



north vancouver

Distributed Learning School

Course Plan: Life Sciences 11

COURSE DESCRIPTION:

Science is an exciting and ever-changing field of study, which provides opportunities for us to improve our understanding of our natural world. The effect that science has on us can be seen daily. Organism reproduction to promote survival of the species, impact of current and circuits in electricity distribution, solar radiation's impact on Earth's organisms, and matter cycles and sustainability of systems are just a few of the problems being worked by scientists. Science extends into all human endeavors, from the circuits to the sustainability of systems. The science curriculum includes content from biology, chemistry, physics, and earth science and provides students with the opportunity to develop skills involving observation, experimentation, and problem solving techniques that every person needs to develop. The Life Sciences 11 curriculum is broken down into the following sub-categories:

- Applications of Science -this is the framework within which all science is taught
- Life Science -the study of reproduction
- Chemical Science -the study of elements and compounds in the periodic table
- Physical Science -the study of electric flow in circuits
- Earth Science -the study of components and interactions of the Earth's major spheres

For the complete Ministry curriculum Science document, go to:

<https://curriculum.gov.bc.ca/curriculum/science/11/life-sciences>

BIG IDEAS:

The Big Ideas consist of generalizations and principles, and the key concepts important in an area of learning. They reflect the "Understand" component of the Know-Do-Understand model of learning. The big ideas represent what students will understand at the completion of the curriculum for their grade. They are intended to endure beyond a single grade and contribute to future understanding.

BIG IDEAS

Life is a result of interactions at the molecular and cellular levels.

Evolution occurs at the population level.

Organisms are grouped based on common characteristics.

CORE COMPETENCIES:

A Core Competency is a skill that all learners need to have to be successful in all aspects of their life. There are 3 core competencies: Communication (Communicating & Collaborating), Thinking (Critical Thinking, Creative and Reflective Thinking), Personal (Personal Awareness and Responsibility, Social Awareness and Responsibility and Positive Personal and Cultural Identity).



COURSE EXPECTATIONS:

- The self-paced nature of this course requires that students manage their time effectively to complete the course by the deadline (typically a year from the date of registration). Successful students make a weekly schedule to plan out the completion of the course.
- Students must read all the information and attempt all activities in the course in order to be successful in the course.
- Students must take care that their communication with the teacher and with other students through email, Moodle message, or in person, is course related, clear and respectful.
- It should be clear from the assignment submissions that the student has personally engaged with the course material and submitted only work that is his or her own. Course work must be original. Communicate with the teacher if you would like to complete a project with a partner or group.
- The core of this course is content and research based. Therefore, students are encouraged to make use of other resources on the internet, but they must cite their sources. A variety of quality resources in the creation of your projects is a sign of academic depth, just make sure that you check the credibility of each source and acknowledge its use in your work.

LEARNING STANDARDS: Curricular Competencies

Using oral, written, visual, and digital texts, students are expected individually and collaboratively to be able to:

Questioning and predicting

- Demonstrate a sustained intellectual curiosity about a scientific topic or problem of personal, local, or global interest
- Make observations aimed at identifying their own questions, including increasingly abstract ones, about the natural world
- Formulate multiple hypotheses and predict multiple outcomes

Planning and conducting

- Collaboratively and individually plan, select, and use appropriate investigation methods, including field work and lab experiments, to collect reliable data (qualitative and quantitative)
- Assess risks and address ethical, cultural, and/or environmental issues associated with their proposed methods
- Use appropriate SI units and appropriate equipment, including digital technologies, to systematically and accurately collect and record data
- Apply the concepts of accuracy and precision to experimental procedures and data:
 - significant figures
 - uncertainty
 - scientific notation

Processing and analyzing data and information

- Experience and interpret the local environment
- Apply First Peoples perspectives and knowledge, other ways of knowing, and local knowledge as sources of information
- Seek and analyze patterns, trends, and connections in data, including describing relationships between variables, performing calculations, and identifying inconsistencies
- Construct, analyze, and interpret graphs, models, and/or diagrams
- Use knowledge of scientific concepts to draw conclusions that are consistent with evidence
- Analyze cause-and-effect relationships

Evaluating

- Evaluate their methods and experimental conditions, including identifying sources of error or uncertainty, confounding variables, and possible alternative explanations and conclusions
- Describe specific ways to improve their investigation methods and the quality of their data
- Evaluate the validity and limitations of a model or analogy in relation to the phenomenon modelled
- Demonstrate an awareness of assumptions, question information given, and identify bias in their own work and in primary and secondary sources
- Consider the changes in knowledge over time as tools and technologies have developed
- Connect scientific explorations to careers in science
- Exercise a healthy, informed skepticism and use scientific knowledge and findings to form their own investigations to evaluate claims in primary and secondary sources
- Consider social, ethical, and environmental implications of the findings from their own and others' investigations

- Critically analyze the validity of information in primary and secondary sources and evaluate the approaches used to solve problems
- Assess risks in the context of personal safety and social responsibility

Applying and innovating

- Contribute to care for self, others, community, and world through individual or collaborative approaches
- Cooperatively design projects with local and/or global connections and applications
- Contribute to finding solutions to problems at a local and/or global level through inquiry
- Implement multiple strategies to solve problems in real-life, applied, and conceptual situations
- Consider the role of scientists in innovation

