**Area of Learning: SCIENCE — Chemistry Grade 11**

**BIG IDEAS**

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Atoms and molecules** are building blocks of matter. |  | **Organic chemistry** and its applications have significant implications for human health, society, and the environment. |  | The **mole** is a quantity used to make atoms and molecules measurable. |  | Matter and energy are conserved in **chemical reactions**. |  | **Solubility** within a solution is determined by the nature of the solute and the solvent. |

**Learning Standards**

|  |  |
| --- | --- |
| **Curricular Competencies** | **Content** |
| *Students are expected to be able to do the following:*Questioning and predicting* **QPCH1** Demonstrate a sustained intellectual curiosity about a scientific topic or problem of personal, local, or global interest
* **QPCH3** Make observations aimed at identifying their own questions, including increasingly abstract ones, about the natural world
* **QPCH2** Formulate multiple hypotheses and predict multiple outcomes

Planning and conducting* **PCCH3** Collaboratively and individually plan, select, and use appropriate investigation methods, including field work and lab experiments, to collect reliable data (qualitative and quantitative)
* **PCCH2** Assess risks and address ethical, cultural, and/or environmental issues associated with their proposed methods
* **PCCH4** Use appropriate SI units and appropriate equipment, including digital technologies, to systematically and accurately collect and record data
* **PCCH1** Apply the concepts of accuracy and precision to experimental procedures and data:
	+ significant figures
	+ uncertainty
	+ scientific notation

Processing and analyzing data and information* **PDCH4** Experience and interpret the local environment
* **PDCH2** Apply First Peoples perspectives and knowledge, other ways of knowing, and local knowledge as sources of information
 | *Students are expected to know the following:** quantum mechanical model and **electron configuration**
* valence electrons and Lewis structures
* **chemical bonding** based on electronegativity
* **bonds/forces**
* **organic compounds**
* **applications of organic chemistry**
* the mole
* **dimensional analysis**
* **reactions**
* **stoichiometric calculations** using significant figures
* local and other **chemical processes**
* **green chemistry**
* **solubility** of molecular and ionic compounds
* **stoichiometric calculations in aqueous solutions**
* **analysis techniques**
 |

**Area of Learning: SCIENCE — Chemistry Grade 11**

**Learning Standards (continued)**

|  |  |
| --- | --- |
| **Curricular Competencies** | **Content** |
| * **PDCH5** Seek and analyze patterns, trends, and connections in data, including describing relationships between variables, performing calculations, and identifying inconsistencies
* **PDCH3** Construct, analyze, and interpret graphs, models, and/or diagrams
* **PDCH6** Use knowledge of scientific concepts to draw conclusions that are consistent with evidence
* **PDCH1** Analyze cause-and-effect relationships

Evaluating* **EVCH9** Evaluate their methods and experimental conditions, including identifying sources of error or uncertainty, confounding variables, and possible alternative explanations and conclusions
* **EVCH7** Describe specific ways to improve their investigation methods and the quality of their data
* **EVCH8** Evaluate the validity and limitations of a model or analogy in relation to the phenomenon modelled
* **EVCH6** Demonstrate an awareness of assumptions, question information given, and identify bias in their own work and in primary and secondary sources
* **EVCH4** Consider the changes in knowledge over time as tools and technologies have developed
* **EVCH2** Connect scientific explorations to careers in science
* **EVCH10** Exercise a healthy, informed skepticism and use scientific knowledge and findings to form their own investigations to evaluate claimsin primary and secondary sources
* **EVCH3** Consider social, ethical, and environmental implications of the findings from their own and others’ investigations
* **EVCH5** Critically analyze the validity of information in primary and secondary sources and evaluate the approaches used to solve problems
* **EVCH1** Assess risks in the context of personal safety and social responsibility
 |  |

**Area of Learning: SCIENCE — Chemistry Grade 11**

**Learning Standards (continued)**

|  |  |
| --- | --- |
| **Curricular Competencies** | **Content** |
| Applying and innovating* **AICH2** Contribute to care for self, others, community, and world through individual or collaborative approaches
* **AICH4** Cooperatively design projects with local and/or global connections and applications
* **AICH3** Contribute to finding solutions to problems at a local and/or global level through inquiry
* **AICH5** Implement multiple strategies to solve problems inreal-life, applied, and conceptual situations
* **AICH1** Consider the role of scientists in innovation

Communicating* **COCH3** Formulate physical or mental theoretical models to describe a phenomenon
* **COCH1** 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
* **COCH2** Express and reflect on a variety of experiences, perspectives, and worldviews through **place**
 |  |