



North Vancouver Online Learning

Course Plan: Science for Citizens 11

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COURSE DESCRIPTION:

Science for Citizens 11 prepares students for science in the work place and focuses on real-world, practical applications of science. Students build skills around three big ideas: scientific processes and knowledge impact our daily lives and decisions; how scientific technology and knowledge is used in the workplace; and an understanding of science that enables us, as citizens, to respond and adapt to change on a local and global level. Students are guided in learning to think critically, creatively, and reflectively; and to be respectful of a range of perspectives and worldviews. For the complete Ministry curriculum document for **Science for Citizens 11** please go to <https://curriculum.gov.bc.ca/curriculum/science/11/science-for-citizens>

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.

Scientific processes and knowledge inform our decisions and impact our daily lives.

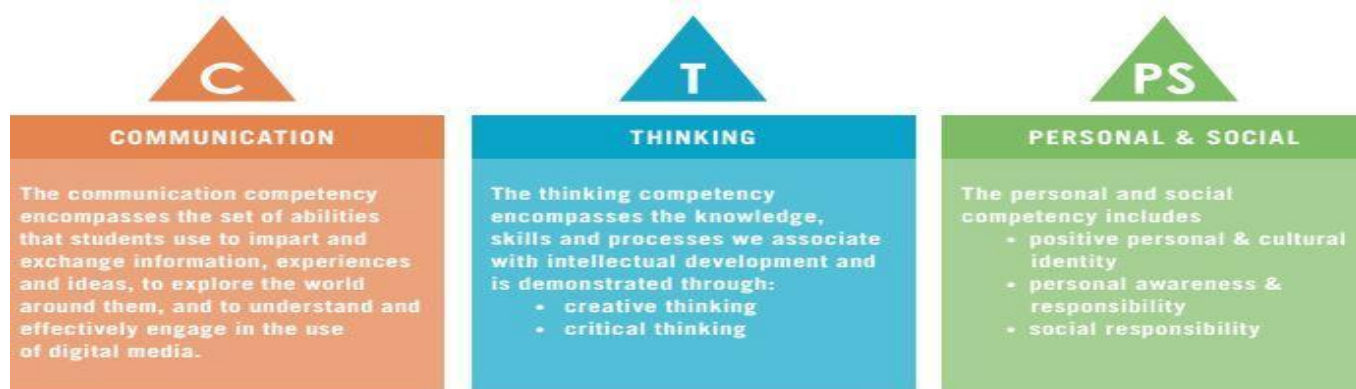
Scientific knowledge can be used to develop procedures, techniques, and technologies that have implications for **places of employment**.

Scientific understanding enables humans to **respond and adapt to changes** locally and globally.

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, Brightspace message, or in person, is course related, clear and respectful.
- Students must take care that their work is their own and not plagiarized from any other source. This includes, previous work submitted for another course, other people's assignments, Web or other resources etc.

LEARNING STANDARDS: Curricular Competencies

Students are expected to be able to do the following:

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

- Use local knowledge to 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
- Co-operatively 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

Introduction Unit - Assignment: First Peoples Principles of Learning will cover the following Learning Outcomes (Curricular Competencies)

- Use knowledge of scientific concepts to draw conclusions that are consistent with evidence
- Apply First Peoples perspectives and knowledge, other ways of knowing, and local knowledge as sources of information

These are 2 of the 33 learning outcomes in the course curriculum, which comprises 6% of the course Learning Outcomes/Activities. (2/33= 6%)

LEARNING STANDARDS: Course Content

Students are expected to know the following:

- evidence-based decision making through science
- personal and public health practices, including First Peoples traditional health and healing practices
- impact of technologies
- personal safety and awareness
- workplace safety
- certifications
- practical applications of science in the workplace
- impacts of technology in the workplace
- applications of materials science
- beneficial scientific innovations
- natural hazards and responses
- human impact on Earth's systems: natural resources and effects of climate change
- actions and decisions affecting the local and global environment, including those of First Peoples

UNIT OVERVIEWS AND LEARNING ACTIVITIES:

Unit 1 – Health and Nutrition

Students will be learning about **personal and public health practices** as it relates to nutrition and lifestyle choices.