Communicating

- Formulate physical or mental theoretical models to describe a phenomenon
- Communicate scientific ideas and information, and perhaps a suggested course of action, for a specific purpose and audience, constructing evidence-based arguments and using appropriate scientific language, conventions, and representations
- Express and reflect on a variety of experiences, perspectives, and worldviews through place

Unit 1 of Module 1 (*Biology is the scientific study of life and living organisms*) will cover the following Learning Outcomes (Curricular Competencies)

- Make observations aimed at identifying their own questions, including increasingly abstract ones, about the natural world
- Formulate multiple hypotheses and predict multiple outcomes
- Collaboratively and individually plan, select, and use appropriate investigation methods, including field work and lab experiments, to collect reliable data (qualitative and quantitative)
- Seek and analyze patterns, trends, and connections in data, including describing relationships between variables, performing calculations, and identifying inconsistencies
- Construct, analyze, and interpret graphs, models, and/or diagrams
- Use knowledge of scientific concepts to draw conclusions that are consistent with evidence
- Analyze cause-and-effect relationships

These are 7 of the 31 learning outcomes in the course curriculum, which comprises 23% of the course Learning Outcomes/Activities. (7/31 = 23%)

LEARNING STANDARDS: Course Content

MODULE OVERVIEWS AND LEARNING ACTIVITIES:

Module 1: Characteristics of Living Things

This module encompasses three course units: Biology is the scientific study of life and living organisms; cells are the building blocks of life; and, viruses outnumber all other life forms on Earth

Big Idea: Life is a result of interactions at the molecular and cellular levels.

Core Competency Focus: Communication, Personal and Social, Thinking

Essential Questions: How do you know something is alive?

First Peoples Principle of Learning: First Peoples understandings of interrelationships between organisms

Module Overview: Students will focus on learning about the life processes performed at the cellular level. They will understand the characteristics defining living organisms, different arrangements and types of cells making up all organisms, cellular processes, structures of viruses and bacteria, immunity, and processes that contribute to an epidemic or pandemic.

Module 2: Evolution and Taxonomy

This module encompasses two course units: Much of our research in modern biology is based on evolution; parts of studying life is categorizing all the living organisms.

Big Idea: Evolution occurs at the population level.

Core Competency Focus: Communication, Personal and Social, Thinking

Essential Questions: How are new organisms created?

First Peoples Principle of Learning: First Peoples understandings of interrelationships between organisms

Module Overview: Students will explore microevolutionary and macroevolutionary processes; the various forms of evidence supporting evolution; and the use of artificial selection and genetic modifications for the betterment of humanity, along with the ethics surrounding the use of these technologies. Students will also investigate taxonomic principles of classification; the binomial nomenclature and the evidence for phylogenetic relationships between taxa.

Module 3: Taxonomy

This module encompasses three course units: A branch of biology that focuses on plants is 'botany'; some living organisms are more simple than others; advanced organisms generally have more complex features.

Big Idea: Organisms are grouped based on common characteristics

Core Competency Focus: Communication, Personal and Social, Thinking

Essential Question: Where do we belong?

First Peoples Principle of Learning: First Peoples understandings of interrelationships between organisms

Module Overview: Students will explore trends in complexity among various life forms and analyze patterns of similarities and differences between domains and kingdoms

STUDENT LEARNING ACTIVITIES AND STRATEGIES:

- Course readings
- Unit learning guides
- Practice quizzes
- Interactive videos/activities
- Communicate information and results (e.g., graphs, diagrams, models, formulae)
- Projects
- Unit exams, midterm exam, final exam

ASSESSMENT:

Life Sciences11 has been re-structured to a holistic, letter grade-based system. Therefore, assignments will be marked on holistic rubrics, without the use of percentages. The course will include formative assessment opportunities where students will receive teacher feedback and also have the opportunity to incorporate self-reflection and self-assessment tools. The formative tasks are designed to help students correct, hone and improve on their work before being assessed. After each submission of work, the teacher will provide feedback based on criteria and standards that can then be incorporated into the final summative assignment. Summative assessment will take place after formative assessments and be used on final performance tasks and tests throughout each unit. This course will be using specific rubrics for different tasks and students will have access to these rubrics before submission of the assignments. The North Vancouver Assessment and Evaluation Handbook will be used as a guideline for assessment.- <http://nv44curriculumhub.ca/assessment/>

Formative may include:

- Learning guides and self-assessment (checking for understanding of lessons)
- Practice quizzes (checking for completion and understanding of lessons)

Summative may include:

- Projects – (written feedback, rubric assessment)
- Unit Exams, Midterm Exam and Final Exam

EVALUATION:

Based on performance standards and criteria as outlined in each assignment:

Evaluation	Percentage of Final Mark
Substantive Student Course Activity	5%
Formative assessments	20%
<i>Learning Guides</i>	
<i>Practice Quizzes</i>	
Summative assessments	75%
<i>Unit Tests</i>	
<i>Projects</i>	
<i>Final Exam</i>	
Course Total	100%

RESOURCES:

There are some required texts for this course, which will be available either online or can be signed out from the teacher. Resources for readings and assignments are listed in the instructions of each lesson. These include websites maintained by government and non-profit organizations, as well as individuals. Students need access to a computer with Internet capabilities. Throughout the course, students will have the choice to engage with a variety of applications and online digital tools. The DL Centre is available for students who do not have computer access at home or who would like to meet with the teacher for academic and tech support.