



SUBJECT: Science 9

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COURSE OUTLINE

BIG IDEAS

Cells are derived from cells	The electron arrangement of atoms impacts their chemical nature	Electric current is the flow of electric charge	The biosphere, geosphere, hydrosphere, and atmosphere are interconnected, as matter cycles and energy flows through them
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CURRICULAR COMPETENCIES: *Students are expected to be able to do the following*

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, including increasingly complex 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 and those of others
- Select and use appropriate equipment, including digital technologies, to systematically and accurately collect and record data
- 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
- Seek and analyze patterns, trends, and connections in data, including describing relationships between variables (dependent and independent) and identifying inconsistencies
- Construct, analyze and interpret graphs (including interpolation and extrapolation), 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 the 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 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 and to evaluate claims in secondary sources
- Consider social, ethical, and environmental implications of the findings from scientific investigations
- Critically analyze the validity of information in secondary sources and evaluate the approaches used to solve problems

Applying and innovating

- Contribute to care for self, others, community, and world through individual or collaborative approaches
- Transfer and apply learning to new situations
- Generate and introduce new or refined ideas when problem solving
- Contribute to finding solutions to problems at a local and/or global level through inquiry
- Consider the role of scientists in innovation

Communicating

- Formulate physical or mental theoretical models to describe a phenomenon
- Communicate scientific ideas, claims, 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](#)

Content Knowledge – students are expected to understand the following

ASEXUAL REPRODUCTION:

- mitosis
- the process through which pre-existing cells make two identical copies of themselves
- different forms of asexual reproduction: fission, budding, cloning, spores, grafting

SEXUAL REPRODUCTION:

- meiosis
- the process through which sex cells (eggs and sperm) are formed by the dividing of a parent cell twice, resulting in four daughter cells
- human sexual reproduction
- the result of humans having two parents is that offspring are not genetically identical to either parent

ELEMENT PROPERTIES AS ORGANIZED IN THE PERIODIC TABLE:

- The periodic table groups elements according to their atomic number and properties (e.g., atomic size, metals/non-metals/semi-metals, chemical families, diatomic elements).
- The arrangement of electrons determines the compounds formed by elements
- ionic and covalent
- names and formulas

CIRCUITS MUST BE COMPLETE FOR ELECTRONS TO FLOW

- basic components include power source, load/resistor (lightbulbs, etc.), conductor and switch
- types of circuits include series, parallel, short circuits
- current flow in a circuit: alternating current (AC) and direct current (DC)

VOLTAGE, CURRENT, AND RESISTANCE

voltage, current, and resistance are related:

- Ohm's Law ($V=IR$)
- relative dangers of current and voltage

EFFECTS OF SOLAR RADIATION

- solar radiation provides the energy required for most life on Earth, and is the root cause of wind and ocean currents, which distribute energy and nutrients around the planet, as well as the energy sources for the water cycle on the cycling of matter and energy

MATTER CYCLES WITHIN BIOTIC AND ABIOTIC COMPONENTS OF ECOSYSTEMS

- e.g., water, nitrogen, carbon, phosphorous, etc.
- human impacts on sources and sinks (e.g., climate change, deforestation, agriculture, etc.)
- bioaccumulation and biomagnification

SUSTAINABILITY OF SYSTEMS

- a systems approach to sustainability sees all matter and energy as interconnected and existing in dynamic equilibrium (e.g., carbon as a key factor in climate change, greenhouse effect, water cycle, etc.)
- First Peoples knowledge of interconnectedness
- everything is connected, from local to global; First Peoples perspectives on interconnectedness and sustainability

POLICIES AND PROCEDURES:

1) CELL PHONES IN CLASS

Students are expected to adhere to the no-phones policy established by the BC Ministry of Education. As such, if a student is struggling to manage their own behaviours with their phones, parents and counsellors may be contacted to help support the student in establishing good habits.

2) PREPARATION FOR CLASS

It is the student's responsibility to arrive for each class **on time** with their notebook, pencils, calculator, and textbook. **Good work habits**, effort, regular attendance, and completion of assignments contribute to successful achievement.

3) ABSENCES

Students should check in during tutorial time if they were absent from class. This allows the teacher to prioritize what needs to be done to catch up, and potentially, which things can be skipped. If possible, checking in ahead of time is best to prevent getting behind.

- a. Students absent for illness, medical appointments, and other emergencies **must** contact their teacher **on the day they return to school** to submit overdue assignments, schedule missed assessments, and to receive missed work.
- b. Students absent for school related activities (ex. field trips, work experience, sports trips, etc.), **must** inform their teacher of this absence **well in advance** of the activity, in order to receive specific instructions on work that will be missed and the rescheduling of missed assessments.
- c. Students absent for any other reason, including family vacations, are considered **unexcused**. Any work or assessments missed for these absences must be made up.

Students are encouraged to make use of tutorial time if they need help making sense of concepts, completing assignments, or just to get some extra practice. Retests will only be granted if students have already attended **3 tutorial sessions in a row prior to the re-write.**