

Chemistry 11

Foundational Outcomes

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EECD has made suggestions for prioritizing outcomes to assist teachers as they support student learning. Teachers will need to make their professional decisions based on the needs of their students.

The Foundational Outcomes identified in this document represent outcomes determined to be relevant for future learning in the discipline. Decisions about foundational outcomes were made in consultation with teachers, science specialists and post-secondary institution expectations. The foundational outcomes are meant to guide teachers in making decisions about creating learning experiences that will prepare and engage their learners in a responsive way. However, a teacher's professional judgment remains the most crucial factor for responding effectively to the needs of learners.

It might be relevant for teachers to review or to seek out learning outcomes from an earlier curriculum or grade level in order to support learners moving forward with current curriculum. Sometimes, however, current curricular learnings do not directly rely on learning from the previous year and current curriculum can be engaged in without additional review.

The learning environment (face-to-face, blended, online) will continue to be an important factor that will impact the types of learning experiences with which learners are able to engage. While learning science in a hands-on, experimental way is preferred, should laboratory experiments not be possible due to public health concerns, teachers are encouraged to offer online experiment simulations, to record scientific phenomena to discuss, notice, observe and unpack with learners, to support simple, safe experiments that could be done at home, to provide authentic data that can be analysed etc...

Integrated, project-based learning and inquiry-based learning (especially in areas that connect STSE) allow for learner choice and flexible pacing which is particularly effective for students to not only learn new concepts but also for demonstrating their learning.

It is suggested that the focus for science in grades 9-12 be on using the foundational outcomes to focus on foundational understandings for future learning, encouraging cross-cutting scientific themes and application of learning. Weighting for course modules should be reflective of the amount of time spent exploring the outcomes in the module.

Unit: Stoichiometry

Subtopic: THE MOLE AND MOLAR MASS

- define molar mass and perform mole-mass inter-conversions for pure substances (323-1)
- explain how a major scientific milestone, the mole, changed chemistry (115-3)

Subtopic: CALCULATIONS AND CHEMICAL EQUATIONS

- identify mole ratios of reactants and products from balanced chemical equations (323-10)

- perform stoichiometric calculations related to chemical equations (323-11)

Subtopic: APPLICATIONS OF STOICHIOMETRY

- identify various stoichiometric applications (323-12)
- predict how the yield of a particular chemical process can be maximized (323-13)

Unit: From Structures to Properties

Subtopic: PROPERTIES OF IONIC AND MOLECULAR COMPOUNDS AND METALLIC SUBSTANCES

- identify and describe the properties of ionic and molecular compounds and metallic substances (321-7)

Subtopic: BONDING

- illustrate and explain the formation of ionic, covalent, and metallic bonds (321-4)

Subtopic: STRUCTURAL MODELS OF BONDING

- explain the structural model of a substance in terms of the various bonds that define it (321-11)

Subtopic: BOND ENERGIES

- identify limitations of categorizing bond types based on differences in electronegativity between the elements and compounds (214-2)
- describe how the different types of bonds account for the properties of ionic and molecular compounds and metallic substances (321-8)

Subtopic: POLAR AND PURE COVALENT BONDING

- illustrate and explain hydrogen bonds and van der Waals' forces (321-5)

Unit: Organic Chemistry

Subtopic: SO MANY COMPOUNDS

- explain the large number and diversity of organic compounds with reference to the unique nature of the carbon atom (319-4)

Subtopic: CLASSIFYING ORGANIC COMPOUNDS

- classify various organic compounds by determining to which families they belong, based on their names or structures (319-7)

Subtopic: NAMING AND WRITING ORGANIC COMPOUNDS

- write the formula and provide the IUPAC name for a variety of organic compounds (319-5)

Subtopic: ISOMERS IN ORGANIC CHEMISTRY

- define isomers and illustrate the structural formulas for a variety of organic isomers (319-6)

Subtopic: WRITING AND BALANCING CHEMICAL EQUATIONS

- write and balance chemical equations to predict the reactions of selected organic compounds (319-8)

Subtopic: POLYMERIZATION

- describe processes of polymerization and identify some important natural and synthetic polymers (319-9)

Note: *If teachers need to eliminate parts of a unit, the unit that has aspects with the least impact on future concept-building in the study of Chemistry is the Organic Chemistry unit.*

For Chemistry 12, teachers should ensure students have a solid grasp of stoichiometry and the basics of bonding prior to engaging with the chemistry 12 concepts.