

Biology, Grade 11, College Preparation (SBI3C)

NOTES

1. All Ontario Ministry of Education curriculum documents with full course content information can be located at www.edu.gov.on.ca/eng/curriculum/secondary/
2. Detailed information on Ministry of Education assessment, evaluation, and reporting policy is provided in Ontario Schools, Kindergarten to Grade 12, Policy and Program Requirements (OS), 2011, located at www.edu.gov.on.ca/eng/document/policy/os/index.html

COURSE DETAILS

| | |
|-----------------------------|---|
| Program Area: | Science |
| Curriculum Leaders: | Ms. Muhammad-Gold; Ms. Likins |
| Course Title: | Biology, Grade 11, College Preparation (SBI3C) |
| Curriculum Document: | Ministry of Education. <i>The Ontario Curriculum Grades 11 and 12: Science</i> . Queen's Printer for Ontario, 2008. |
| Credit Value: | 1 |
| Teacher: | Mr. Dunbar, room 110W |
| Prerequisite: | Science Grade 10, Applied or Academic |
| Textbook: | <i>Nelson Biology 11</i> . Di Giuseppe <i>et al.</i> Toronto: Nelson, a Division of Thomson Canada Ltd., 2003. |
| Websites: | mr.dunbar.ca and tinyurl.com/sbi3c |

OVERALL GOALS

This course focuses on the processes that occur in biological systems. Students will learn concepts and theories as they conduct investigations in the areas of cellular biology, microbiology, genetics, the anatomy of mammals, and the structure of plants and their role in the natural environment. Emphasis will be placed on the practical application of concepts, and on the skills needed for further study in various branches of the life sciences and related fields.

OVERALL EXPECTATIONS

A *Scientific Investigation Skills and Career Exploration*

- A1 demonstrate scientific investigation skills (related to both inquiry and research) in the four areas of skills (initiating and planning, performing and recording, analysing and interpreting, and communicating);
- A2 identify and describe careers related to the fields of science under study, and describe the contributions of scientists, including Canadians, to those fields.

B *Cellular Biology*

- B1 evaluate the impact of environmental factors and medical technologies on certain cellular processes that occur in the human body;
- B2 investigate the structures and functions of cells, and the factors that influence cellular activity, using appropriate laboratory equipment and techniques;
- B3 demonstrate an understanding of the basic processes of cellular biology.

C *Microbiology*

- C1 assess the effects of microorganisms in the environment, and analyse ethical issues related to their use in biotechnology;
- C2 investigate the development and physical characteristics of microorganisms, using appropriate laboratory equipment and techniques;
- C3 demonstrate an understanding of the diversity of microorganisms and the relationships that exist between them.

D *Genetics*

- D1 evaluate some social, ethical, and environmental implications of genetic research and related technologies;
- D2 investigate the process of meiosis, and analyse data related to the laws of heredity;
- D3 demonstrate an understanding of the process of meiosis, and explain the role of genes in the transmission of hereditary characteristics.

E *Anatomy of Mammals*

- E1 analyse the social or economic impact of a technology used to treat systems in the human body, and the impact of lifestyle choices on human health;
- E2 investigate, through laboratory inquiry or computer simulation, the anatomy, physiology, and response mechanisms of mammals;
- E3 demonstrate an understanding of the structure, function, and interactions of the circulatory, digestive, and respiratory systems of mammals.

F *Plants in the Natural Environment*

- F1 analyse the roles of plants in ecosystems, and assess the impact of human activities on the balance of plants within those ecosystems;
- F2 investigate some of the factors that affect plant growth;
- F3 demonstrate an understanding of the structure and physiology of plants and their role in the natural environment.

ASSIGNMENTS

Evaluations in grade 11 college biology will cover all four achievement categories. Regular attendance and completion of all assignments will help you succeed in this course. In addition there will be many smaller assessments throughout the year to provide you with feedback about your progress.

Please note: evaluations are *subject to change*. This list is given to you to give you an idea of the kinds of activities and assignments you can expect to be evaluated on in this course.

| Unit | Timing |
|--|---|
| Scientific Investigation Skills and Career Exploration | Taught and evaluated throughout the course as part of the other units |
| Genetics | September ~ October |
| Cellular biology | November ~ December |
| Microbiology | January ~ February |
| Anatomy of Mammals | March ~ April |
| Plants in the Natural Environment | April ~ May |
| Culminating Activity | May ~ June |

EVALUATION PLAN

Each student is evaluated according to the four achievement categories: Knowledge & Understanding; Thinking & Investigation; Communication; and Application.

| | Knowledge & Understanding | Thinking & Investigation | Communication | Application |
|-------------------------------|---|--------------------------|---------------|-------------|
| Term (70%) | 20% | 30% | 20% | 30% |
| Final Evaluation (30%) | This evaluation is cumulative, containing material from all units and will evaluate all 4 achievement categories. | | | |

| Unit | Assignments | Achievement Categories | Due Date |
|---|---|------------------------|----------|
| A. Scientific Investigation Skills and Career Exploration | Taught and evaluated throughout the course as part of the other units | | |
| | Cells presentation | C | |
| | Mitosis/microscope lab | I | |
| B. Cellular biology | Food technology task | A | |
| | Unit test | K | |
| | pH lab | I | |
| | Bread mold lab (baking bread) | I; A | |
| C. Microbiology | Antibiotics assignment | C | |
| | Unit test or dichotomous key | K | |
| | Dissection | I; A | |
| | Digestive enzymes lab | I | |
| D. Anatomy of Mammals | Anatomy quizzes & test | K | |
| | Unit test or anatomy task | K; A | |
| | Reebop assignment (meiosis) | I; A | |
| | GATTACA/ethics presentation | C | |
| E. Genetics | GMO panel discussion | A | |
| | Virus creation | A | |
| | Take home assignment | K | |
| | Flower anatomy lab | I | |
| F. Plants in the Natural Environment | Cloning lab | I; A | |
| | Economic botany activity | A | |
| | Unit test | K | |
| Culminating Activity | Demonstrate mastery of the overall expectations of SBI3C | K; I; C; A | |

