North Vancouver Online Learning

Course Plan: Science 8

COURSE DESCRIPTION:

Science is an exciting and ever-changing field of study, which provides opportunities for us to better understand our natural world. The effect that science has on us can be seen daily. Microorganisms in nutrient cycling, viruses and bacteria in industrial and agriculture production, epidemics, and antibiotics resistances are just a few of the problems being worked by scientists. Science extends into all human endeavors, from the cameras to the control of diseases. 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 Science 8 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 life and cells
- Chemical Science - the study of matter properties and chemical theories, and components of atoms
- Physical Science - the study of the properties of light and its behaviours
- Earth Science - the study of components of the Earth's crust and events

For the complete Ministry curriculum Science document, go to:
https://curriculum.gov.bc.ca/sites/curriculum.gov.bc.ca/files/pdf/science_learning_standards_elab.pdf

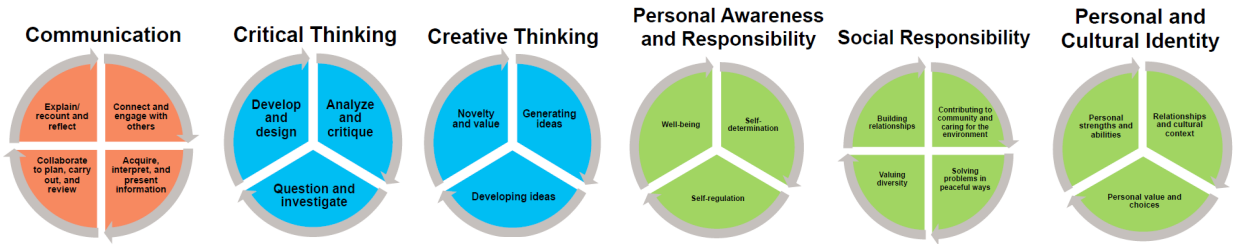
BIG IDEAS:

Big Ideas are the key understandings that students will achieve by the end of the course. These Big Ideas cover the following concepts: Cellular Processes, Behaviour of Matter, Energy Transfer, and Earth's Geological Processes. Students will explore and understand the following Big Ideas throughout the Science course:

Life processes are performed at the cellular level.	**The behaviour of matter can be explained by the kinetic molecular theory and atomic theory.**	**Energy can be transferred as both a particle and a wave.**	**The theory of plate tectonics is the unifying theory that explains Earth's geological processes.**

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 6 core competencies: Communication, Critical Thinking, Creative Thinking, Personal Awareness and Responsibility, Social Responsibility and Personal and Cultural Identity. Throughout the Science course, students will focus on one of these competencies in each unit.



COURSE EXPECTATIONS:

- The self-paced nature of the course requires that students manage their time effectively to complete the course by the deadline (June 1st or as determined by program requirements). Successful students engage in coursework at least an hour each day.

- Students must attempt all activities in the course to receive a passing grade, including quizzes, readings, research, reflections, and the documentation of learning in their course.

- Students should take care that their communication with the teacher and with other students, through email, or Moodle message, is course related, clear, and respectful in tone.

- 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. Coursework 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

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 interest
- Make observations aimed at identifying their own questions about the natural world
- Identify a question to answer or a problem to solve through scientific inquiry
- Formulate alternative "If…then…" hypotheses based on their questions
- Make predictions about the findings of their inquiry

Planning and conducting

- Collaboratively plan a range of investigation types, including field work and experiments, to answer their questions or solve problems they have identified
- Measure and control variables (dependent and independent) through fair tests
- Observe, measure, and record data (**qualitative and quantitative**), using equipment, including digital technologies, with **accuracy** and **precision**
- Use appropriate SI units and perform simple unit conversions
- Ensure that safety and ethical guidelines are followed in their investigations

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
- Construct and use a range of methods to represent patterns or relationships in data, including tables, graphs, keys, models, and digital technologies as appropriate
- Seek patterns and connections in data from their own investigations and secondary sources
- Use scientific understandings to identify relationships and draw conclusions

Evaluating

- Reflect on their investigation methods, including the adequacy of controls on variables (dependent and independent) and the quality of the data collected
- Identify possible sources of error and suggest improvements to their investigation methods
- Demonstrate an awareness of assumptions and bias in their own work and secondary sources
- Demonstrate an understanding and appreciation of evidence (qualitative and quantitative)
- Exercise a healthy, informed skepticism and use scientific knowledge and findings from their own investigations to evaluate claims in secondary sources
- Consider social, ethical, and environmental implications of the findings from their own and others' investigations

