared with other diseases (AB-1)
- define mental health and mental illness, giving the causes and strategies to address them (AB-2)
- examine society's expectations about positive mental health and mental illness (AB-3)
- report on mental health and mental illness from a medical or societal perspective (AB-4)

INVESTIGATION: AN INDEPENDENT STUDY/EXPERIMENT (15%)

- design a plant problem- or project-based investigation and report on the findings (AB-5)