Big Idea: Scientific processes and knowledge inform our decisions and impact our daily lives.

Core Competency: *Thinking*

First Peoples Principle of Learning: Learning involves generational roles and responsibilities and learning is embedded in memory, history and story

Unit 2 – Science at Home

Students will examine the science of maintaining a home. Student look will at hazards of chemicals in the home as well as the development of home technologies.

Big Idea: Scientific processes and knowledge inform our decisions and impact our daily lives.

Core Competency: *Thinking*

First Peoples Principle of Learning: Learning is holistic, reflexive, reflective, experiential, and relational (focused on connectedness, on reciprocal relationships and a sense of place).

Unit 3 – Science at Work

Students will examine the science of workplace. Student look will at hazards of chemicals in the workplace as well as the development of workplace technologies including waste and disposal.

Big Idea: Scientific knowledge can be used to develop procedures, techniques, and technologies that have implications for **places of employment**

Core Competency: *Thinking*

First Peoples Principle of Learning: Learning involves generational roles and responsibilities and learning is embedded in memory, history and story.

Unit 4 - Weather and Climate

Students will develop an understanding of the difference between weather and climate and will examine the hazards associated with extreme weather.

Big Idea: Scientific understanding enables humans to **respond and adapt to changes** locally and globally.

Core Competency: *Thinking*

First Peoples Principle of Learning: Learning is holistic, reflexive, reflective, experiential, and relational (focused on connectedness, on reciprocal relationships and a sense of place).

Unit 5 – Sustainability

Students will develop an understanding of sustainability by looking at changes that will impact our future and will examine energy generation and needs, and the sustainability of resources.

Big Idea: Scientific understanding enables humans to **respond and adapt to changes** locally and globally.

Core Competency: *Thinking*

First Peoples Principle of Learning: Learning is holistic, reflexive, reflective, experiential, and relational (focused on connectedness, on reciprocal relationships and a sense of place).

Unit 6 – Forensic Science

Students will develop an understanding that there is a lot of science in solving crime. Students will look at crime scene investigation including: estimating the time of death, hair and fibre analysis, fingerprinting, DNA and identity.

Big Idea: Scientific knowledge can be used to develop procedures, techniques, and technologies that have implications for **places of employment**.

Core Competency: *Thinking*

First Peoples Principle of Learning: Learning is holistic, reflexive, reflective, experiential, and relational (focused on connectedness, on reciprocal relationships and a sense of place).

STUDENT LEARNING ACTIVITIES AND STRATEGIES:

- Course readings
- Quizzes
- Interactive activities
- Reflective writing
- Assignments may include:
 - Essay/multi-paragraph writing
 - Paragraph writing
 - Verbal speeches/marketing ideas
 - Projects using a variety of technology
 - Podcasts, digital recordings
 - Presentations using a variety of tools (PowerPoint, Glogs, Prezi etc)

ASSESSMENT:

The course will include many 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 full submission of work, the teacher will provide feedback based on criteria and performance standards that can then be incorporated into the final summative assignment. Summative assessment will take place after extensive formative assessment 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 Curriculum Hub Principles of Assessment - <http://nvsc44curriculumhub.ca/assessment/>

Formative:

- Teacher – student conferences (online or in person) to discuss drafts and progress
- Online quizzes to check for completion and understanding of lessons.

Summative:

- Assignments and projects – written feedback, rubric assessment and grade
- Final performance task – written feedback, rubric assessment and grade
- Tests to check for comprehension, analysis, and synthesis of course learning

EVALUATION:

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

Evaluation	Percentage of Final Mark
Learning Guides	30
Unit Projects	50
Unit Tests	20
<i>Course Total</i>	100

RESOURCES:

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 OL 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.