Applying and innovating

- Contribute to care for self, others, community, and world through personal or collaborative approaches
- Cooperatively design projects
- Transfer and apply learning to new situations
- Generate and introduce new or refined ideas when problem solving

Communicating

- Communicate ideas, findings, and solutions to problems, using scientific language, representations, and digital technologies as appropriate
  Express and reflect on a variety of experiences and perspectives of place

LEARNING STANDARDS: Course Content

Students are expected to know the following:

- characteristics of life
- cell theory and types of cells
- photosynthesis and cellular respiration
- the relationship of microorganisms with living things:
  - basic functions of the immune system
  - vaccination and antibiotics
  - impacts of epidemics and pandemics on human populations
- kinetic molecular theory (KMT)
- atomic theory and models
- protons, neutrons, and quarks
- electrons and leptons
- types and effects of electromagnetic radiation
- light:
  - properties
  - behaviours
  - ways of sensing
- plate tectonic movement
- major geological events of local significance
- First Peoples knowledge of:
  - local geological formations
  - significant local geological events
- layers of Earth

UNIT OVERVIEWS AND LEARNING ACTIVITIES:

Unit 1: Life Science

Big Idea:
Life Processes are performed at the cellular level.
Core Competency Focus:
Personal and Social
Essential Questions:
How do we know if something is alive (observable externally and microscopically)?
First Peoples Principle of Learning:
Learning involves recognizing the consequences of one's actions

Unit Overview:
The Life Science Unit 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. Performance tasks will include creating a presentation about how the decision to vaccinate or not vaccinate, as well as antibiotics use influence society, and how our understanding of cells influences our awareness the spread of disease outbreak.

By communicating and reflecting on their understanding of cell's life processes, students will be aware of their actions on factors influencing epidemic and pandemic events.

Unit 2: Chemical Science

Big Idea:
The behaviour of matter can be explained by the kinetic molecular theory and the atomic theory.
Core Competency Focus:
Communication
Essential Questions:
How do we measure changes in behaviour?
First Peoples Principle of Learning:
Learning involves patience and time.

Unit Overview:
The Chemical Science unit will focus on the understanding of Kinetic Molecular Theory, properties of matter, atomic theory and building blocks of atoms. Students will understand the particles of matter and how the particles interact in predictable ways. Performance tasks will include creating a graphic of Kinetic Molecular Theory and creating a concept matter to classify matter. By creating and communicating on their understanding of Kinetic Molecular Theory and matter, students will be aware of how changes we can predict matter behaviour.

Unit 3: Physical Science

Big Idea:
Energy can be transferred as both a particle and a wave.
Core Competency Focus:
(Creative) Thinking
Essential Question:
How are energy and matter related?
First Peoples Principle of Learning:
Learning involves patience and time.

Unit Overview:
The Physical Science unit will focus on the understanding of light as a type of energy, as well as the different properties of light. Students will understand how light energy could travel via different mediums and object and the resulting effect on image. Students will also explore the components of their eyes and how it contributes to their sight. Performance tasks will include creating a magnifying periscope and creating a pinhole camera to manipulate images. By thinking creatively, students will build their understanding of energy transfer.

Unit 4: Earth Science

Big Idea:
The theory of plate tectonics is the unifying theory that explains Earth's geological processes.
Core Competency Focus:
(Critical) Thinking
Essential Questions:
How can we predict and understand changes?

First Peoples Principle of Learning:
Learning involves patience and time

Unit Overview:
The Earth Science unit will focus on the understanding of Earth's layer, plate tectonics and interactions, and its influences on the Earth's geological processes. Students will understand how historical events occurred as a result of the interaction of Earth's layers and plate movements. Performance tasks will include creating an educational game focusing on the understanding of plate tectonics and creating a world map of hotspots of volcanic and earthquake activities.

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:

Science 8 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.

Formative:
- Learning guides and self-assessment (checking for understanding of lessons)
- practice quizzes (checking for completion and understanding of lessons)

Summative:
- 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
Activation Assignment 20%	
Formative Assessment:	20%
Learning Guides 10%	
Practice Quizzes 10%	
Summative Assessment:	80%
Unit Tests/Exams 40%	
Projects 20%	
Final Exam 20%	
Course Total	100%

RESOURCES:

There is no required textbook for this course. Students will access the course material in their Moodle website. Students need access to a computer with Internet capabilities. Students will also need to evaluate and research on additional resources for their projects. Throughout the course, students will have the choice to engage with a variety of applications and online digital tools/activities. 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.