Note 1. K = knowledge and understand; I = thinking and investigation; C = communication; A = application

Note 2. To estimate when an assignment is due, please see the assignments table on page 3.

REPORTING

Four reports cards will be issued during the year. All reports will give a numeric grade to each student calculated according to the achievement categories. All reports are cumulative. The November, February and April report cards are snapshots of all course work until that time. They will be based on the most consistent level of achievement to that point in time.

LEARNING SKILLS

On each report card there are 6 learning skills that are assessed. These learning skills will be assessed, but will not be included when determining the student's grade. These are the four levels of the learning skills:

- N (level 1) = needs improvement (student rarely exhibits the skill criteria)
 S (level 2) = satisfactory (student sometimes exhibits the skill criteria)
 G (level 3) = good (student usually exhibit the skill criteria)
 E (level 4) = excellent (student always or almost always exhibits the skill criteria)

| LEARNING SKILL | The student... |
|-----------------------|--|
| Responsibility | accepts responsibility for own behaviour uses class time effectively completes and submits class work, homework, and assignments according to timelines fulfills responsibilities and commitments |
| Organization | brings required material to class keeps an organized and complete notebook is aware of and is prepared for quizzes/tests establishes priorities and manages time to achieve goals |
| Independent Work | completes class work/homework follows instructions with minimal supervision shows thought and revision pays attention in class and stays on task |
| Collaboration | does a fair share of work shows respect for all group members (listens actively, encourages others, considerate) shares ideas and resources with peers cooperates to complete task and works to achieve goal |
| Initiative | tries new techniques and approaches to learning shows interest and curiosity in learning demonstrates the capacity for innovation makes up missed work |
| Self-regulation | seeks extra help when appropriate assesses and reflects critically on own strengths, needs, and interests perseveres and makes an effort when responding to challenges sets own individual goals and monitors progress towards achieving them |

TEACHING, ASSESMENT AND EVALUATION STRATEGIES

A range of teaching, assessment and evaluation strategies will be used to address the needs of students' learning styles and allow students a variety of methods to demonstrate their achievement of the expectations.

Teaching Strategies

To facilitate the learning of the various concepts, a variety of teaching strategies will be used and might include:

Activity Based Strategies

Examples: practical laboratory work, oral presentations, field trips, simulations, activity centres

Cooperative Learning Strategies

Examples: Think-Pair-Share, Teams-Games-Tournament, Group Investigation

Arts Based Strategies

Examples: drawing and origami

Direct Instruction Strategies

Examples: Socratic dialogue, lecture, demonstration, conferencing, review, tutorial, textbook

Independent Learning Strategies

Examples: homework, independent reading/study, memorization, note making, reports

Inquiry/Research Models

Examples: inquiry process, research process, scientific process, writing process

Technology Applications

Examples: database application, internet websites and research, media presentation

Thinking Skills Strategies

Examples: brainstorming, classifying, concept mapping, concept attainment, concept formation, experimenting, expressing another point of view, graphing, issue-based analysis, lateral thinking, oral explanation, problem solving

Assessment

The primary purpose of assessment is to improve student learning. Assessment is ongoing, varied in nature and allows students to assess their own progress and determine next steps.

The following assessment strategies may be used at different times throughout the course: quizzes; practice tests; conferencing; practical skill checks; written assignments; self-assessment/peer-assessment; and reflective summary.

Evaluation

Evaluation is varied and is used to determine a student's achievement grade. The following evaluation strategies may be used at different times throughout the course: quizzes, tests, written lab reports, practical skill checks, written assignments, presentations, written exams

Cellular Biology

- Life processes are determined by the structures and functions of biochemical compounds, cell organelles, and body systems.
- Technological devices that support cellular functions and processes can be used to improve human health.
- Substances that are present in our everyday lives can affect cellular functions and processes in positive and negative ways.

Microbiology

- Groups of microorganisms have common characteristics, and these characteristics enable them to interact with other organisms in the environment
- Microorganisms can have both positive and negative effects on the environment.
- The technological use of microorganisms raises many ethical issues.

Genetics

- Genetic research and biotechnology have social, environmental, and ethical implications.
- Variability and diversity of living organisms result from the distribution of genetic materials during the process of meiosis.

Anatomy of Mammals

- Groups of organs with specific structures and functions work together as systems, which interact with other systems in the body.
- Technologies that are used to maintain human health have social and economic benefits and costs.
- Environmental factors, including natural factors and those resulting from human activity, can have a wide range of effects on human health.

Plants in the Natural Environment

- Plants have specialized structures with distinct functions that enable them to respond and adapt to their environment.
- Plants are critical to the survival of ecosystems.
- Humans affect the sustainability of ecosystems when they alter the balance of plants within those ecosystems.